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Karuna Patil, Lauren Habenicht, Adam Murphy, Kristin Weisbrod, Giuseppe Del’Anna

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SALT LAKE CITY, UTAH

SALT LAKE CITY, UTAH

EXPICING PROGRAM PLANNED FOR ATTENDEES!

On behalf of the National Meeting Program Committee (NMPC), it is my absolute pleasure to welcome you to the 74th AALAS National Meeting in beautiful Salt Lake City, Utah! The program committee has put together an exciting and informative lineup of educational talks covering a broad array of cutting-edge and important topics that will interest all members of the lab animal science community.

I’d like to take this opportunity to thank the amazing NMPC members who have helped plan the agenda for another exciting National Meeting. Their efforts to review abstracts and put forward content for this annual event is quite the undertaking, and the educational success of the National Meeting rests heavily on their shoulders. I’d also like to thank the Local Arrangements Committee (led this year by Penny Noel) and the AALAS staff for their hard work and dedication to making this meeting fun and successful. Thank you again to those who have given their time and talent to help us deliver an exciting and educational meeting!

And, of course, I’d like to also thank all of those who have submitted abstracts and topics for this year’s meeting. While the committee has the challenging job of selecting the perfect content, we wouldn’t have so much to choose from without all the wonderful submissions from our members!

While you are at the National Meeting, be sure to enjoy some personal time and take in the wonderful sights and attractions that Salt Lake City has to offer. While the AALAS National Meeting is a great educational experience, it also provides time to explore, recharge, and reconnect with dear friends and colleagues. I’m looking forward to seeing old friends and making new ones as the week progresses, and I hope to see you there!

Jenny Wood, VMD, DACLAM
Program Committee Chair

SEE YOU IN SALT LAKE CITY!

It’s that time of year once again - AALAS National Meeting!

I welcome you to join me in the mountains of Salt Lake City, Utah, for the 74th annual AALAS National Meeting. Thank you for joining the National AALAS Program Committee led by Jenny Wood has completed the education program, and it’s packed with all of the expansive training, education, and information sharing that has made the AALAS National Meeting the preeminent event for our profession for the last 74 years.

To kick off this special meeting at our Opening General Session, we have a keynote speaker, Greg Fine, who will be talking about volunteering, leadership and contributing to society. I have heard Greg speak before, and I can assure you, you don’t want to miss his keynote address! Following the Opening General Session, Penny Noel and the Local Arrangements Committee are proud to host you at the Welcome Reception to enjoy spirits and networking.

In addition to the Opening Session and educational aspect of the National Meeting, attendees will also have the opportunity to see firsthand some of the latest products from our vendors. This year we have also added a new program called Exhibitor Teach & Chat (ETC) where vendors will host 20-minute sessions about their products and services. The response from exhibiting companies has been overwhelming, and we hope you find time to take part in the sessions during your time in Salt Lake City!

Since AALAS has hosted a National Meeting in Salt Lake City before, we know that there is plenty around the city to do in your free time. From Temple Square to the amazing scenery at Big Cottonwood Canyon, we’re certain you’ll enjoy your time in the city.

We look forward to seeing you in Salt Lake City for the 74th AALAS National Meeting. You don’t want to miss this historic event and party!

Pamela Straeter, CMAR, RLATG
2023 AALAS President
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SATURDAY
OCTOBER 21

Exhibit Hall Exhibitor Set-Up
2:00 PM–6:00 PM, CC, Exhibit Hall BC

First Aid
7:30 AM–6:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Mothers Room
2:00 PM–6:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Registration
2:00 PM–6:00 PM, CC, East Registration

COMMITTEE MEETINGS

2023 AALAS Board of Trustees Annual Business Meeting
12:00 PM–3:00 PM, Hyatt, Regency D

AALAS Executive Committee Meeting
9:00 AM–11:30 AM, Hyatt, Deer Valley

AALAS Foundation Board of Directors
3:00 PM–6:00 PM, Hyatt, Brighton

AFFILIATE EVENTS

Allied Trade Association (ATA) Board Meeting
3:00 PM–5:00 PM, CC, 251A

Allied Trade Association (ATA) New Product Showcase set-up
2:00 PM–6:00 PM, CC, Outside Exhibit Hall Entrance

ICLAS General Assembly
9:00 AM–12:00 PM, Hyatt, Park City

ICLAS Governing Board
1:30 PM–2:30 PM, Hyatt, Woodward

SUNDAY
OCTOBER 22

AALAS Foundation Silent Auction & “Boot Up for Research” Contest
9:00 AM–5:00 PM, CC, North Foyer

Career Center
2–4 pm Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)
8:00 AM–5:00 PM, CC, 254B

Technical Trade Presentations – Management Innovation in Facilities and Animal Care Track II
1:00 PM–4:00 PM, CC, 1510G

Tecniplast Welcome Breakfast
8:00 AM–2:00 PM, CC, Ballroom J

Vivarium Operational Excellence Network
8:00 AM–3:00 PM, Hyatt, Powder Mountain

COMMITTEE MEETINGS

Educational Resources Committee
9:00 AM–11:00 AM, CC, 251B

Nominations Committee
10:00 AM–1:30 PM, CC, 251A

Online Learning Committee
12:30 PM–2:30 PM, CC, 251B

Program Committee Walk Thru
4:00 PM–5:00 PM, CC, meet at Registration

Scientific Advisory Committee
3:00 PM–5:00 PM, CC, 251B

AFFILIATE EVENTS

ACLAM Board of Directors
7:30 AM–4:00 PM, Hyatt, Woodward

ACLAM Exam Question Writing Committee
1:00 PM–5:00 PM, Hyatt, Alta

ACLAM GRAC
2:00 PM–5:00 PM, Hyatt, Snowbird

ACLAM Publications Committee
9:00 AM–12:00 PM, Hyatt, Snowbird

Allied Trade Association (ATA) Membership Meeting/Breakfast (Invitation only; RSVP required)
8:30 AM–10:30 AM, CC, Ballroom I

Allied Trade Association (ATA) New Product Showcase
7:30 AM–7:00 PM, CC, Outside Exhibit Hall Entrance

ASLAP Board of Directors Meeting
11:30 AM–3:30 PM, Hyatt, Brighton

ICLAS Award Winner Lectures
See Mobile App for presenters and talk titles
3:00 PM–5:00 PM, CC, 250A

LAMA Board Meeting
11:00 AM–5:00 PM, Hyatt, Solitude
MONDAY
OCTOBER 23

Career Center
9–11am & 2–4pm Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)
8:00 AM–5:00 PM, CC, 254B

Exhibit Hall
8:30 AM–5:00 PM, CC, Exhibit Hall BC

Exhibit Hall (opening ceremony w/ ribbon cutting 8:30 a.m.)
8:30 AM–5:00 PM, CC, Exhibit Hall C Entrance

First Aid
7:30 AM–6:15 PM, CC, Exhibit Hall Level between Escalators and Room 150

Mothers Room
7:30 AM–5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Poster Sessions
8:30 AM–5:00 PM, CC, Inside Exhibit Hall

Poster Sessions set-up by presenting author
7:50 AM–8:30 AM, CC, Inside Exhibit Hall

Registration
7:30 AM–5:00 PM, CC, East Registration

Speaker Ready Room
7:30 AM–4:00 PM, CC, 252A

MEETINGS & EVENTS

AALAS Ask Me Anything (AALAS Learning Library, ACE Membership Community, CMAR, ILAM, Educational Products, Registry, Publications)
7:30 AM–5:00 PM, CC, Exhibit Hall BC

AALAS Foundation Silent Auction & “Boot Up for Research” Contest
8:00 AM–5:00 PM, CC, North Foyer

District 1 Membership Meeting
5:15 PM–6:15 PM, CC, 250C

District 2 Membership Meeting
5:15 PM–6:15 PM, CC, 250B

District 3 Membership Meeting
5:15 PM–6:15 PM, CC, 250A

District 4 Membership Meeting
5:15 PM–6:15 PM, CC, 250D

District 5 Membership Meeting
5:15 PM–6:15 PM, CC, 250E

District 6 Membership Meeting
5:15 PM–6:15 PM, CC, 250F

District 7 Membership Meeting
5:15 PM–6:15 PM, CC, 150G

District 8 Membership Meeting
5:15 PM–6:15 PM, CC, 150G

Technician Fun Fair
8:30 AM–5:00 PM, CC, North Foyer

Technician Lunch & Learn Sponsored in part by PMI Lab Diet
12:30 PM–2:00 PM, CC, Ballroom I

Technician Town Hall
2:00 PM–2:50 PM, CC, Ballroom I

Veterinary Tech Student Program
10:30 AM–11:30 AM, CC, 250F

Veterinary Tech Student Program
3:30 PM–4:30 PM, CC, 250F

COMMITTEE MEETINGS

Certification & Registry Board
2:00 PM–4:00 PM, CC, 251B

Editorial Staff Meeting
3:00 PM–5:00 PM, CC, 251A

AFFILATE EVENTS

AAALAC International Emeritus/Council Networking Reception
(Invitation only; RSVP required)
6:00 PM–8:00 PM, Hyatt, Park City

ACLAM Forum Program Committee
10:00 AM–12:00 PM, Hyatt, Brighton

ACLAM Outreach Committee
3:00 PM–5:00 PM, Hyatt, Woodward

Allied Trade Association (ATA) New Product Showcase
8:30 AM–5:00 PM, CC, Outside Exhibit Hall Entrance

ASLAP CE Seminar Committee
11:00 AM–12:00 PM, CC, 251A

ASLAP LARC Meeting
5:00 PM–6:00 PM, Hyatt, Solitude

ASLAP Networking
12:00 PM–2:00 PM, CC, Ballroom J

Camp ACLAM Committee
3:00 PM–5:00 PM, Hyatt, Brighton

ICLAS ARC Open Meeting
1:00 PM–2:00 PM, CC, 257B

LAWTE General Membership Meeting
3:00 PM–5:00 PM, CC, 251E

TUESDAY
OCTOBER 24

AALAS Ask Me Anything (AALAS Learning Library, ACE Membership Community, CMAR, ILAM, Educational Products, Registry, Publications)
7:30 AM–5:00 PM, CC, Exhibit Hall BC

AALAS Foundation Silent Auction & “Boot Up for Research” Contest
8:00 AM–5:00 PM, CC, North Foyer

Career Center
9–11am & 2–4pm Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)
8:00 AM–5:00 PM, CC, 254B

Exhibit Hall
9:00 AM–5:00 PM, CC, Exhibit Hall BC

First Aid
7:30 AM–5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Mothers Room
7:30 AM–5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Poster Sessions
9:00 AM–5:00 PM, CC, Inside Exhibit Hall

Poster Sessions Reception w/ poster award winners announced at 4:45pm
4:00 PM–5:00 PM, CC, Inside Exhibit Hall

Registration
7:30 AM–5:00 PM, CC, East Registration
COMMITTEES & EVENTS

MEETINGS & EVENTS

AALAS/FELASA Executive Group Meeting
9:00 AM-10:00 AM, CC, 251A
Area Teachers Program Invitation only; RSVP required
9:30 AM-1:30 PM, CC, Ballroom I
Branch Leadership Meeting
4:30 PM-5:30 PM, CC, 250C
IIAM 30th Anniversary Reception
5:30 PM-6:30 PM, CC, Ballroom J
Lab Animal Breeders Meeting
7:30 AM-9:00 AM, Hyatt, Woodward
Past President’s Luncheon
12:00 PM-2:00 PM, Hyatt, Blue Spruce
VAMO & VMU Supervisor’s Business Meeting/Luncheon
12:00 PM-2:00 PM, Hyatt, Aspen

COMMITTEE MEETINGS

Abstract Review Subcommittee (Poster Awards)
12:00 PM-1:30 PM, CC, 251A
CMAR Committee
9:00 AM-11:00 AM, CC, 251B
Editorial Review Board Meeting
7:30 AM-8:30 AM, CC, 251A
Government Relations Committee
10:00 AM-11:00 AM, CC, 251D
IIAM Committee
2:00 PM-5:00 PM, CC, 251B
LAS Pro Editorial Advisory Board
2:00 PM-4:00 PM, CC, 251A

AFFILIATE EVENTS

AAALAC Consultant/Specialist Orientation
7:00 AM-10:30 AM, Hyatt, Salt Lake A
ACLAM Awards Committee
7:30 AM-9:30 AM, Hyatt, Deer Valley
ACLAM General Business Meeting
5:00 PM-7:00 PM, Hyatt, Salt Lake A
ACLAM New Diplomate Orientation
9:00 AM-11:00 AM, Hyatt, Powder Mountain
Allied Trade Association (ATA) New Product Showcase
9:00 AM-5:00 PM, CC, Outside Exhibit Hall Entrance

WEDNESDAY
OCTOBER 25

AALAS Ask Me Anything (AALAS Learning Library, ACE Membership Community, CMAR, IIAM, Educational Products, Registry, Publications)
7:30 AM-1:00 PM, CC, Exhibit Hall BC
Career Center
9-11am & 2-4pm Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)
8:00 AM-5:00 PM, CC, 254B
Exhibit Hall
9:00 AM-1:00 PM, CC, Exhibit Hall BC
Exhibit Hall Exhibitor Dismantle
1:00 PM-10:00 PM, CC, Exhibit Hall BC
First Aid
7:30 AM-11:00 AM, CC, Exhibit Hall Level between Escalators and Room 150
Mothers Room
7:30 AM-5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150
Poster Sessions
9:00 AM-1:00 PM, CC, Inside Exhibit Hall
Poster Sessions – dismantle
1:00 PM-3:00 PM, CC, Inside Exhibit Hall
Registration
7:30 AM-5:00 PM, CC, East Registration
Speaker Ready Room
7:30 AM-4:00 PM, CC, 252A
Technician Fun Fair – Winner Announced
2:00 PM, CC, North Foyer

MEETINGS & EVENTS

AALAS Affiliates Roundtable Conference/Breakfast (Invitation only; RSVP required)
7:30 AM-9:30 AM, Hyatt, Aspen
AALAS Foundation & Boot Up for Research
8:00 AM-11:00 AM, CC, North Foyer
AALAS Foundation Live Auction & Appreciation Reception
6:30 PM-8:30 PM, Hyatt, Salt Lake C
AALAS Foundation Silent Auction (Auction ends at 1pm)
5:00 PM-6:30 PM, Hyatt, Salt Lake B
RBL/NBL Animal Care Meeting
4:00 PM-6:00 PM, Hyatt, Snowbird

COMMITTEE MEETINGS

CTAD Committee
5:00 PM-6:00 PM, CC, 251B
Exhibitor Advisory Council
5:30 PM-5:00 PM, CC, 251B

AFFILIATE EVENTS

AAALAC/AAALAS/ICLAS International Luncheon (Invitation only; RSVP required)
12:00 PM-2:00 PM, Hyatt, Salt Lake A
ACLAM TBD
1:50 PM-4:00 PM, Hyatt, Alta
ACLAM/ASLAP Program Committee
8:00 AM-12:00 PM, Hyatt, Alta
Allied Trade Association (ATA) New Product Showcase
9:00 AM-1:00 PM, CC, Outside Exhibit Hall Entrance
Allied Trade Association (ATA) New Product Showcase take down
1:00 PM-5:00 PM, CC, Outside Exhibit Hall Entrance
THURSDAY
OCTOBER 26

Career Center
9–11am Veterinarian Job Fair
sponsored by ACLAM, APV
and ASLAP (see mobile app for
companies participating)
8:00 AM–2:00 PM, CC, 254B

First Aid
7:30 AM–5:00 PM, CC, Exhibit Hall Level
between Escalators and Room 150

Mothers Room
7:30 AM–2:00 PM, CC, Exhibit Hall Level
between Escalators and Room 150

Registration
7:30 AM–12:00 PM, CC, East Registration

Speaker Ready Room
7:30 AM–1:00 PM, CC, 252A

2023/2024 AALAS Program
Committee
2:15 PM–5:00 PM, Hyatt, Powder Mountain

AALAS Executive Committee
Meeting
9:00 AM–11:00 AM, Hyatt, Deer Valley

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SUNDAY
OCTOBER 22
Afternoon
Track I
- Modernizing In Vivo Study Management with Benchling
  Andrew Ian Smith
  1:00 PM - 1:20 PM (TTP)
- Dosing by Infusion: Best Practices for Using Implantable Pumps
  Samantha Bazzell
  1:20 PM - 1:40PM (TTP)
- Low Stress, Spot On, Introducing Fluospotter: A Wearable Blood Collection Device for Large Animals
  Shelly Carballo
  1:40 PM - 2:00 PM (TTP)
- Maximizing Catheter Patency in Research Studies
  Steven C Denault
  2:00 PM - 2:20 PM (TTP)
- Use of a QR Code Mini Tag for Identification of Mice in an Automated Colony Management System
  Austin Lanham
  2:20 PM - 2:40 PM (TTP)
- Best Practices and Technology for Improving Animal Study Reproducibility
  Jens Ibsen
  3:00 PM - 3:20 PM (TTP)
- Digital Lab Assistants & the Vivarium of the Future
  Steve Sansing
  3:20 PM - 3:40 PM (TTP)
- One Size Fits All, But Not When It Comes to Managing a Vivarium
  Mathew D Sanderson
  3:40 PM - 4:00 PM (TTP)
- How Can Your Animal Facility Benefit from More Precise Humidification Control?
  Patrick Johnson
  2:00 PM - 2:20 PM (TTP)
- Doubling Scientifically Useful Animals With Limited Cage Space
  Jessica Janeczek
  2:20 PM - 2:40 PM (TTP)
- Video Automation to Improve Daily Cage Inspections
  Zachary Wright
  2:40 PM - 3:00 PM (TTP)
- Reimagining Decontamination: Unique Approaches to IVC Decontamination with Hybrid Hydrogen Peroxide Technology
  Elizabeth McGauley
  3:00 PM - 3:20 PM (TTP)
- Pathogenic Biofilm and Research Facilities
  Stephanie Cormier
  3:20 PM - 3:40 PM (TTP)
- Room Air vs. 100% O2: Considerations for Anesthetic Delivery
  Kathy Garner
  3:40 PM - 4:00 PM (TTP)
- TPTV Presents “Cage Hunters”
  Morgan Holmes
  4:00 PM - 4:20 PM (TTP)

MONDAY
OCTOBER 23
Morning
- W-01 Animal Facility Design, Processes, Decisions and Technology
  Mark A Corey
  8:00 AM - 12:00 PM (W)
- W-02A Microsurgery Skills Training Using Surgical Loupes
  Robert F Hoyt
  8:00 AM - 12:00 PM (W)
- W-03 Practical Guide and Implementation Strategies to Building Resiliency and Compassion Satisfaction in the Vivarium
  Rachel A Beall
  8:00 AM - 12:00 PM (W)
- W-04 Update on Anesthesia and Analgesia - Rodents
  Cholawat Pacharinrak
  8:00 AM - 12:00 PM (W)
- W-05 Beginning Training Methods and Techniques for NHP’s
  Andrea N Franklin
  1:00 PM - 5:00 PM (W)
TUESDAY
OCTOBER 24
Morning

- W-05 cont Beginning Training Methods and Techniques for NHP's Andrea N Franklin
  8:00 AM – 12:00 PM (W)
- W-08 Designing and Participating in a Discussion-Based Disaster Preparedness Exercise Evan T Shukan
  8:00 AM – 11:00 AM (W)
- W-09 Would You Like to Improve Your Suturing and Rodent Surgery Aseptic Technique? Marcel I Perret-Gentil
  8:00 AM – 12:00 PM (W)
- Advances in Zebrafish Husbandry Joshua R Barber
  8:00 AM - 10:00 AM (S)
- Get the Dirt: Practical Approaches and Experiences Using Sentinel-Free Environmental Health Monitoring for Rodents
  Robert Livingston
  8:00 AM – 10:15 AM (S)
- International Perspectives and Considerations for Housing of Non-Human Primates Geraldine Fleurie
  8:00 AM – 10:00 AM (S)
- Optimizing Chronic Infusion and Sampling Studies: From Surgery to Study Design Paige Ebert
  8:00 AM – 10:15 AM (S)
- Exhibitor Teach & Chat: Rockstep Solutions 10:00 AM – 10:30 AM
- Exhibitor Teach & Chat: VRL Laboratories - USA 10:35 AM – 11:00 AM (STL)
- Use, Abuse, and Presentation of ANOVA (Analysis of Variance) Data George J DeMarco
  11:00 AM – 12:00 PM (STL)
- Charles River Ethics and Animal Welfare Lecture: How Can We Optimize Fish Welfare Using Behavioral Strategies?
  Lynne U Sneddon
  11:00 AM – 12:00 PM (STL)
- Optimizing Animal Welfare in the Vivarium: Event Recognition, Reporting and Welfare Assessment
  Patricia V Turner
  3:00 PM – 5:15 PM (S)
- Research Use, Care, and Considerations for Immunodeficient Mice and the Emerging Infectious Threats
  Kenneth S Henderson
  3:00 PM – 5:00 PM (S)
- Swine Cancer Models: Ready for Prime Time in the Fight to Cure Cancer
  Raimon Duran-Struuck
  3:00 PM – 5:00 PM (S)

TUESDAY
Afternoon

- As a Veterinary Technician, One Background and Many Paths, How a Veterinary Specialist Can Thrive in Laboratory Animal Medicine
  Summer Boyd
  12:30 PM – 2:00 PM (P)
- Culture of Care: A Comprehensive Approach to Supporting People and Animals Cindy A Buckmaster
  12:30 PM – 2:00 PM (P)
- Danio Zoom Live! Christine Archer
  12:30 PM – 2:00 PM (P)
- Impacts on the Workplace: The Pandemic, Tight Labor Market, and Employee Engagement Stacy L Pritt
  12:30 PM – 2:00 PM (P)
- W-10 Crisis Communication & Media Training for Animal Research Institutions Kirk Leech
  1:00 PM – 5:00 PM (W)
- W-11 Don't Pet, Palpate! Improve Your Physical Exam Skills and Discuss Treatment Plans for Rodent Cases
  Katherine E Brannick
  1:00 PM – 5:00 PM (W)
- W-12 How to Proactively Prepare for Anti-Research Campaigns to Help Ensure Continued Operations and Minimize Reputational Damage
  Paula A Clifford
  1:00 PM – 5:00 PM (W)
- Exhibitor Teach & Chat: Taconic 2:10 PM – 2:30 PM
- Exhibitor Teach & Chat: Genotyping Center of America 2:35 PM – 2:55 PM
- Exhibitor Teach & Chat: Don't Pet, Palpate! Improve Your Physical Exam Skills and Discuss Treatment Plans for Rodent Cases
  Katherine E Brannick
  3:00 PM – 5:00 PM (S)
- Management of Animal Facilities in a Post-Pandemic Era
  Laura A Conour
  3:00 PM – 5:00 PM (S)
- Zebrafish Health: Understanding Common Zebrafish Diseases, Their Impact on Research, and Disease Prevention, Monitoring, and Management
  Christine Lineberger
  3:00 PM – 5:00 PM (S)

WEDNESDAY
OCTOBER 25
Morning

  Lesley A Colby
  8:00 AM – 12:00 PM (W)
- W-14 The Joy of Training with Dr. WOW: A Cost Efficient and Effective Means to Apply the 3Rs to Hands-On Training of Research Personnel
  Wendy O Williams
  8:00 AM – 12:00 PM (W)
- W-15 Tools to Achieve Sustainable Diversity, Equity, Inclusion and Belonging in the Workplace: A Multiorganization Collaboration
  Crystal H Johnson
  8:00 AM – 12:00 PM (W)
**PROGRAM OVERVIEW**

**THURSDAY Afternoon**
- **Conversations on How to Create an Inclusive Environment for Animal Caregivers in Lab Animal Science**
  - J Preston Van Houser
  - 12:30 PM - 2:00 PM (P)
- **Designing the Future Vivarium**
  - Dana M LeMoine
  - 12:30 PM - 2:00 PM (P)
- **Emerging Animal Rights Trends Across the US and UK: Understanding the Situation and Combatting the Misinformation**
  - Shelby Carbello
  - 12:30 PM - 2:00 PM (P)
- **How Home Cage Monitoring is Transforming Drug Development by Addressing Translational Gap**
  - Szczepan W Baran
  - 12:30 PM - 2:00 PM (P)

**WEDNESDAY Afternoon**
- **Discussion on the 2023 Report of the National Academies Committee on Nonhuman Primate Model Systems**
  - Kelly Metcalf Pate
  - 12:30 PM - 2:00 PM (P)
- **Environmental Health Monitoring: A Holistic Approach for All Housing Types**
  - Megan R Lafollette
  - 12:30 PM - 2:00 PM (P)
- **Evolution of Behavior Management**
  - Kristina Alicia Bartley
  - 12:30 PM - 2:00 PM (P)
- **The Anesthesia/Analgesia Puzzle: Putting All the Pieces Together by Answering YOUR Questions!**
  - Rebecca A Johnson
  - 12:30 PM - 2:00 PM (P)
Where Convenience Meets Compliance

EZ-DOCK SMARTBOX® Euthanasia Station

The EZDock combines the best features of all our systems. A built-in flow circuit and times are already preset for the specific cage type to ensure AVMA compliance. Plug in, connect the provided gas line and the system is ready for use! Once the cage is placed in dock properly, the cycles begin and shuts off when time has elapsed. The unit is designed to be as simple to use as possible.

Designed for specific cage types. More manufacturer's models coming soon.

Features:
- Compliant with AVMA Guidelines
- Cycle starts automatically when cage is docked
- Choose between adult and neonates
- LED indicator lights show when cycle is running and when complete
- Automatically shuts off if cage is removed for safety
- Uses house or bottled CO₂ supply at 15-100 psi
- Super E-Z

Scan to watch video

Shown with Tecniplast GM500 Cage. Other Cage Types Available.
OPENING GENERAL SESSION/GENERAL MEMBERSHIP MEETING

Salt Palace Convention Center | Sunday, October 22, 2023
5:00–6:30 PM | Salt Palace Convention Center, Ballroom G

- Welcome from AALAS President, Pamela Straeter
- AALAS Awards presentations
- Recognition of guests and Board of Trustees members
- Gavel ceremony introducing the new president
- Introduction of new trustees
- Incoming president, Bob Quinn’s address
- Keynote Speaker Greg Fine, FASAE, CAE
- Welcome Reception from 6:30–8:00 PM, Salt Palace CC, Ballroom A

Welcome Reception, Ballroom A, Sunday, October 22, 2023

District membership meetings will be held on Monday, October 23 at 5:15 PM. See the mobile app for room numbers.
Meet Gregory Fine, FASAE, CAE, Our National Meeting Keynote Speaker!

With 30+ years of successfully helping organizations grow and prosper; combined with boundless energy, passion and enthusiasm, Greg’s collaborative approach delivers the insight, strategies, and resources necessary to turn intent into action. With a reputation for organizational change and innovation, his diverse and successful career has provided a deep and comprehensive expertise that informs all of his work.

His practice areas include: strategic planning, volunteer leadership training, governance, and executive capacity building. His service as faculty for the ASAE CEO Symposium and U.S. Chamber’s Institute for Organizational Management feeds a deep passion for helping others succeed, teaching, and mentoring.

Prior to joining Tecker, he served as the CEO of CCIM Institute, a 13,000–member international professional association and before that, he was global CEO of the Turnaround Management Association.

A respected and engaged volunteer leader, he was a member of the ASAE and ASAE Foundation Boards, Association Media & Publishing Board - including tenure as president, the DigitalNow Advisory Group, and the Chamber’s Association Committee of 100. He is a prolific writer and speaker, most recently co-authoring a chapter in Professional Practices in Association Management (4th edition 2021).

Among many awards, Greg received the 2017 Association Forum “Inspiring Leader” award; the 2009 “Young and Aspiring Association Professional” by Association TRENDS; and the Angerosa Research Foundation’s inaugural “Publishing Trendsetter,” an award recognizing innovation that advances association publishing. CCIM was the inaugural recipient of the Association Forum Welcoming Environment Award® in 2018 and he was recognized as one of Crain’s Chicago 2020 Notable LGBTQ Executives.

Growing up in Missoula, Montana, Greg was a leader from his earliest years. This included becoming one of the state’s youngest elected officials in history when, at age 18, he was elected to the Missoula County High School’s Board of Trustees. He was re-elected twice and served as Board Chair. He is a graduate of The University of Montana with a BA in PSc and History Minor, is an avid world traveler, and an award-winning amateur poet. A “Digital Nomad” his current basecamp is in Scottsdale, AZ.
Level 1

Access to all exhibit halls, the grand ballroom and various meeting rooms. North and south ballroom foyers provide elegant reception and registration space.

The south plaza is an outdoor area perfect for receptions and parties!

Click on any room or hall to view its information. Drag your cursor across the map to see highlighted reception areas.
Level 2

Level 2 features a large, sunlit lobby that leads to the Business Center, Visit Salt Lake Visitors’ Center, gift shop and meeting rooms. There are several areas on this level designed for receptions and registration. Click on any meeting room to view its information. Drag your cursor across the map to see highlighted reception areas.
WELCOME TO SALT LAKE CITY AND THE 74TH AALAS NATIONAL MEETING!

Here we are for the AALAS National Meeting, and we’re glad you’re here in Salt Lake City for our 74th annual event!

The Program Committee has created an exciting and action-packed schedule. As in years past, we will have everything from educational presentations to the latest products from our vendors on display during our annual meeting. Be sure to check out the new and exciting additions, such as our Exhibitor Teach & Chat (ETC) program. There are 10 spots filled with different vendors that will take the opportunity to host 20-minute sessions on a variety of topics. You’ll find a list of the vendors and their presentations titles on page 127 in this program.

In addition to visiting with our exhibiting companies, you’ll certainly want to take part in the educational sessions offered throughout the week. Our National Meeting is filled with great presentations and educational opportunities for all attending.

And if you have any free time, you’ll want to check out some of the excursions in and around Salt Lake City. You can spend some quality time enjoying the fresh air in the mountains or plan a tour of downtown to view the beautiful architecture, but you certainly will want to take advantage of everything the city has to offer.

Whether you’re a vendor or an attendee, make certain to embrace everything our National Meeting has to offer.

Stop by and say Hi,

Perry Spires
Chair, Exhibitor Advisory Council

DON’T MISS THE AALAS NATIONAL MEETING EXHIBIT HALL!

Approximately 200 companies (almost 400 booths) exhibiting at the AALAS National Meeting. Exhibitors interact with people from the academic community, research institutions, government organizations, and commercial companies. Visit the Exhibitors section of nationalmeeting.aalas.org for a prospectus, a list of previous exhibitors, sponsorship opportunities, and other information.

RIBBON CUTTING CEREMONY  Monday, October 23, 8:30 a.m.
COMMERCIAL COMPANY BOOTHS  Monday: 8:30 a.m. - 10:30 a.m. (sponsored by Cayuse)
AFFILIATE BOOTHS  Learn about the latest products and services offered by vendors in the field.
REFRESHMENT BREAKS  Visit with our affiliate members and check out their public outreach and educational materials.
(Located in the Exhibit Hall Lounge)
POSTER SESSIONS  Monday: 9:00 a.m. - 11:00 a.m. (sponsored by NEPCO)
AFFILIATE BOOTHS  Tuesday: 9:00 a.m. - 11:00 a.m. (sponsored by The Jackson Laboratory)
EXPEDITED BOOTHS  Wednesday: 9:00 a.m. - 11:00 a.m. (sponsored by TBD)
POSTER SESSIONS  Come view this year’s poster sessions, and don’t miss the Poster Reception on Tuesday from 4:00 p.m. - 5:00 p.m. Meet the authors, enjoy some refreshments, and see who won this year’s Poster Awards.

EXHIBIT HALL HOURS
Monday, October 23: 8:30 a.m. - 5:00 p.m.
Tuesday, October 24: 9:00 a.m. - 5:00 p.m.
Wednesday, October 25: 9:00 a.m. - 1:00 p.m.
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Laboratory Animal Management Association
Laboratory Animal Welfare Training Exchange (LAWTE)
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Scientists Center for Animal Welfare (SCAW)
Thai Association for Laboratory Animal Science (TALAS)
The 3Rs Collaborative (3RsC)
The Academy of Laboratory Animal Veterinary Technicians and Nurses
Vivarium Operational Excellence / OpExAHC
Zebrafish Husbandry Association

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Foundation for Biomedical Research
Institute for Laboratory Animal Research
International Council for Laboratory Animal Science
International Society for Transgenic Technologies
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Laboratory Animal Management Association
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The 3Rs Collaborative (3RsC)
The Academy of Laboratory Animal Veterinary Technicians and Nurses
Vivarium Operational Excellence / OpExAHC
Zebrafish Husbandry Association
limited resources develop into robust animal care and use programs. He serves as ad hoc Specialist for AAALAC International. His passion is in helping programs worldwide with limited resources develop into robust animal care and use programs.

494 special presentations. He has held 35 consulting positions including governmental, biotech company with global responsibility for all laboratory animal programs. He is currently a Professor of Veterinary Pathobiology and Co-Director of the Mutant Mouse Resource and Research Center. His research, which has resulted in approximately 140 manuscripts and 250 posters or seminar presentations, centers on refinement of rodent models for optimal reproducibility and translatability, most recently focusing on the role of complex microbiota in model phenotype modulation. As Director of the Comparative Medicine Program and Veterinary Research Scholars Program, he has advised over 90 post-DVM trainees and 700 veterinary students exploring and pursuing biomedical research careers.

Kiirsa Pokryfke, MS, CMAR
Managing Director of the Training Core and Technical Services
University of Michigan

George R. Collins Education and Training Award
Kiirsa Pokryfke is the Managing Director of the Unit for Laboratory Animal Medicine (ULAM) Training Core and Technical Services teams at the University of Michigan. In her 12+ years in this role, Kiirsa has developed and managed the training program that services approximately 3800 research and ULAM personnel. Previously, Kiirsa Pokryfke was employed at a contract research organization and developed their first training program. She earned her B.S. in Biology from Western Michigan University and completed a graduate degree in Strategy, Management and Leadership from Michigan State University.

Shandell Solbach, RLATG, CMAR, ILAM
Laboratory Animal Manager
Genetech

Joseph J. Garvey Management Award
Ms. Solbach received her degree in Wildlife, Fisheries & Conservation Biology from the University of California, Davis in 1996. She immediately entered the laboratory animal field and worked as an Animal Resources Supervisor at the University for 14 years. She joined Genentech in 2010, supporting the RED Animal Resources as a Laboratory Animal Manager in Animal Care. She enjoys serving on the Genentech IACUC and Community Emergency Response Team. She is a Sacramento Valley (SV-AALAS) branch member, serving 5 years in various board positions, and honored with the 2007 Technician of the Year award. A dedicated National AALAS member since 1999, proudly achieved RLATG (2004), CMAR (2014), and graduated ILAM (2017).

Jennifer Crosby, BS, RLAT
Breeding Colony Specialist
University of Michigan

Technician of the Year Award
Jennifer Crosby is a Breeding Colony Specialist at the University of Michigan ULAM. She earned her Bachelor of Science in Animal Science at Michigan State University. Jennifer manages several colonies of immunocompromised mice for investigators across campus and recently completed a platform project on how to improve weaning survival in immunocompromised mouse strains. Jennifer is passionate about improving animal welfare practices by attending workshops and webinars. She plans to continue to grow in her professional role as a technical leader and advocate for both animals and humans alike. Outside of work, Jennifer enjoys listening to music, gardening, cooking, and fishing.

2023 AALAS AWARD WINNERS
Small Animal Research Solutions for:

- Low-Flow Anesthesia
- Physiological Monitoring
- Noninvasive Blood Pressure
- Ventilators
- Animal Warming
- Surgical Platforms
Drug Abuse, Addiction, and Diversion of Opioids

Controlled Substance: Ethiqa XR contains buprenorphine, a mu opioid partial agonist and Schedule III controlled substance with an abuse potential similar to other Schedule II opioids. Ethiqa XR can be abused and is subject to misuse, abuse, and criminal diversion. Ethiqa XR is intended to be hand-held to minimize the risk of diversion. Access to the drug, use of accounting procedures, and proper disposal methods, as appropriate to the laboratory setting and as required by law.

Abuse of Ethiqa XR poses a hazard of overdose and death. This risk is increased with concurrent abuse of alcohol and other substances including other opioids and benzodiazepines. Buprenorphine has been diverted for non-medical use into illicit channels of distribution. All people handling opioids require careful monitoring for signs of abuse. Drug abuse is the intentional misuse or abuse of a prescription drug for a condition for which the drug is not intended. Abuse of this type of drug can occur in the absence of true addiction.

Storage and Disposal: Ethiqa XR is a Class III opioid. Store in a locked, substantially constructed cabinet according to DEA and local controlled substance guidelines. Discard breached vials after 90 days. Any unused or expired vials must be destroyed by a DEA registered reverse distributor; for further information, call 1-833-384-4729.

Precautions

Mice
The safety of Ethiqa XR has not been evaluated in pregnant, lactating, neonatal, or immune-compromised mice. As with other opioids, Ethiqa XR causes sedation, decreased blood pressure, decreased heart rate, decreased gastrointestinal motility, and respiratory depression. Use caution with concomitant administration of Ethiqa XR with drugs that cause respiratory depression. The use of paper or soft bedding for softness and increased risk of wood chip-type bedding after administration of Ethiqa XR Pica involving wood chip-type bedding can be lethal in rats.

Buprenorphine is excised in the feces (see Clinical Pharmacology section below). Coprophagy may lead to ingestion of buprenorphine or its metabolites by mice treated with Ethiqa XR and contaminated cage mats.

Rats
The safety of Ethiqa XR has not been evaluated in pregnant, lactating, neonatal, or immune-compromised rats. As with other opioids, Ethiqa XR causes sedation, decreased blood pressure, decreased heart rate, decreased gastrointestinal motility, and respiratory depression. Use caution with concomitant administration of Ethiqa XR with drugs that cause respiratory depression. Rats may ingest signs of nausea including pica 3 to 5 days post-treatment. Rats should be maintained on paper or soft bedding to avoid ingestion of wood chip-type bedding after administration of Ethiqa XR. Pica involving wood chip-type bedding can be lethal in rats.

Buprenorphine is excised in the feces (see Clinical Pharmacology section below). Coprophagy may lead to ingestion of buprenorphine or its metabolites by rats treated with Ethiqa XR and contaminated cage mats.

Adverse Reactions

Mice
No adverse reactions were observed in 30 to 25 gram young adult male and female mice after a single subcutaneous injection of Ethiqa XR 4.5 times the indicated dose. Laboratory parameters evaluated in the study included hematology and clinical chemistry, histopathology was performed. In a second study, adult male and female mice received Ethiqa XR subcutaneously at 5 times the indicated dose for three doses at four day intervals. A surgical procedure was performed on the mice prior to receiving each of the three doses of Ethiqa XR. Mortality was seen in 2 male mice after the third surgical procedure and dose of Ethiqa XR (total dose of 45 mg buprenorphine/ kg body weight).

Weight loss has been observed in mice treated post-procedurally with Ethiqa XR.

Rats
Adverse reactions were evaluated in 180 to 200 gram young adult male and female rats after a single injection of Ethiqa XR. A surgical procedure was performed on the rats prior to administration of a single dose at the indicated dose of 0.65 mg/kg or a single dose of 2, 0 or 5 fold excess dose. Adverse reactions also evaluated in male and female rats administered 2, 5 and 10 fold excess dose of the intended dose for three days did not result in a significant effect.

A surgical procedure was performed on the rats prior to administration of the first of three doses. Laboratory parameters evaluated in the study included hematology, clinical chemistry, urinalysis, histopathology, and bodyweight. Signs of nausea were observed at all dose levels within 24 hours of the dose. Signs including self-licking, self-grasping and efforts to eat wood-chip bedding.

Mortality was seen in 1 of 36 rats exposed to wood chip bedding. Necropsy revealed the stomach and esophagus were compacted with bedding, the bladder was abnormally distended and the urethra contained bedding. Mortality was seen in 3 of 222 rats treated with Ethiqa XR due to technical complications with serial bleeding of the jugular vein.

For technical assistance, or to report an adverse drug reaction, please call Fidélis Animal Health, Inc. at 1-833-384-4729.

For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or http://www.fda.gov/AnimalVeterinary/SafetyHealth.

Clinical Pharmacology

Buprenorphine can act as an agonist and antagonist at different classes of opioid receptors. Agonism at the mu opioid receptor and its activation of the kappa and delta opioid receptors are possible underlying mechanisms for the analgesic and bell-shaped dose-response curve of buprenorphine. Studies with knockout mice have shown that the antinociceptive effect of buprenorphine, which is mediated primarily by the mu opioid receptor, is attenuated by the ability of the drug to activate the delta opioid receptor (DOR) receptor. The drug can be described as a full and a partial agonist at the same receptor depending on the specific assay. There appears to be no ceiling effect for analgesia, but there is a ceiling effect for respiratory depression. Pharmacokinetic studies with buphos injections of buprenorphine in mice and rats provide similar models. After buphos intramuscular administration, plasma levels decline exponentially. The drug is degraded in the liver to the metabolite M3 (N-benzyl-3-nitro-buprenorphine), an active metabolite. Studies have shown that glucuronidation metabolites of buprenorphine and N3 are also metabolically active, and can accentuate or reverse the concentration of the parent drug. Sin-metabolite-excreted-in-the-urea and feces one week after injection was 19 and 22.4% of the dose, respectively, and 92% of the dose was accounted for in one week.

Pharmacokinetic parameters of Ethiqa XR were studied in 6-8 week old male and female Balb/c mice following a single subcutaneous injection of 3.25 mg/kg bodyweight. Clinical significant blood levels were observed up to 72 hours after subcutaneous injection.

Pharmacokinetic parameters of Ethiqa XR were studied in 8 week old male and female Fischer rats following a single subcutaneous injection of 0.65 mg/kg bodyweight. Clinical significant blood levels were observed up to 72 hours after subcutaneous injection.

How Supplied

Ethiqa XR is supplied in a 5 mL glass vial containing 3.0 mL of injectable suspension (NDC 86084-100-30). U.S. Patent Nos. 10,055,899, 11,008,629

Storage Information

Store between 15° and 25°C (59° and 77° F or 25° and 77° F) or refrigerated. DO NOT FREEZE. If stored refrigerated, bring to room temperature before use once processed. Once the vial is broached, the multi-dose vial should be discarded after 90 days.

Product contains the following excipients: benzoic acid, sodium metabsulphite, potassium metabsulphite, sorbic acid, and methylparaben.

References

Ethiqa XR® (buprenorphine extended-release injectable suspension) 1.3 mg/mL CIII is the only commercial pharmaceutical-grade extended-release buprenorphine FDA-indexed for the control of post-procedural pain in mice and rats up to 72 hours with just one injection.

Important Safety Information for Rats and Mice

For Rats and Mice: Only administer Ethiqa XR by subcutaneous injection. Ethiqa XR is not intended for intravenous, intra-arterial, intrathecal, intramuscular, or intra-peritoneal injection. Do not use on mice or rats with pre-existing respiratory deficiencies. Do not keep rats on wood chip-type bedding after administration of Ethiqa XR. Use caution with concomitant administration of Ethiqa XR with drugs that cause respiratory depression. For Humans: Ethiqa XR should only be administered by a veterinarian or laboratory staff trained in the handling of potent opioids. Protective clothing is recommended to avoid direct contact with human skin or mucus membranes which could result in absorption of buprenorphine and adverse reactions.

Not for use in humans.

For more information, consult the Prescribing Information including the boxed warning located on the next page.
**SUNDAY**

**OCTOBER 22**

AALAS Foundation Silent Auction & “Boot Up for Research” Contest
9:00 AM-5:00 PM, CC, North Foyer

Career Center
2-4pm Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)
8:00 AM-5:00 PM, CC, 254B

Exhibit Hall Exhibitor Set-Up
7:30 AM-7:00 PM, CC, Exhibit Hall BC

First Aid
7:30 AM-8:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Mothers Room
7:30 AM-7:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Poster Sessions set-up by presenting author
2:00 PM-5:00 PM, CC, Inside Exhibit Hall

Registration
7:30 AM-7:00 PM, CC, East Registration

Speaker Ready Room
12:00 PM-5:00 PM, CC, 252A

Technician Fun Fair
1:00 PM-5:00 PM, CC, North Foyer

**SPECIAL EVENTS**

Opening General Session / General Membership Meeting
5:00 PM-6:30 PM, CC, Ballroom G

Welcome Reception
6:30 PM-8:00 PM, CC, Ballroom A

**MEETINGS & EVENTS**

District 8 Council
2:00 PM-5:00 PM, CC, 251A

Emergent Leadership Forum Luncheon (Invitation only; RSVP required)
12:00 PM-1:00 PM, Hyatt, Park City

Emergent Leadership Forum (Invitation only; RSVP required)
7:30 AM-3:50 PM, Hyatt, Juniper

Facilitators Meeting
3:00 PM-3:30 PM, CC, 250C

**TECHNICAL TRADE PRESENTATIONS – ADVANCEMENTS IN DATA COLLECTION AND REPRODUCIBILITY**

**TRACK I**

* Modernizing In Vivo Study Management with Benchling
1:00 PM – 1:20 PM/Room: 151G
Speaker: Andrew l Smith
Moderator: Johnny Truong
One of the biggest challenges in preclinical research is the poor reproducibility of animal data, which is currently at 11%. Most facilities rely on spreadsheets and legacy software for study management. This software is hard to set up and navigate and siloes data – complicating information sharing between teams and exacerbating the reproducibility crisis. Benchling Studies is a cloud-based study management software developed by scientists as an efficient and user-friendly way to design, manage, and report on in vivo studies. The software solution helps scientists and technicians connect their in vivo data, instruments, and workflows to the rest of their upstream and downstream R&D teams. This reduces non-productive time and increases the amount of research to advance new drugs into the clinic.

This Technical Trade Presentation is sponsored in part by Benchling.

* Dosing by Infusion: Best Practices for Using Implantable Pumps
1:20 PM – 1:40 PM/Room: 151G
Speaker/Moderator: Samantha Bazzell
Are you still injecting? Consider dosing by infusion and avoid the animal stress response and plasma fluctuations associated with frequent injections and other common dosing methods. ALZET Osmotic Pumps are a proven tool in preclinical studies, providing continuous, controlled drug delivery over extended periods. This presentation will provide an overview of the benefits and applications of ALZET Osmotic Pumps and best practices for their effective use. Participants will learn key considerations for effective chronic dosing & tips for the successful use of implantable pumps.

This Technical Trade Presentation is sponsored in part by ALZET® Osmotic Pumps/DURECT Corporation.

* Low Stress, Spot On, Introducing Fluispotter: A Wearable Blood Collection Device for Large Animals
1:40 PM – 2:00 PM/Room: 151G
Speaker: Shelly Carballo
Moderator: Candace A Rohde-Johnson
Until now, serial blood collection – especially in large animals – required physical restraint or tethering. The Fluispotter is a new, wearable blood sampling device that is compatible with species such as rabbits, dogs, pigs, and primates. Implantation of the catheter is minimally invasive and can be done under light anesthesia. The Fluispotter weighs 70g and is light enough to be worn, therefore...
allowing animals to be unrestrained, untethered, unaware of sampling, and even socially housed. As with other methods of automated blood collection, the Fluispotter can improve translatable and reproducibility. This is achieved through sampling from animals with reduced stress, combining study protocols to incorporate both pharmacokinetics (PK) and pharmacodynamics (PD) in a single animal, and collecting samples from unrestrained animals at any time. The Fluispotter provides freedom from labor-intensive manual restraint and collection and improved ergonomics and safety associated with large animal blood collection. This presentation will review studies and publications by researchers who have refined their studies using the Fluispotter in large animal models and will outline the simple steps and materials needed to incorporate Fluispotter volumetric dried blood spot sampling into your study.

*This Technical Trade Presentation is sponsored in part by BASi Research Products.*

**Maximizing Catheter Patency in Research Studies**

2:00 PM – 2:20 PM/Room: 151G  
**Speaker:** Steven C Denault  
**Moderator:** Merryl Cramer  
Animal research frequently requires repeated access to the circulatory system for intravenous administration, blood sampling, continuous infusions, and more. To facilitate this access for both the animal and the researcher, many animals are implanted with indwelling catheters. These catheters require trained access and careful maintenance to maintain patency. When properly implanted, accessed, and maintained, a well-made catheter can be kept patented for months. Not only will this save time and money, but more importantly this can reduce animal use, generate more robust data, and allow cross-over studies. Attend SAI’s presentation to learn how to properly choose and maintain a vascular catheter for maximum patency in mice, rats, pigs, dogs, and primates.

*This Technical Trade Presentation is sponsored in part by BASi Infusion Technologies.*

**Digitalize Your Day: Modern Study Management for Collaborative Efficiency**

2:20 PM – 2:40 PM/Room: 151G  
**Speaker:** Austin A Lanham  
**Moderator:** Austin A Lanham  
In vivo, research is a process problem. According to an industry survey, one-third of research institutions still use some type of legacy data capture and management tools. Forward-thinking research organizations are taking advantage of the benefits of modern technology to streamline their research and improve efficiency by implementing cross-functional, collaborative digital solutions. Using case studies from customers who have successfully digitalized their studies with the Climb study management platform, this session will highlight the real-life results organizations are achieving in their research output and vivarium study operations.

*This Technical Trade Presentation is sponsored in part by RockStep Solutions.*

**Use of a QR Code Mini Tag for Identification of Mice in an Automated Colony Management System**

2:40 PM – 3:00 PM/Room: 151G  
**Speaker:** Steve Sansing  
**Moderator:** Maria Cariglia  
To keep up with the growing complexity of managing GEMs animals, many labs are looking at automated systems to maintain data integrity and efficiency in breeding and generating study cohorts. We have continued to look at various identification methods which help us ensure the correct animals are shipped, mated, and euthanized. We evaluated current identification methods which are available to achieve this level of quality, meet our IACUC standards, and are also cost-effective. Our current facility uses an Internet Colony Management application (ICM™) which drives our colony management and embryology services. This is a web-based application where technicians input data using tablets, RFID, and keypads to manage our breeding operation. In collaboration with RapID Lab, a mini tag was developed to fit our operation needs. This ear tag has a QR code as well as comes in a variety of ten colors. The current size of the mini tag, which is 3.5mm, enables us to identify a mouse at a minimum di2 pre-weaning. We have incorporated the QR functionality into our current system and the various colors provide the technicians with a secondary method of identification, helping to efficiently identify the correct animal. Integrating this mini tag into our colony management system has reduced errors and increased efficiency. This presentation will go through the attributes of the RapID Lab mini tag and show how this can be incorporated into a colony management system for mice to fully automate data collection for a breeding operation and maintain the highest level of animal and sample integrity. The target audience is research and operation facility managers/supervisors, research directors, researchers, and technicians.

*This Technical Trade Presentation is sponsored in part by Charles River.*

**Best Practices and Technology for Improving Animal Study Reproducibility**

3:00 PM – 3:20 PM/Room: 151G  
**Speaker:** Jens Ibsen  
**Moderator:** Daniel Tran  
The goal of the Reproducibility Project: Cancer Biology was to replicate studies from high-impact cancer biology papers and concluded that there are significant opportunities “to improve the transparency, sharing, and rigor of preclinical research to advance the pace of discovery.” The Project found that up to ~90% of studies were not reproducible. The difficulty across the field of in vivo research in generating results with a high level of integrity, detail, and reproducibility consistently underscores the need to critically examine, improve, and standardize processes for animal study conduct. Researchers must understand the factors contributing to poor data quality and irreproducible study results and implement effective “Best Practices” and software technology for data integrity, study conduct, and scientific rigor. Researchers attending this presentation will gain an understanding of some success factors, practical approaches, and study workflow software approaches to make animal studies more reproducible.

*This Technical Trade Presentation is sponsored in part by Studylog Systems, Inc.*

**Digital Lab Assistants & the Vivarium of the Future**

3:20 PM – 3:40 PM/Room: 151G  
**Speaker:** Steve McCoy  
**Moderator:** Michael Evans  
Learn how digital lab assistants improve data quality & reduce contamination for in vivo experiments and operations. In this presentation, LabVoice will profile applications of its digital lab assistants in biotech, pharma vivaria, and in vivo labs as a means of hands-free data collection & guiding technicians and research assistants through various processes such as cage checks, dosing calculations, and more. Further, Steve will highlight the ability to create a real-time audit of processes performed and the impact to biosafety & biosecurity.

*This Technical Trade Presentation is sponsored in part by LabVoice.*
**SUNDAY AFTERNOON**

**Facility Directors - Yale University**
8:30 AM - 1:00 PM, Hyatt, Salt Lake C

**National Meeting Orientation (first time attendees, new members, international attendees)**
2:00 PM - 3:00 PM, CC, Ballroom I

**Technical Trade Presentations - Advancements in Data Collection and Reproducibility – Track I**
1:00 PM - 4:00 PM, CC, 150G

**Technical Trade Presentations - Management Innovation in Facilities and Animal Care Track II**
1:00 PM - 4:00 PM, CC, 1510G

**Tecniplast Welcome Breakfast**
8:00 AM - 2:00 PM, CC, Ballroom J

**Vivarium Operational Excellence Network**
8:00 AM - 3:00 PM, Hyatt, Powder Mountain

**COMMITTEE MEETINGS**

**Educational Resources Committee**
9:00 AM - 11:00 AM, CC, 251B

**Nominations Committee**
10:00 AM - 11:30 AM, CC, 251A

**Online Learning Committee**
12:30 PM - 2:30 PM, CC, 251B

**Program Committee Walk Thru**
4:00 PM - 5:00 PM, CC, meet at Registration

**Scientific Advisory Committee**
3:00 PM - 5:00 PM, CC, 251B

**AFFILIATE EVENTS**

**ACLAM Board of Directors**
7:30 AM - 4:00 PM, Hyatt, Woodward

**ACLAM Exam Question Writing Committee**
1:00 PM - 5:00 PM, Hyatt, Alta

**ACLAM GRAC**
2:00 PM - 5:00 PM, Hyatt, Snowbird

**ACLAM Publications Committee**
9:00 AM - 12:00 PM, Hyatt, Snowbird

**Allied Trade Association (ATA) Membership Meeting/Breakfast (Invitation only; RSVP required)**
8:30 AM - 10:30 AM, CC, Ballroom I

**Allied Trade Association (ATA) New Product Showcase**
7:30 AM - 7:00 PM, CC, Outside Exhibit Hall Entrance

**One Size Fits All, But Not When It Comes to Managing a Vivarium**
3:40 PM – 4:00 PM/Room: 151G
**Speaker:** Mat D Sanderson
**Moderator:** Leo Herlin

All vivariums revolve around caring for the animals and collecting research data, but the way each vivarium is run can vary greatly, and the data collection requirements can be even greater. We know that the processes differ between vivariums, so why should you be forced to use a specific process as defined by a software supplier? During this fun presentation, we will share examples of our analysis process and how the same data can be collected in different methods, depending on your requirements, but still maintaining consistent and accurate data. Topics covered will include ordering animals from internal or external sources and easily and accurately collecting data in real time. The target audience is technicians, veterinary care staff, vivarium managers, and researchers.

*This Technical Trade Presentation is sponsored in part by Brain & Software International.*

**TECHNICAL TRADE PRESENTATIONS – MANAGEMENT INNOVATION IN FACILITIES AND ANIMAL CARE**

**TRACK II**

**Better Disater Resiliency: The Use of Reusable and Disposable IVC Caging**
1:00 PM – 1:20 PM/Room: 150G
**Speaker:** Sarah Rovezzi
**Moderator:** Scott Hoy

An indispensable takeaway from the recent global pandemic is that disasters and disruptions in laboratory animal facilities happen. The COVID-19 crisis and other natural disasters forced Vivarium staff to reimagine their business continuity plans to include every possible setback. Infrastructure failures, catastrophic weather incidents, fires, diseases, epidemics, cyberattacks, and civil unrest are all potential threats that could cause loss of facility utilities, supply shortages, and personnel shortages. So, when a disaster strikes, long-term or temporarily shutting down your cage-wash operations, are you prepared to handle the impact? Our presentation will explain the advantages of being able to utilize recyclable, retrofitable, single use caging for better disaster resiliency. Knowing how quickly circumstances change, the flexibility to use disposable caging and reusable caging can be paramount for your research. Learn how prominent facilities have quickly pivoted from enduring unforeseen downtime back to being fully operational with the simple implementation of disposable caging as a part of their emergency preparedness planning.

*This Technical Trade Presentation is sponsored in part by Allen-town, LLC.*
Transitional from Ethylene Oxide to Chlorine Dioxide Gas Sterilization
1:20 PM – 1:40 PM/Room: 150G
Speaker: Kevin Lorcheim
Moderator: Emily Lorcheim
Ethylene oxide has been used for decades as a gaseous sterilization method for devices and tools. While steam can be a quick method for simple instruments, complex devices often require a gaseous method of sterilization, such as ethylene oxide. However, in recent years ethylene oxide has come under fire by the EPA, FDA, and other regulatory bodies due to its safety. Ethylene oxide has been listed as a carcinogen and many sterilization facilities that utilize ethylene oxide have been forced to shut down due to emissions concerns. Ethylene oxide sterilization also has the potential to leave harmful residues such as ethylene oxide, ethylene chlorohydrin, and ethylene glycol. All these issues show the need to utilize safer methods of gas sterilization, such as chlorine dioxide gas sterilization. Chlorine dioxide gas is a non-carcinogenic method of sterilization that is also non-explosive at use concentrations, unlike ethylene oxide. Chlorine dioxide gas sterilization cycles are simple to operate and have shorter cycles than typical ethylene oxide cycles. Aerations occur within the chamber, and immediately thereafter, the product can be handled due to its benign potential residuals. The chlorine dioxide gas process does not require an increase in temperature during the cycle, which allows for greater material compatibility for temperature-sensitive devices. Chambers are easily able to be implemented within a facility, and if sterilization chambers already exist within a facility, they could be simply converted to become operational with chlorine dioxide gas. Overall, chlorine dioxide gas is an ideal option for those looking to eliminate ethylene oxide gas sterilization from their facility and for those seeking to bring sterilization in-house. This presentation will detail considerations on why a transition away from ethylene oxide may be necessary, the potential benefits of chlorine dioxide sterilization to a facility and its research, and how to properly implement the technology.

This Technical Trade Presentation is sponsored in part by ClorDiSys Solutions, Inc.

Things to Know: Installing Large Autoclaves in Existing Buildings
1:40 PM – 2:00 PM/Room: 150G
Speaker: David Larson
Moderator: Perry L Spires
Ever tried to move a large autoclave into an operating facility in Philadelphia, NYC, Los Angeles, or even Salt Lake City? Installing large and heavy autoclaves in existing buildings often creates ingress issues. Ingress, defined as going in or entering, a large autoclave, can cause a variety of issues stemming from existing building limitations such as doorway dimensions, elevator dimensions and weights, hallway dimensions, and building access. In this talk, we will share the creative solutions we’ve learned in our decades of installing autoclaves. We’ll cover a different autoclave manufacturing process for existing buildings that you might not be familiar with, yet.

This Technical Trade Presentation is sponsored in part by Beta Star Life Sciences Equipment.

How Can Your Animal Facility Benefit from More Precise Humidification Control?
2:00 PM – 2:20 PM/Room: 150G
Speaker: Patrick Johnson
Moderator: Perry L Spires
This presentation will review how more precise humidification control within an animal facility can be beneficial. During the presentation, we will review the current legislation regarding humidification control, acknowledge the benefits of more precise humidification control and understand that both improved animal welfare and a reduction in energy consumption are of major benefit.

This Technical Trade Presentation is sponsored in part by Scanbur.

Doubling Scientifically Useful Animals With Limited Cage Space
2:20 PM – 2:40 PM/Room: 150G
Speaker: Jessie Janeczek
Moderator: Cindy A Buckmaster
Transnetyx has executed case studies with global academic leaders focusing specifically on eliminating unnecessary animal waste, improving cage space utilization, and maximizing efficiencies within research laboratories. The data collected from these studies has helped leading research institutions increase the number of experimental animals by up to 40% and, where needed, reduced cage space by 30%. This session would benefit Animal Program Leaders and staff, IACUC, and laboratory staff and scientists.

This Technical Trade Presentation is sponsored in part by Transnetyx Inc.

Video Automation to Improve Daily Cage Inspections
2:40 PM – 3:00 PM/Room: 150G
Speaker: Zachary Wright
Moderator: Daryl Reynolds
Automating daily cage inspections with a video-based system boosts productivity, reduces costs, improves animal welfare, and increases job satisfaction. Learn how SwiftSENSE reduces in-person cage inspection labor using AI and remote cage inspection. We’ll share results from studies done with our video-based monitoring system. We’ll also discuss other real-world examples of institutions that have used our video-based monitoring system, including need-based cage changes, litter detection, and detecting mouse visual acuity automatically. Ready to boost animal health and save money?

This Technical Trade Presentation is sponsored in part by Swift-SCIENCE.

Reimagining Decontamination: Unique Approaches to IVC Decontamination with Hybrid Hydrogen Peroxide Technology
3:00 PM – 3:20 PM/Room: 150G
Speaker: Elizabeth McQuade
Moderator: Rich E Apolinar
Decontamination of Individual Ventilation Caging (IVC) racks is a critical task for animal laboratory science facility managers. To effectively decontaminate the racks, a variety of steps must be taken, including proper cleaning and disinfection of the cages. Traditional methods of IVC sterilization involve heat in either dry or steam form. While effective, these methods can be detrimental to polycarbonate surfaces and require extensive use of utilities. Facilities also face increased labor due to the multi-step process and possible challenges with aging sterilizers no longer in use which monopolize much-needed laboratory space. This has left the industry wanting a more efficient and materially compatible method of decontamination without sacrificing 6-log repeatable efficacy. This presentation investigates the feasibility of using a lower consequence, low-concentration hydrogen peroxide technology for IVC rack decontamination, where success was measured not only by 6-log efficacy, but also by the ease of use, resource sustainability, and reduction in downtimes to.
improve contamination control strategies. To achieve these goals and maximize potential cost savings, two facilities tested alternative decontamination methods for their animal housing systems using 7% hybrid hydrogen peroxide technology. Join us to learn lessons from one facility’s journey to implement proper IVC decontamination within individual cages and discover key factors for successful 6-log efficacy and sustainability using the tested technology. We will explore how another facility implemented in-place decontamination of its IVC rack to prevent cross-contamination and increase labor efficiency. Come see how the results of these studies present laboratories with diverse and efficacious alternatives to traditional heat methods, offering greater ease of use, material compatibility, and efficacy while lowering vivarium costs through a sustainable approach to IVC decontamination. This presentation is ideal for facility directors, biosafety officers, and laboratory technicians in charge of maintaining the integrity of the research environment.

**This Technical Trade Presentation is sponsored in part by CURIS System.**

**Pathogenic Biofilm and Research Facilities**

3:20 PM - 3:40 PM/Room: 150G  
**Speaker:** Stephanie M Cormier  
**Moderator:** Donna Monroe  
Many research facilities deal with biofilm in animal drinking water systems, but surface biofilms can also have lingering effects on animal research. In this technical trade presentation, Senior Biosafety Consultant Stephanie Cormier will explain the impacts environmental biofilm can have on research outcomes, the historical difficulties of killing and removing this environmental biofilm, and the methods that have shown to be effective so far. Pathogenic Biofilms can lead to increased pathogenesis for bacteria like E. coli, data inconsistencies in gut microbiota, differences in prognoses of hereditary diseases, wasted hours tracking down biofilm-related diseases’ source, and effects on biofilm- or plaque-related research. Participants will learn about the role of pathogenic bacteria in forming environmental biofilm and some methods that have proven successful at killing and removing environmental biofilm. The target audience for this talk is researchers and animal care staff concerned about biofilm’s effects on research models.

**This Technical Trade Presentation is sponsored in part by Quip Laboratories.**

**Room Air vs. 100% O2: Considerations for Anesthetic Delivery**

3:40 PM - 4:00 PM/Room: 150G  
**Speaker:** Kathy Garner  
**Moderator:** David Poldiak  
Many researchers report using 100% oxygen (room air) as a carrier gas, as well as limited differences between room air and 100% O2. Here, we discuss the benefits and risks of using room air vs. 100% O2 in order for researchers to make an informed decision regarding carrier gases. We will also go over the features of the SomnoFlo low-flow anesthetic vaporizer, especially how its ability to use room air or oxygen can provide researchers with more freedom to make the carrier gas decision that is right for them.

**This Technical Trade Presentation is sponsored in part by Kent Scientific Corporation.**

**Sol Del Mar, Inc.**

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Inquire: GetCertified@soldelmarinc.com

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**SUNDAY AFTERNOON**

**ASLAP Board of Directors Meeting**

11:30 AM - 3:30 PM, Hyatt, Brighton  

**ICLAS Award Winner Lectures**

See Mobile App for presenters and talk titles  
3:00 PM - 5:00 PM, CC, 250A  

**LAMA Board Meeting**

11:00 AM - 5:00 PM, Hyatt, Solitude

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**TPTV Presents “Cage Hunters”**

4:00 PM - 4:20 PM/Room: 150G  
**Speaker:** Morgan A Holmes  
**Moderator:** Massimo Ferrari

On this episode of TPTV’s Cage Hunters, Mr. Laboradorous Ratty is on the search for his perfect home. He has an extensive wish list containing must-haves such as great views, ample air, eco-considerate building materials, unique accessories, and close proximity to eating establishments and watering holes. While the market is still quite competitive in this post-covid era, TPTV is certain by the end of this session their client will be thrilled with his selection. Join in and help Mr. Ratty as he explores the unique listings presented to him in this fun, informative session in his hometown of Squeakytown, USA.

**This Technical Trade Presentation is sponsored in part by Tecniplast.**

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**Leading the path to AALAS Certification!**

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More Than Hydration

- Hydration Support
- Dietary Support
- Medication Delivery
- Thermoreversible Gel
- Enrichment Solutions
- Water Acclimation
- Breeder Support
- Aging Support
- Mouse Model Health
- Dermatological Support
- Complete Nutrition
- Electrolyte Replenishment
- Surgical Recovery
- Weanling Support

VISIT AALAS BOOTH #1726 OR CLEARH2O.COM TO LEARN MORE
**MONDAY MORNING**

**AALAS 74TH NATIONAL MEETING**

**MONDAY OCTOBER 23**

Career Center
9-11am & 2-4pm Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)
8:00 AM-5:00 PM, CC, 254B

Exhibit Hall
8:30 AM-5:00 PM, CC, Exhibit Hall BC

Exhibit Hall (opening ceremony w/ribbon cutting 8:30 a.m.)
8:30 AM-5:00 PM, CC, Exhibit Hall C Entrance

First Aid
7:30 AM-6:15 PM, CC, Exhibit Hall Level between Escalators and Room 150

Mothers Room
7:30 AM-5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Poster Sessions
8:30 AM-5:00 PM, CC, Inside Exhibit Hall

Poster Sessions set-up by presenting author
7:30 AM-8:30 AM, CC, Inside Exhibit Hall

Registration
7:30 AM-5:00 PM, CC, East Registration

Speaker Ready Room
7:30 AM-4:00 PM, CC, 252A

**MEETINGS & EVENTS**

AALAS Ask Me Anything (AALAS Learning Library, ACE Membership Community, CMAR, ILAM, Educational Products, Registry, Publications)
7:30 AM-5:00 PM, CC, Exhibit Hall BC

AALAS Foundation Silent Auction & “Boot Up for Research” Contest
8:00 AM-5:00 PM, CC, North Foyer

District 1 Membership Meeting
5:15 PM-6:15 PM, CC, 250C

District 2 Membership Meeting
5:15 PM-6:15 PM, CC, 250B

District 3 Membership Meeting
5:15 PM-6:15 PM, CC, 250A

District 4 Membership Meeting
5:15 PM-6:15 PM, CC, 250D

District 5 Membership Meeting
5:15 PM-6:15 PM, CC, 250E

**WORKSHOPS**

**W-01 Animal Facility Design, Processes, Decisions and Technology SOLD OUT**

8:00 AM - 12:00 PM/Room: 250A

Leader: Mark A Corey

Faculty: Lauri Tyrrell, Chad Zuberbuhler, Cliff R Roberts, Laura Halverson, Katie L McGimpsey, Mitch Hickmann

Facilitator: Audrey Harris

Workshop Fee: $150 Workshop Limit: 50

This session will benefit those involved with animal facility design and operations by describing the process, decisions, and technologies involved in the design and construction of animal facilities. The workshop will begin with a discussion of the facility design process - who should be involved, the objectives and level of effort by stakeholders, milestone decisions to be reached, and the anticipated duration of the various process phases. Current trends in the industry will be explored through discussions about planning, interior construction, acoustics, and finishes. Throughout the session, we will be framing the discussion from the occupant’s perspective and their experiences in the real world. We will include critical mechanical, electrical, and piping design and operations. This section will focus on the mechanical, electrical, and plumbing risks associated with compromised animal welfare, loss of research, and facility resiliency, and how engineering decisions affect each of these parameters. The lessons learned will help enable participants to make more informed decisions as they develop and operate their own facilities. Conversations will focus on vivarium operations and facility sanitation and safety. We will also discuss strategies regarding energy and water conservation that are being effectively implemented in animal facilities and the derived long-term benefits.

**W-02A Microsurgery Skills Training Using Surgical Loupes**

(offered twice, also Monday 1:00 PM)

8:00 AM - 12:00 PM/Room: 250D

Leader: Robert F Hoyt Jr

Faculty: Tannia S Clark, Tanya L Herzog, Kenneth R Jeffries, Karen J Keenan, Audrey Noguchi, Tom L Thomas, Gayle Z Nugent, Shawn Kozlov, Tim J Hunt

Facilitator: Paige Ebert

Workshop Fee: $250 Workshop Limit: 20

Performing surgical procedures with the aid of magnification has gained widespread use in human medicine over the past 35 years. Using surgical loupes, surgeons can now routinely perform procedures on very small structures that were considered impossible a few decades ago. The use of microsurgery and its value to biomedical research has, unfortunately, only just begun to be realized. Because of their small structures, laboratory animals, such as rats and mice, have generally not been considered animal models for many types of surgical procedures routinely performed in biomedical research. Investigators have rather routinely elected to use larger species such as dogs, pigs, sheep, rabbits, and nonhuman primates for such modeling because both surgical equipment is more readily available, and the surgical techniques are more familiar to the support personnel. The recent shift to using genetically engineered rodents, especially mice, has now resulted in increased researcher desire to use these smaller animals in more sophisticated modeling procedures, especially surgery. Rather than being limited to only simple procedures such as IM, IP, or IV injections, researchers using microsurgery can now perform complex surgical procedures on...
many rodent organ systems, such as the heart, lungs, and gastrointestinal tract. This workshop will provide an introduction to the basic techniques, equipment, and general applications of microsurgery using surgical loupes. Hands-on training will be conducted in two phases: 1) teaching students to develop technical skills by performing exercises using surgical loupes and 2) applying these skills to perform simple surgical procedures using rodents and organ surrogates. To enhance student success, we have greatly increased the teacher: student ratio. The target audience is veterinarians, investigators, and technicians.

This Workshop is sponsored in part by Q-Optics Surgical Loupes, Supramid Suture, RICA Surgical Products and SurgiReal Products, Inc.

**W-03 Practical Guide and Implementation Strategies to Building Resiliency and Compassion Satisfaction in the Vivarium**

**8:00 AM - 12:00 PM/Room: 250B**

**Leader:** Rachel A Beall  
**Faculty:** Rachel A Beall, Sally Thompson-Iritani, Dawn M Abney, Judy Murray  
**Facilitator:** Kirsten Bell

**Workshop Fee:** $150  
**Workshop Limit:** 50

Recent surveys of compassion fatigue and mental well-being in research animal caregivers have identified multiple ways to raise awareness of compassion stress and fatigue, as well as strategies that support resiliency and increase compassion satisfaction in the vivarium. This workshop will provide didactic and experiential learning activities that attendees can use to develop or enhance programs that support colleagues experiencing compassion stress or fatigue while building resiliency and emotional engagement at work. Participants will develop a plan to apply these tools with management at their site as well as participate in sessions to practice empathetic listening through ‘Emotional CPR.’ Participants will also have the ability to cross-share strategies in their facilities to provide a robust review of implementation techniques. This workshop will discuss the current research on compassion stress and compassion fatigue in the laboratory animal science field; compare and contrast psychological safety and toxic positivity in the workplace as it relates to building resiliency; experiment with empathetic listening as a peer support tool within the vivarium; create an implementation plan for how to initiate a resiliency program within your facility and/or how to invigorate current programs. This workshop is for individuals seeking to learn more about this topic or who are looking for tools to develop and enhance the resiliency program at their site or facility. There are no requirements for tenure or seniority as this workshop is intended to help everyone.

**W-04 Update on Anesthesia and Analgesia – Rodents SOLD OUT**

**8:00 AM - 12:00 PM/Room: 250E**

**Leader:** Cholawat Pacharinsak  
**Faculty:** Patrick E Sharp  
**Facilitator:** Vathana Vongphakham

**Workshop Fee:** $150  
**Workshop Limit:** 35

Rodent anesthesia/analgesia challenges result from multiple species-specific and research-related factors (e.g., animal size, high metabolic rate, experimental manipulations). Because rodent anesthesia is a common procedure, providing safer anesthesia requires anesthetists to familiarize themselves with different anesthetic monitoring techniques and interpret those anesthetic monitoring parameters. Although gas anesthesia is commonly used and typically encouraged, when possible, injectable anesthesia is a viable option when gas anesthesia cannot be provided. Regardless of using either gas or injectable anesthesia, anesthetic monitoring is vital to reducing morbidity and mortality. Because rodent anesthesia monitoring equipment and techniques can be different from larger animals, understanding the equipment, and techniques, and interpreting these parameters are key to making anesthesia safer. This workshop will discuss both gas and injectable anesthesia, available monitoring methods, and offer some troubleshooting. This basic rodent anesthesia and analgesia workshop is suited for researchers, veterinarians, veterinary technicians, and IACUC members.

**Communications 101: Transforming Challenges into Opportunities**

**8:00 AM - 10:15 AM/Room: Ballroom A**

**Leader/Moderator:** Jason S Villano  
**Facilitator:** Amanda Maxwell

In the field of laboratory animal science, we communicate daily with different stakeholders of the animal care and use program, such as husbandry and veterinary personnel and researchers. These groups are composed of individuals who come from many different backgrounds, representing an array of personal preferences, experiences, culture, training, and expertise. They represent varying facets of the program and have thus different interests and possibly, perspectives. Even within a stakeholder group, the same variability exists among personnel. Since relationships between diverse individuals abound in our workplace, communication is key to ensuring the functionality and well-being of the institutional program. In this seminar, we discuss topics that may impede communication among laboratory animal science professionals in the workplace. We aim to provide an overview of their complexities—presenting them initially as challenges—and then giving the audience the necessary tools to transform these challenges into opportunities for personal and professional growth and organizational health. The seminar is appropriate for all members of the association, including veterinarians, managers, technicians, and administrators.

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<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
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<tbody>
<tr>
<td>8:00</td>
<td>Jason S Villano</td>
<td>Welcome and Introductions</td>
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<tr>
<td>8:10</td>
<td>Portia S Allen</td>
<td>Understanding how you communicate and refining your practice</td>
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<tr>
<td>8:35</td>
<td>Jason S Villano</td>
<td>Reaching out and getting the buy-in</td>
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<tr>
<td>9:00</td>
<td>Jean A Nemzek-Hamlin</td>
<td>Dealing with imposter syndrome and perfectionism in the workplace</td>
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<tr>
<td>9:25</td>
<td>Jason S Villano</td>
<td>Navigating racial and cultural challenges: from language barrier to self-effacement</td>
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District 6 Membership Meeting
5:15 PM–6:15 PM, CC, 250F
District 7 Membership Meeting
5:15 PM–6:15 PM, CC, 151G
District 8 Membership Meeting
5:15 PM–6:15 PM, CC, 150G
Technician Fun Fair
8:30 AM–5:00 PM, CC, North Foyer
Technician Lunch & Learn Sponsored in part by PMI Lab Diet
12:30 PM–2:00 PM, CC, Ballroom I
Technician Town Hall
2:00 PM–2:30 PM, CC, Ballroom I
Veterinary Tech Student Program
10:30 AM–11:30 AM, CC, 250F
Veterinary Tech Student Program
3:30 PM–4:30 PM, CC, 250F
COMMITTEE MEETINGS
Certification & Registry Board
2:00 PM–4:00 PM, CC, 251B
Editorial Staff Meeting
3:00 PM–5:00 PM, CC, 251A
AFFILIATE EVENTS
AAALAC International Emeritus/Council Networking Reception (Invitation only; RSVP required)
6:00 PM–8:00 PM, Hyatt, Park City
ACLAM Forum Program Committee
10:00 AM–12:00 PM, Hyatt, Brighton
ACLAM Outreach Committee
3:00 PM–5:00 PM, Hyatt, Woodward
Allied Trade Association (ATA) New Product Showcase
8:30 AM–5:00 PM, CC, Outside Exhibit Hall Entrance
ASLAP CE Seminar Committee
11:00 AM–11:30 AM, CC, 251A
ASLAP LARC Meeting
5:00 PM–6:00 PM, Hyatt, Solitude
ASLAP Networking
12:00 PM–2:00 PM, CC, Ballroom J
Camp ACLAM Committee
3:00 PM–5:00 PM, Hyatt, Brighton

9:50 John N Norton
Managing difficult conversation: tools of success

Multisensory Scalable 24/7 Home Cage Monitoring: Anticipating Clinical Signs and Improving Translatability in Several Mouse Models
8:00 AM – 10:00 AM/Room: Ballroom B
Leader/Moderator: Stefano Gaburro
Facilitator: Guido Gottardo

Home cage monitoring devices that permit continuous observation of animal behavior and physiological data in their natural living habitat are one of the most recent developments in laboratory animal science. Yet, technical miniaturization and complex environments (e.g., required environmental enrichment and non-standard lighting conditions) are among the most significant barriers to increasing the number of sensors within a home cage. The scientific session will showcase the advantages of employing advanced multimodal technology to monitor animals in their home cages, focusing on improving animal welfare and translational value. The first speaker will discuss the evolution and revolution of using home cage monitoring in preclinical safety assessment paradigms, as well as how to balance scientific and animal welfare goals through the integration of technologies. The second speaker will describe the translational implications of detecting polyuria in mouse models of metabolic dysregulation by monitoring urination in the home cage. The third speaker will explore optimizing the finding of digital biomarkers through integrated home-cage monitoring technologies and data exchange. The fourth and final speaker will discuss how to implement 24/7 home cage monitoring to evaluate the welfare consequences of common mouse breeding programs and how to embrace the digital future. The duration of each speaker’s presentation will be 30 minutes. This four-speaker session is designed for academics, scientists, and veterinarians with a particular interest in preclinical disease models, drug development, and translational medicine to learn about the significance of home cage monitoring systems, the challenges associated with their implementation, and the potential benefits of incorporating modern multimodal scalable technology in animal research.

Speakers/Topics:

8:00 Stefano Gaburro
Welcome and Introduction
8:05 Pierre P Lainee
Home cage monitoring in a preclinical safety assessment paradigm: evolution / revolution to combine scientific and welfare expectations
8:35 Thomas Svava Nielsen
Urination in the home cage: Detection of polyuria in mouse models of metabolic dysregulation
9:05 Fabrizio Scorrano
Maximizing digital biomarker discovery at NIBR through integrated home-cage monitoring solutions and data sharing
9:35 Michael Wallis
Embracing a digital future: Utilizing 24/7 home cage monitoring to evaluate welfare impacts of common mouse breeding schemes
Opportunities and Limitations of Using Animal-Free, Human-Relevant New Approach Methodologies (NAMs) in Biomedical Research

8:00 AM – 10:00 AM / Room: Ballroom H
Leader/Moderator: Megan R LaFollette
Facilitator: Kristin E Killoran

Over the last decade, the use of animal-free New Approach Methodologies (NAMs) in scientific research has accelerated. While adherence to the 3Rs of animal research (replace, reduce, refine) is always encouraged by IACUCs, emphasis on replacement varies among institutions and geographic locations. It may involve suggestions of refinement rather than replacement by substituting other animal species. One cause for interinstitutional variation may be a lack of understanding of the opportunities and limitations of non-animal, human relevant NAMs, and where their implementation is and is not appropriate. Furthering the understanding of how NAMs can reduce and replace the use of animals in biomedical research is critical for all scientific research professionals to tackle the growing prevalence of human diseases. In this session, attendees will learn about some of the progress in biomedical research using animal-free NAMs and how the FDA supports their use. Furthermore, we will discuss the current potential limitations of using NAMs in biomedical research and how we can work towards overcoming them. Following this session, attendees will have learned about several promising human relevant NAMs, tips for implementing NAMs at their home institutions, and communications advice to further public understanding of both the opportunities and limitations of NAMs. The target audience includes veterinarians, scientists, IACUC administrators, and other attendees interested in learning about animal-free NAMs.

Speakers/Topics:

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<tr>
<td>8:00</td>
<td>Megan R LaFollette Welcome and Introductions</td>
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<tr>
<td>8:05</td>
<td>Jim Newman</td>
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<td>8:25</td>
<td>Megan R LaFollette</td>
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<td>8:45</td>
<td>Kathrin Herrmann</td>
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<td>9:05</td>
<td>Thomas Hartung</td>
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<td>9:25</td>
<td>John U Dennis</td>
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Platforms Sessions

Animal Welfare, Training, and the 3Rs 1
8:00 AM – 9:45 AM / Room: 150G
Leader: Sean McGuire
Facilitator: Stephanie Womack

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<th>Time</th>
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<tr>
<td>8:00</td>
<td>PS1 Optimizing rat handling practices: what do the rats want?</td>
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<td>8:15</td>
<td>PS2 Post-Mortem Study on the Effects of Routine Handling and Manipulation of Laboratory Mice</td>
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<td>8:30</td>
<td>PS3 Quantifying blood loss volume of submandibular venipuncture in mice using contrast-enhanced CT</td>
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<tr>
<td>9:00</td>
<td>PS4 Nest quality as an early indicator for pregnancy in C57BL/6 mice</td>
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<tr>
<td>9:15</td>
<td>PS5 Quantifying blood loss volume of submandibular venipuncture in mice using contrast-enhanced CT</td>
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<tr>
<td>9:30</td>
<td>PS6 Evaluation of alternative communication button devices to access preferred activities in juvenile swine</td>
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Clinical 1
8:00 AM – 9:30 AM / Room: 151G
Leader: Sarah Hansen
Facilitator: Kelly A Jimenez

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<tr>
<td>8:00</td>
<td>PS7 Awake Electrocardiogram Recordings Using a Cage-side Commercial Device: A Medical and Welfare Refinement</td>
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<td>8:15</td>
<td>PS8 Chlamydia muridarum Associated Pulmonary and Urogenital Disease and Pathology in a Colony of Enzootically-Infected IL12rb2 deficient and Stat1 knockout Mice</td>
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<tr>
<td>8:30</td>
<td>PS9 Eradication of Chlamydia muridarum from Laboratory Mice: Aberrant and Not So Elementary</td>
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<tr>
<td>8:45</td>
<td>PS10 Chronic Wound Management in an Aged Female Macaque</td>
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<tr>
<td>9:00</td>
<td>PS11 The Use of Acupuncture for Treatment of a Lame Goat</td>
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This Seminar is sponsored in part by American College of Laboratory Animal Medicine (ACLABM) / American Society of Laboratory Animal Practitioners (ASLAP) Joint Program Committee.
9:00  
**PS12** Pappilomatous-like lesions and mortality associated with Nannizziopsis arthrosporiodes in Central American Boas and other species within a breeding colony

CA Johnson-Delaney

9:15  
**PS13** Type 2 Diabetes Mellitus in *Tupaia belangeri* (Northern Tree Shrew)

AP Lamacchia*, KL Gardiner, KM O’Brien

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**PANEL DISCUSSIONS**

**Pathology Quiz Bowl**

8:00 AM - 9:15 AM/Room: Ballroom G

Leader: Marcia L Hart
Moderator: Bettina A Gentry
Facilitator: Sarah A Hansen

Panelist: Marcia L Hart, Bettina A Gentry, Craig L Franklin

This panel discussion will consist of an informal review of the pathology of comparative laboratory animals in the form of an image-based quiz using Mentimeter. Topics will include lesions of well-described infectious and non-infectious diseases, pathological manifestations of emerging diseases, and selected phenotypic characteristics of important genetically engineered animal models. Images will be educational and challenging to laboratory animal specialists at all levels of pathology expertise. The targeted audience is comparative medicine trainees, laboratory animal veterinarians, pathologists, and scientists. Participants from comparative medicine training programs can receive a fabulous cash prize for the highest score. Participants will learn the gross and histologic pathology of laboratory animals.

**Keeping it in the FAMily: Facility and Animal Management Quiz Bowl**

9:30 AM - 10:45 AM/Room: Ballroom G

Leader: Erin K O’Connor
Moderator: Samantha A Gerb
Facilitator: Craig L Franklin

Panelist: Samantha A Gerb, Scott W Korte, Erin K O’Connor, Sarah N Schlink, Dana E Weir-Guffey

This panel discussion is a partner to the long-standing Pathology Quiz Bowl and will consist of an informal review of elements of facility operations and experimental animal models in the form of an image-based quiz using Mentimeter. Topics will include facility equipment, environmental conditions and husbandry considerations, and animal models and experimental techniques. Images will be educational and challenging to laboratory animal specialists at all levels of laboratory animal expertise. The targeted audience is comparative medicine trainees, laboratory animal veterinarians, laboratory animal care professionals, and scientists. Participants from comparative medicine training programs have the opportunity to receive a fabulous cash prize for the highest score.

**EXHIBITOR TEACH & CHAT**

**Lomir Biomedical Inc**

Acclimation Strategies for Jacketed Laboratory Animals – A Summary

10:10 AM - 10:30 AM/Room: Exhibit Hall

Speaker: Teresa Woodger, President and CEO, Lomir Biomedical Inc

Description: Use of specialized laboratory animal jackets is a long-established, reproducible component of many animal models. Success with this type of equipment requires acclimation in advance of experimental procedures. This presentation will discuss regulatory requirements for, and scientific benefits of, acclimation and the contribution to overall animal welfare. Included will be an international review of current acclimation strategies by species, geographic location, type of facility and housing.

**Allentown LLC**


10:35 AM - 10:55 AM/Room: Exhibit Hall

Speaker: Sal Lucchesi, Technical Sales Consultant at Allentown; Matt Ruiter, Chief Scientific Officer at UID

Description: Discover how the Allentown Individual Animal Home Cage Monitoring System can improve your research outcomes, enhance husbandry practices, and promote the wellbeing of your animals in this enlightening educational presentation. You will take away refreshed insights on the significance of digitally monitoring key biomarkers of rodents, such as temperature and activity, for biomedical research results and animal husbandry tasks, including comprehensive welfare assessments. More specifically, you will become familiarized with innovative home cage monitoring technology and how continuous and remote tracking of digital biomarkers in group-housed mice can benefit and improve your research program. Additionally, gain a deeper understanding of how automated home cage monitoring ensures minimal disruption to research animals’ environments, significantly improving animal welfare and reducing stress while offering researchers an unparalleled opportunity to observe and understand critical biomarkers with high accuracy. Most importantly, you will leave empowered to make a well-informed decision when selecting the most suitable digital monitoring system for your unique research application. That’s why we’re calling all research directors, lab facility managers, animal care program directors or supervisors, veterinarians, IACUC members, research personnel, or lab animal technicians for an incredible technology-focused learning experience you won’t want to miss.

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**Leader:**
**Panelist:**
**Facilitator:**
**Moderator:**
**Description:**

*Note: Images and other visual elements are not included in this text representation.*
Facilitator: Juan Slaughter
Moderator: B Taylor Bennett

AS defined by the American Veterinary Medical Association (AVMA), “One Health refers to two related ideas. First, it is the concept that humans, animals, and the world we live in are inextricably linked. Second, it refers to the collaborative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, and the environment.” One Health is the most influential organizing concept in the medical sciences. From the AVMA to the WHO, One Health is proclaimed and virtually universally accepted as the primary goal and the underlying methodological approach of veterinary and medical education, research, and practice. This presentation will describe the crucial role laboratory animal research played in the development of the concept of One Medicine, the historical precursor of One Health. The discussion will review differing definitions of and approaches to One Health and will discuss how animal research can be an essential component of some of these definitions and approaches. The presentation will also highlight current definitions of and approaches to One Health that threaten the viability of animal research by diminishing the importance of human and animal research that benefits both human and animal health, requiring the diversion of critical resources away from animal research, or by incorporating concepts of “health” (such as environmental health, ecosystem health, or planetary health) that are often unclear, may sometimes be incoherent, or sometimes include societal or geopolitical considerations that have no connection with biomedical research. The presentation will examine how the biomedical research community can recognize, and counter approaches to One Health that threaten animal research. The discussion will suggest ways (including proclaiming the continuing value of the concept of One Medicine) the community can support and engage in approaches to One Health that benefit people, animals, and the environment appropriately. The audience is anyone involved in biomedical research.

This Special Topic Lecture is sponsored in part by National Association for Biomedical Research (NABR).

Charles C. Hunter Lecture: Are Ceramides the New Cholesterol?
Speaker: Scott A Summers
Moderator: Travis Stein
Facilitator: Lynn Lambert

Overnutrition, physical inactivity, and genetic aberrations promote the accumulation of fat-derived molecules in tissues not suited for lipid storage, leading to tissue dysfunction that underlies diabetes and cardiovascular disease. Of the myriad lipids that accumulate, sphingolipids such as ceramides may be amongst the most deleterious, as they alter metabolic programs and induce apoptosis and fibrosis. In humans, serum ceramides are strong biomarkers of diabetes and major adverse cardiac events, and clinics have started measuring circulating ceramides as markers of disease risk. In rodents, inhibiting ceramide biosynthesis ameliorates diabetes, steatohepatitis, and heart failure. The author will discuss the potential of therapeutic strategies to lower ceramides and combat these metabolic pathologies. This session will appeal to researchers and veterinarians.

This Special Topic Lecture is sponsored in part by Committee for Technician Awareness and Development (CTAD).

Experience-Based Neuroplasticity in Domesticated and Wild Animals
Speaker: Kelly Lambert
Moderator: Allison M Williams
Facilitator: Chris Doeden

Mammalian neuroplasticity has been explored in rodent models since the 1960s, with multiple lines of evidence pointing to the importance of complex environments and experiences in sculpting healthy mammalian neurons. In recent years, however, a new wave of interest has emerged, driven by advances in our understanding of the role of experience in shaping the brain. Whether it's through changes in gene expression, modifications to synaptic connections, or alterations in neurotransmitter metabolism, experience-based neuroplasticity plays a critical role in the development and function of the nervous system.

Scott A. Summers

Dr. Summers is a Distinguished Professor and Chair of the Department of Nutrition and Integrative Physiology at the University of Utah. He also co-directs the university’s Diabetes and Metabolism Research Center and, in 2021, was named the William J. Rutter, PhD, Presidential Endowed Chair in Biochemistry. Dr. Summers has been a leading voice advancing the idea that a class of fat molecules termed ceramides contribute to the pathogenesis of diabetes and its complications in the heart, liver, and kidney. Though the idea was initially controversial, the role of ceramides as drivers of pathology is now widely accepted and clinics have started measuring ceramides as a means of assessing disease risk. In 2015, he co-founded Centaurus Therapeutics, a USA-based biotechnology company that is developing new ceramide-lowering therapeutics to combat the metabolic underpinnings of metabolic disorders.

Prior to joining the University of Utah, Dr. Summers held faculty appointments at Duke University and its affiliated medical school in Singapore (Duke-NUS); the Baker Heart and Diabetes Institute in Melbourne, Australia; and Colorado State University in Fort Collins, Colorado. He completed his BS at Indiana University, his PhD at Southern Illinois University, and his postdoctoral training at the University of Pennsylvania.
Digital Transformation (DX): Practical Applications in Today’s Vivarium
12:30 PM - 2:00 PM/Room: 255C
Leader/Moderator: Jenniffer Caesar
Facilitator: Courtney Nesline
Panelist: Kimberly L. Suh, Megan Gerhardt, Bruce W Kennedy, Traci J Weber
Digital transformation (DX) is a popular term, but what does it actually mean and what does it look like when successfully applied? The understanding and use case for DX is often misunderstood or undervalued. DX is not simply the acquisition of a digital tool but utilizing it to transform business practices. A successful DX will increase automation, reduce errors, enhance collaboration, and create a real-time visual of workloads. This panel discussion will cover practical applications using various digital tools in laboratory animal facilities to transform different business practices. Panelists will also discuss what digital tools are used, the benefits and unique challenges associated with the DX, and future digital initiatives. Overall, this presentation will provide an increased understanding of what a digital transformation can look like and the importance of DX in the LAR community. The target audience for this presentation are researchers, animal care staff, veterinarians, and vivarium managers interested in DX to increase operational efficiency and innovation in the management of vivarium operations.

Emotional Wellbeing, a Perspective from an Employee Assistance Therapist and a Laboratory Animal Science Professional
12:30 PM - 2:00 PM/Room: 255B
Leader/Moderator: Anneke Keizer
Facilitator: Kim Klukas
Panelist: Amber Cardinal, Anneke Keizer
The purpose of this session is to introduce a One Health approach to the education of animal caregivers. This education focuses on the importance of recognizing their own individual emotional needs as well as the opportunities they have to support each other within a laboratory animal facility. Many organizations rely on their existing Employee Assistance Program (EAP) to provide support to their Laboratory Animal Science (LAS) employees. This leaves gaps in the support offered as EAP is a general resource, while LAS employees require specialized care. This talk will offer information to help LAS employees understand how to best utilize their EAP and offer guidance on how leadership, employees, and supporters can create an internal peer support and individual self-care plans that are relevant to the work they do. This session will be a perspective from an EAP Therapist certified in Compassion Fatigue Therapy and Education and a Laboratory Animal Scientist/Certified Compassion Fatigue Professional. Participants will learn about the relationship between people, animals, and their environment, how it impacts animal care and use programs, and how it influences the study results. This session will include how managers, supervisors, and research staff can give animal caregivers proper guidance and support to provide the emotional well-being they so badly need. This talk will also provide insights as to how leadership can influence existing EAP resources, and practical ways employees can incorporate resources into their own self-care. This session will be of interest to animal caregivers including veterinarians, husbandry technicians, researchers, administrative members, IACUC members, and any other personnel who may be involved with the care and oversight of animals in a research setting.

Take Your IACUC to the Next Level: An Exploration of IACUC Efficiency and Effectiveness
12:30 PM - 2:00 PM/Room: 255E
Leader/Moderator: Stacy L Pritt
Facilitator: Ciera Starkey
Panelist: Stacy L Pritt, Kathryn L Cavanaugh, Madeline L Budda, Debbie Cunningham
Efficiency and effectiveness are at the heart of operational success. While many within the research community view institutional animal care and use committees (IACUCs) as committees where debate and thought guide discussions, IACUCs also have specific operational mandates as described within regulations and other relevant guidelines. Therefore, even when IACUCs have excellent debates and arrive at the best conclusions, such outcomes need efficient and effective processes to appropriately engage researchers and ensure research success. This panel discussion will explore multiple facets of efficiency and effectiveness specific to IACUC operations, including defining efficiency and effectiveness for IACUCs, measuring effectiveness with the appropriate metrics, approaching operations with a systems mindset, and lessening administrative burden through applying lean strategies. The overall goal will be to share and discuss strategies to build and improve dynamic processes to support the directives given to IACUCs. This panel will be of interest to administrators, chairs, and members of IACUCs and other institutional animal ethics committees; institutional officials; research compliance specialists.

The Other 3Rs: “Re-Creation, Recruitment, and Retention”: Do Our Veterinary Team Job Descriptions Meet the Needs of our Current Applicant Pool?
12:30 PM - 2:00 PM/Room: 255F
Leader/Moderator: Natalie H Ragland
Facilitator: Kerith R Luchins
Panelist: Glenn A Jackson, William L Singleton, Tasha M Thomas, Carissa Jones
A significant recruitment gap exists, leaving key stakeholders unable to fill open positions for veterinary teams in laboratory animal medicine when hiring across multiple roles, including veterinarians,
technicians, and post-doctoral trainees. With a transition to post-pandemic professional life and a growing proportion of Millennial and Generation Z candidates, new work-life balance expectations have emerged from these potential candidates. This warrants the need for recruitment stakeholders to consider how to appeal to these individuals and whether current job descriptions represent a good fit as perceived by the present applicant pool. This panel will examine multiple barriers to hiring and retaining a cohesive veterinary team and explore strategies to strengthen your institution’s ability to navigate these challenges. The panel will provide insights into what potential candidates seek in their professional roles and make suggestions for hiring organizations to update job requirements and craft employment descriptions to attract top candidates. In addition, panelists will discuss tactics for retaining a highly functional team and bridging generational gaps in the work environment. The target audience is Laboratory Animal Professionals and Recruitment Teams.

WORKSHOPS

**W-05 Beginning Training Methods and Techniques**

(8-hour workshop continued Tuesday 8:00 AM)

1:00 PM - 5:00 PM/Room: 250E

Leader: Andrea N Franklin

Faculty: Kyle W Cheves, Lisa A Houser, Jaine E Perlman, Stacey Smith, Sabrina Bourgeois

Facilitator: LaJuana Durbin

Workshop Fee: $250  Workshop Limit: 50

Positive reinforcement training (PRT) improves the lives and welfare of non-human primates (NHPs) by giving them opportunities to cooperate with clinical, husbandry, and research procedures as well as providing a form of cognitive enrichment. However, PRT can be a daunting task to implement in a research environment, especially for staff who have not had any prior training experience. In this 8-hour workshop, participants will gain knowledge and experience to form a foundation on which to implement basic PRT for clinical, husbandry, and research-related procedures. Lectures will be supplemented with hands-on experience through interactive activities and demonstrations for implementing basic training concepts and techniques. This workshop will also provide an understanding of fundamental concepts associated with training - how to set yourself and your NHP up for success in training, how to utilize preference assessments and clickers to enhance your training sessions, how to shape behavior, how to use targets to train a new behavior, how to implement desensitization techniques to overcome fear in animals, and how to troubleshoot training issues. Participants will gain a strong foundation of training terminology and techniques to use with NHPs in the laboratory setting. This workshop is designed for anyone who has an interest in learning how to use positive reinforcement training to train NHPs for clinical, husbandry, and research-related procedures including animal care technicians, animal care managers, behavior specialists, veterinary technicians, veterinarians, and research technicians.

*This Workshop is sponsored in part by Lomir, BioServ and LabDiet.*

**W-06 Effective Communication Skills Workshop - Tools and Approaches**

1:00 PM - 5:00 PM/Room: 250B

Leaders/Faculty: Jason S Villano, Portia S Allen, Jean A Nemzek-Hamlin, John N Norton

Facilitator: Amanda Maxwell

Workshop Fee: $150  Workshop Limit: 50

Laboratory animal science professionals play a central role in the responsible care and use of animals in research. We constantly communicate on a typical workday within and outside our stakeholder groups in the animal care and use program, as well as with institutional leadership. The wide variety of interpersonal relationships we have in the workplace encompasses people from various backgrounds, including personal and professional experiences, training and education, expertise, and language and culture. The very nature of what we do dictates that effective and open communication is key to the program’s success, professional growth, and personal well-being. In this workshop, participants will be presented with effective communication tools and approaches to navigate challenging situations ranging from cultural differences and bias to difficult conversations in animal welfare or between a supervisor and an employee. Practical, experience-based advice and actionable steps on communication, including written, verbal, and nonverbal, strategies for overcoming difficult situations like imposter syndrome and perfectionism, and participant-driven, real-life case scenarios will be discussed. This workshop is targeted at all lab animal professionals, including veterinarians, supervisors, managers, technicians, and administrative staff.

**W-07 Inclusion Diversity Equity and Accessibility Outcome-Focused Workshop**

1:00 PM - 5:00 PM/Room: 250C

Leaders: Janet L Steele, Chandra D Williams

Faculty: Ramaswamy M Chidambaram, Sherrie Jean, Mark A Suckow, Emily I Weston

Facilitator: Tracy A Parker

Workshop Fee: Free  Workshop Limit: 50

Previously, AALAS surveyed and collected ideas from members and panel participants on DE&I topics within the organization and the field of laboratory animal science. It is now time for action! This free workshop will be in round-table format and targeted to those ready to brainstorm, strategize and create action plans regarding DE&I initiatives for AALAS. Each group will develop DE&I initiatives, create measurable goals, and transform selected ideas into tangible action items to present to the AALAS Executive Board for implementation consideration. This workshop is open to members and professional development organizations affiliated with AALAS.

*This Workshop is sponsored in part by Inclusion, Diversity, Equity and Accessibility (IDEA) Committee.*

**W-02B Microsurgery Skills Training Using Surgical Loupes SOLD OUT**

(offerd twice, also Monday 8:00 AM)

1:00 PM - 5:00 PM/Room: 250D

Leader: Robert F Hoyt Jr

Faculty: Tannia S Clark, Tanya L Herzog, Kenneth R Jeffries, Karen J Keeran, Audrey Noguchi, Tom L Thomas, Gayle Z Nugent, Shawn Kozlov, Tim J Hunt

Facilitator: Maria Lehto

Workshop Fee: $250  Workshop Limit: 20

See Monday AM for a description.

*This Workshop is sponsored in part by Q-Optics Surgical Loupes, Supramid Suture, RICA Surgical Products and SurgiReal Products, Inc.*
EXHIBITOR TEACH & CHAT

∗ Inotiv
Animal Welfare, Care, and Furthering the 3R’s in Immunodeficient Rodents: A Vendor’s Perspective
2:10 PM - 2:30 PM/Room: Exhibit Hall
Speaker: TBD
Description: Animal vendors have a unique role in the research process. Our responsibility to breed, maintain, and provide animals to the research community, allowing for robust, repeatable research to occur, is of utmost importance. Without quality animals and quality research, life-saving advances in both human and animal health are not possible. This presentation will provide a vendor’s perspective with regards to animal husbandry, breeding, sourcing, and diet and their impact to research outcomes. How well the animal copes with its living conditions – health, nutrition, ability to express natural behavior, appropriate care and shelter, and human handling can have confounding effects. Dietary and nutritional needs should also be carefully considered, including the benefits of sourcing and maintaining animals on the same diet from birth through the study to minimize variables. Attendees will gain an inside view of animal housing and husbandry standards at an animal vendor to help achieve your unique research goals.

∗ Wedgewood Pharmacy/Zoo Pharm
Cultivating Quality: The Evolution and Excellence of Extended Release Medication Production at Wedgewood Connect
2:35 PM - 2:55 AM/Room: Exhibit Hall
Speaker: Paul Yamamoto, the Pharmacist in Charge at Wedgewood Connect
Description: Paul Yamamoto, the Pharmacist in Charge at Wedgewood Connect, a leading FDA-registered, cGMP compliant 503B outsourcing facility, will highlight Wedgewood Connect, a leading FDA-registered, cGMP compliant 503B outsourcing facility, will highlight Wedgewood Pharmacy/Zoo Pharm’s quality standards underpinning all the medications they produce, with an emphasis on Extended Release medication production. Diving deep into the meticulous world of pharmaceutical quality, Paul will elucidate the exacting standards that govern Active Pharmaceutical Ingredients (API), excipients, drug stability, production, quality and packaging, all while ensuring alignment with IACUC regulations. This session promises more than a mere glance; attendees will gain an inside view of animal husbandry, breeding, sourcing, and diet and their impact to research outcomes. How well the animal copes with its living conditions – health, nutrition, ability to express natural behavior, appropriate care and shelter, and human handling can have confounding effects. Dietary and nutritional needs should also be carefully considered, including the benefits of sourcing and maintaining animals on the same diet from birth through the study to minimize variables. Attendees will gain an inside view of animal housing and husbandry standards at an animal vendor to help achieve your unique research goals.

HUSBANDRY/MANAGEMENT 1
3:00 PM - 4:30 PM/Room: 150G
Moderator: Jori K Leszcynski
Facilitator: Sarah Choi

3:00 PS14 Animal Research, a Risky Business?
TJ Jameson*, K Stepney

3:15 PS15 Photobiomodulation Therapy Implementation in an Outdoor Nonhuman Primate Breeding Colony
R Rose*, J Crews, M Stovall

3:30 PS16 Examining the relationship between self-efficacy and the implementation of Lean methodology while working in an animal care and use program
D Covington*, D Jarrell

3:45 PS17 Results from the AALAS-ASLAP 2022 Workforce Demographic and Salary Survey of Laboratory Animal Veterinarians
KL Szilagyi*, JR Eswaraka, JK Leszcynski, S Craig, KL Lencioni, J Xu, K Caspersen, SM Kirchain, B Weigler

4:00 PS18 Advocating for aquatic technician/vivarium employees to upper administration (salary, educational experiences, conferences, job levels, retention, work life balance, etc.)
RA Malbrue

4:15 PS19 Careers in Laboratory Science: Shareable Videos for the Promotion of Diversity in Laboratory Animal Science
DL Hickman*, L Shelton, AT Pierce

LABORATORY INVESTIGATIONS 1
3:00 PM - 5:00 PM/Room: 151G
Moderator: Ida M Washington
Facilitator: Dawn M Olson

3:00 PS20 Pharmacokinetics and efficacy of extended-release buprenorphine for post-operative pain management in the domestic ferret (Mustela putorius furo)
J Plunkard, IA Jimenez*, MC Craney, JS Villano

3:15 PS21 Pharmacokinetics of an Extended-release Buprenorphine in Female Yorkshire Swine (Sus scrofa domestica)
L Stevey-Rindenow*, M Saenz, V La, CL Franklin, A Aycock-Williams, P Fueger

3:30 PS22 Transdermal Mirtazapine Pharmacokinetics in Rhesus Macaques (Macaca mulatta)
D Bissinger*, L Wittenburg, L Garzel, G Timmel, D Stockinger

<795>, <797>, and <800>. This discourse serves as an essential primer for those navigating the evolving landscape of veterinary pharmaceutical standards. Pharmacopeia) Chapters <795>, <797>, and <800>. This discourse serves as an essential primer for those navigating the evolving landscape of veterinary pharmaceutical standards.
Building Culture After the Pandemic: Responding to Staffing Challenges, Investigator Relationship Changes and Financial Pressures in an Academic Biomedical Program

3:00 PM - 5:00 PM/Room: Ballroom A
Leader/Moderator: Clifford Gibbons
Facilitator: Jessica Hunt

With the seeming emergence from the height of the COVID-19 pandemic, many things in our society are back to “normal,” yet other aspects seem intrinsically altered. At the Massachusetts General Hospital’s Center for Comparative Medicine (MGH CCM), creating and instituting an emergency response plan during the height of the pandemic allowed us to continue laboratory research support, albeit in a modified way. While overall successful in navigating this unprecedented time, some of the plans put in place during this critical period have resulted in new, post-pandemic challenges. In this session, we will use our program as a case study on how we responded to challenges that many vivariums currently face. Most notably, we will focus on the changing nature of the workforce and the domino effect that has resulted. Staff members have personal challenges and stresses resulting in physical, social, and mental health considerations that we rarely experienced pre-pandemic. The research demands for internal space and services have increased, while, like many institutions, we have experienced staffing shortages and a reduction of financial resources. Adding to these challenges are soaring inflation rates, increased salary and wage expectations, and a changing world that has social justice and political issues at a boiling point. This seminar is intended for anyone interested in participating in an examination of one program’s successes and pitfalls in responding to the challenges created during and after the pandemic response. We hope to collaborate and have other individuals share their experiences as well.
The first immunodeficient models depended on discovering spontaneous mutations and identifying phenotypes within standard mouse strains. The crossbreeding among these models led to even more highly immunodeficient models that further advanced cancer, immunology, and infectious disease research. With the advent of genetic engineering, immunodeficient model creation has grown substantially to provide an array of unique models for focused research areas. However, along with immunodeficient model advancement, the challenge of propagating and maintaining these highly disease susceptible models has come. Facility housing, restricted access, husbandry, equipment, and vivarium workflow are essential elements elevated to reduce the introduction of adventitious agents. Another roadblock is materials such as tumor cell lines, cell products, or other biologics that have been passaged in or derived from rodents or other species, including humans. Routine screening of research biologics prior to introduction into a research vivarium serves to disarm these trojan horses and mitigate the confounded research outcomes and potential outbreaks. It is well documented that immunodeficient models infected with commonly excluded pathogens often present with more severe morbidity or mortality; however, the growing ubiquitous use of highly immunodeficient models is extending the threat to organisms considered normal flora found in standard strains or other vivarium-associated exposures. Therefore, available screening tests may not identify the etiology of the disease, and culture or antigenic molecular methods (NGS) may be required to investigate. This seminar will review the application of immunodeficient models in research, the care and biosecurity considerations, and the growing impact of normal flora on highly immunodeficient models. This seminar is recommended for vivarium lab animal caregivers, facility managers, and veterinarians.

### Speakers/Topics:

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<tr>
<th>Time</th>
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<tr>
<td>3:00</td>
<td>Kenneth S Henderson Welcome and Introductions</td>
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<tr>
<td>3:05</td>
<td>Steven Bronson Immunodeficient Rodent and Humanized Mouse Models for Preclinical Research</td>
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<td>3:25</td>
<td>Guy Mulder Considerations for Managing Immunodeficient Mouse Models</td>
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<td>3:45</td>
<td>Cheryl L. Perkins Pathogen Threats in Research Biologies: Prevalence and Protocol</td>
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<td>4:05</td>
<td>Kourtney P Nickerson Uncommon Disease Threats to Highly Immunodeficient Mice</td>
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<td>4:25</td>
<td>Zachary T Freeman Leveraging New and Old Diagnostic Methods to Identify Novel Pathogens of Immunodeficient Mice</td>
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### Swine Cancer Models: Ready for Prime Time in the Fight to Cure Cancer

**3:00 PM – 5:00 PM/Room: Ballroom G**

**Leader/Moderator:** Raimon Duran-Struuck

**Facilitator:** Mary Sauer

Cancer is the leading cause of death worldwide. Currently, 93-95% of novel therapies fail Phase-I clinical trials. Despite low predictive value, rodents are critical for mechanistic and proof-of-concept studies. Novel clinically relevant large animal models are desperately needed to bridge rodent-tested therapies into humans. A large (non-rodent), reliable, and reproducible cancer model is required in order to test tools and diagnostic approaches critical in the effort to diagnose and treat cancer. Hence, swine is uniquely positioned to become the ideal partner to achieve this goal. Swine share similarities in size, physiology, anatomy, and immunology with man. They have societal acceptance (when compared to canines and non-human primates) and have been extensively utilized in biomedical research. The ease of breeding and current advances in genetic engineering arguably position swine as a practical and attractive model for pre-clinical and co-clinical studies. In this seminar, we aim to discuss the generation of swine cancer models, their use and value as pre-clinical partners in the fight for eradicating cancer. Immuno-competent and immunodeficient herds receiving human xenografts, developing spontaneous neoplasms, and novel genetically engineered swine with human-specific gene mutations will be presented. The seminar will also address the potential use of these models as a platform for immunotherapies beyond rodents. Participants will learn about multiple swine models, which are becoming central to the treatment of liquid and solid tumors. We will discuss the advantages and disadvantages of immunodeficient pigs receiving xenografts, swine herds that develop spontaneous tumors, and current and future uses of valuable genetically engineered swine. The seminar will also discuss novel immunotherapies ready to be tested in swine models. The target audience includes scientists, physicians, veterinarians, and veterinary and animal care technicians.

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<tr>
<td>3:00</td>
<td>Raimon Duran-Struuck Welcome and Introductions</td>
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<td>3:05</td>
<td>Kyle M Schachtschneider Generation of the Oncopig</td>
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<td>3:25</td>
<td>Matthew Niemeyer Liver Cancer Model</td>
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<td>3:45</td>
<td>Christopher S Rogers Exemplar Models of Cancer</td>
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<td>4:05</td>
<td>Christopher K Tuggle Swine SCID Model and Xenografts</td>
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<td>4:25</td>
<td>Guy Bouchard Melanoma in Sinclair Miniswine</td>
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<td>4:45</td>
<td>Raimon Duran-Struuck 1. MHC-Characterized Liquid Tumors 2. Swine CAR T cell technology</td>
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At Quip Labs, we are dedicated to revolutionizing hygiene standards in vivariums and animal care facilities. With a relentless commitment to research-driven solutions, our mission is to provide cutting-edge chemistries and services that ensure the health, safety, and wellbeing of laboratory animals. Now, with the acquisition of Halosil International NXT by Quip Labs leadership, our commitment to the next generation of biosafety and facility hygiene is stronger than ever.

Quip Labs Makes It Safe. Simply and Sensibly.
TUESDAY MORNING

WORKSHOPS

W-05 cont. Beginning Training Methods and Techniques for NHP’s
(8-hour workshop continued from Monday 1:00 PM)
8:00 AM - 12:00 PM/Room: 250E
Leader: Andrea N Franklin
Faculty: Kyle W Cheves, Lisa A Houser, Jaine E Perlman, Stacey Smith, Sabrina Bourgeois
Facilitator: LaJuana Durbin
See Monday 1:00 PM for pricing and description.
This Workshop is sponsored in part by Lomir, BioServ, and Lab-Diet.

W-08 Designing and Participating in a Discussion-Based Disaster Preparedness Exercise
8:00 AM - 11:00 AM/Room: 250C
Leaders: Evan T Shukan, Hana Bao
Faculty: Hana M Petersen, Shannon V Wilson
Facilitator: Chris Doeden
Workshop Fee: $150  Workshop Limit: 50
We will guide participants through a discussion-based disaster preparedness exercise, using an evolving scenario and timed small-group and larger-group discussions to help participants understand the strengths and weaknesses of their own programs. The target audience is anyone who has a leadership, response or oversight role in their animal program, including supervisors, veterinarians, business managers, and ACUC members. We will also focus on helping participants learn how to put together and build their own discussion-based disaster preparedness exercises.

W-09 Would You Like to Improve Your Suturing and Rodent Surgery Aseptic Technique?
8:00 AM - 12:00 PM/Room: 250B
Leader: Marcel I Perret-Gentil
Faculty: Marcel I Perret-Gentil, Raphael A Malbrue, Vittoria M Capria, Mary M Walker, Szczepan W Baran, Miguel A Torres, Laurie A Long, Erin Grove
Facilitator: Viridiana Vizcaino
Workshop Fee: $150  Workshop Limit: 30
You may feel proficient, even confident in performing rodent surgery; however, you may be surprised how small improvements can have a huge impact on your animal’s recovery and data. During this workshop, participants will learn and refine commonly used suture, knot-tying, and rodent surgical draping techniques. The workshop will focus on appropriate hand-eye coordination to improve suturing skills and provide updates from recent scientific studies on the benefits of using Press’n Seal and Reynolds Wrap aluminum foil in routine rodent surgical aseptic procedures. A state-of-the-art inanimate model will be introduced and utilized during the suture practice. Easy-to-apply hands-on exercises will be put into practice that has been shown to significantly improve aseptic technique with Press’n Seal and Reynolds Wrap. This workshop is designed for individuals who have minimal or no suturing skills but is also a great opportunity for those with considerable experience wanting to upgrade their skills and teach others enhanced techniques. It is also for those that wish to improve and teach rodent surgery aseptic technique with quite simple to implement methods as well as trainers that want to pass on these skills to their students.
This Workshop is sponsored in part by Kent Scientific, Atramat, and SurgiReal.

TUESDAY OCTOBER 24
AALAS Ask Me Anything (AALAS Learning Library, ACE Membership Community, CMAR, ILAM, Educational Products, Registry, Publications)
7:30 AM–5:00 PM, CC, Exhibit Hall BC
AALAS Foundation Silent Auction & “Boot Up for Research” Contest
8:00 AM–5:00 PM, CC, North Foyer
Career Center
9-11am & 2-4pm Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)
8:00 AM–5:00 PM, CC, 254B
Exhibit Hall
9:00 AM–5:00 PM, CC, Exhibit Hall BC
First Aid
7:30 AM–5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150
Mothers Room
7:30 AM–5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150
Poster Sessions
9:00 AM–5:00 PM, CC, Inside Exhibit Hall
Poster Sessions Reception w/poster award winners announced at 4:45pm
4:00 PM–5:00 PM, CC, Inside Exhibit Hall
Registration
7:30 AM–5:00 PM, CC, East Registration
Speaker Ready Room
7:30 AM–4:00 PM, CC, 252A
Technician Fun Fair
8:00 AM–5:00 PM, CC, North Foyer
MEETINGS & EVENTS
AALAS/FELASA Executive Group Meeting
9:00 AM–10:00 AM, CC, 251A
AREA Teachers Program Invitation only; RSVP required
9:30 AM–1:30 PM, CC, Ballroom I
Branch Leadership Meeting
4:30 PM–5:30 PM, CC, 250C
ILAM 30th Anniversary Reception
5:30 PM–6:30 PM, CC, Ballroom J
SEMINEARS

*Advances in Zebrafish Husbandry*

8:00 AM – 10:00 AM/Room: Ballroom A

Leader/Moderator: Joshua R Barber
Facilitator: Christine Archer

As the most recently designated primary species, zebrafish have solidified their role in biomedical research due to attributes that make them useful animal models. The zebrafish community continues to trailblaze with new insights and innovations into the care of this emerging species and we recognize the importance of sharing our discoveries with the community at large. This seminar session will delve into the basics of aquatic systems, operations, and avoidance of pitfalls when managing an aquaculture facility. We will then cover the importance of water quality and approaches to both breeding and line maintenance of zebrafish including mutant and wildtype strains. Next, we will discuss key aspects of larval zebrafish care with an emphasis on breeding strategies during this crucial time of growth and development. Lastly, we will provide instruction on the basics of how mutant and transgenic fish are made, providing some examples of zebrafish used in the biomedical research setting. Participants will walk away from this seminar equipped with a strong foundational knowledge of how zebrafish systems function as well as key guidance on how several well-established facilities care for and breed their fish. In addition, participants will be shown tangible examples of how zebrafish are used in biomedical research to help develop therapies and learn more about human diseases. This information is valuable for those who currently work with, or plan to work with, the zebrafish model and allows for conversational tools for educational discussion with the general public, furthering the cause of laboratory animal use in science.

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<tr>
<td>8:00</td>
<td>Joshua R Barber</td>
<td>Welcome and Introductions</td>
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<td>8:05</td>
<td>Joshua R Barber</td>
<td>Making of a Model: The Integration of Biotechnology, Medicine and Zebrafish</td>
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<td>8:30</td>
<td>Lauren M Pandolfo</td>
<td>Bringing Up Baby: Foundations of Feeding and Care for Early Stage Zebrafish</td>
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<tr>
<td>8:35</td>
<td>Austin Forbes</td>
<td>Core Principles of Zebrafish Facilities</td>
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<tr>
<td>9:20</td>
<td>Dante M D’India</td>
<td>Advanced Strategies in Zebrafish Breeding and Colony Management</td>
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This Seminar is sponsored in part by Zebrafish Husbandry Association (ZHA).

*International Perspectives and Considerations for Housing of Non-Human Primates*

8:00 AM – 10:00 AM/Room: Ballroom H

Leader: Geraldine JS Fleurie

Moderator: Cynthia A Pekow

Facilitator: Jussi Helppi

This session will compare and contrast non-human primate (NHP) housing in five nations across the globe. NHPs are accommodated in varied housing configurations, primarily based on facility goals. Producers have housing adapted to breeding and rearing offspring, often outdoors in conditions in or close to the natural origin of the animals. Sites focused on research may house animals exclusively indoors. Breeding and research may be combined in a naturalistic environment to support specific work such as neurobehavioral studies. Housing is influenced by national and international regulations linked to use and transport of NHPs, as well as welfare concerns, animals’ social and physical needs, disease and injury prevention, protection from extremes of environment, and health and safety of animals and people. Attendees will gain an appreciation for variables influencing considerations on housing for NHPs influenced by species, environ-
ment, regulations, social needs, research purpose, and health and safety concerns. Novel housing for specific types of research will be highlighted. This session will be for anyone interested/involved with NHP research, housing, and care.

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<tr>
<td><strong>8:00</strong> Cynthia A Pekow</td>
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<td><strong>8:05</strong> Atsushi Iriki</td>
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**Optimizing Chronic Infusion and Sampling Studies: From Surgery to Study Design**

**8:00 AM - 10:15 AM/Room:** Ballroom G

**Leader:** Paige A Ebert

**Moderator:** Nicole Navratil

**Facilitator:** Merryl Cramer

Many protocols require the use of catheterized animals. Whether the study is with rodents or large animals, a wide array of methodologies is used from person to person and from lab to lab. Unlike other research areas, infusion and sampling tend to stay out of the spotlight. It is unclear whether this is because there isn’t a specific forum for sharing best practices or whether the work itself isn’t considered worthy of notice. No matter the reason, the lack of discussion and sharing of best practices results in varying degrees of success and failure, which impacts reproducibility, reduction, and refinement. In this session, we cover best practices that will increase success and reproducibility and decrease failure and animal use. From surgery to post-operative care to blood collection on-study, we’ll identify tips and tricks to help improve study outcomes. Refining these techniques can result in healthier animals and more reliable data so that you can ultimately reduce the number of animals needed for each study. Participants will learn techniques to improve surgical outcomes, post-operative care of catheterized animals, and tools to optimize blood collection and infusion. Much of the data shared will be for small animal and rodent studies, but there will also be consideration given for large species. This session will be most beneficial for researchers performing animal studies that require dosing and sampling using chronic or acute catheterizations. Since it touches on tips for successful animal care both during and after surgery, it applies to those that perform their own surgery and purchase pre-implanted animals. Tips, tools, and techniques will be shared for small and large animal models.

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<td><strong>8:00</strong> Nicole Navratil</td>
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<td><strong>8:20</strong> Brad Gien</td>
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<td><strong>9:15</strong> Candace A Rohde-Johnson</td>
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PLATFORM SESSIONS

∗ Laboratory Investigations 2
8:00 AM – 10:30 AM/Room: 150G
Moderator: Courtney Hunter
Facilitator: David M Hampton

8:00  PS28 Creation of a Swine Model of Oral Angioedema
      M Haney’, K Klepner, S Wargacki, R Kainthan, H Ponichtera

8:15  PS29 A System to Monitor Health and Exploratory Behavior
      Reveals that Starved Gut-Associated Bacteria Do not Induce
      Peritonitis in Myeloperoxidase-Deficient Mice
      F Celio’, B Grubb, V Vaidhvi Singh, F Cominelli, A Rodriguez-Palacios

8:30  PS30 Impact of aspen versus corn cob bedding on
      reproductive measures in a transgenic mouse model
      of cystic fibrosis
      A Barabas’, C Hodges

8:45  PS31 Early antibody response and viral neutralization
      correlate with reduced SIV infiltration in the CNS
      of pigtail macaques (Macaca nemestrina)
      N Castell’, C Abreu, E Shirk, S Queen, L Gama, J Mankowski, R Veenhuis, J Clements

9:00  PS32 Immunogenicity of the mXCL1-PyCSP Fusion Protein
      Prime-and-Trap Malaria Vaccine
      K Boey’, AC Kalata, SC Murphy

9:15  PS33 Analysis of Gross and Histopathologic Changes
      from Repeated Celiotomies in African Clawed Frogs
      (Xenopus laevis)
      R Turcios’, R Kries, BM Clancy, K Luchins, G Langan, D Mailhiot

9:30  PS34 Effect of Gut Microbiota Transfer Methods
      on DSS-Induced Colitis Disease Severity
      TR Rodriguez’, K Gustafson, CL Franklin, A Ericsson

9:45  PS35 SARS-CoV-2 doggybone DNA vaccine is immunogenic
      and protective in immunosuppressed hamsters
      (Mesocricetus auratus) following viral challenge
      C Ledesma-Feliciano’, E Spiegel, J Hooper

10:00 PS36 Developing patient-derived xenografts (PDX)
       models to evaluate immunotherapies targeting human and
       canine T cells
       C Cheatham’, V Radhakrishnan, O Okpaso, C Mahadevappa, F Furan, D Kumar, J Kaiil, J Bryan, A Schrum, D Avella, D Gil

∗ What’s Your Diagnosis 1
8:00 AM – 10:15 AM/Room: 151G
Moderator: Lauren M Habenicht
Facilitator: Lisa Steiner

8:00  PS37 Inappropriate Head Holding and Inappetence
      in a Rhesus Macaque (Macaca mulatta)
      CA Walsh’, JA Avellino, R Fulbright, J Asher, G Terwilliger, A Duque, C Zeiss

8:15  PS38 Lethargy and Hypoxemia in a 4-Month-Old
      Domestic Pig
      JF Jacobs’, AW Michael, DR Montone

8:30  PS39 Ocular swelling in two African cichlids (Neolamprologus pulcher)
      VM Capria’, C Freed

8:45  PS40 Multiple Subcutaneous Masses in an Aged Long Evans Rat
      NA Lordi’, VM Capria, SM Meeker

9:00  PS41 Bilateral Hind Limb Paralysis in an Outbred Swiss Sentinel Mouse
      A Michelson’, R Ricart Arbona, J Miranda

9:15  PS42 Tail mass in a Sugar Glider (Petaurus breviceps)
      ER Lachenauer’, P Cunningham, J MacGuire, LA Conour, G Barnett

9:30  PS43 Menometrorrhagia in a Cynomolgus Macaque
      (Macaca fascicularis)
      G Leung’, MB Palillo, HR Martin, C Cheleuittute-Nieves, A Le Roux, NS Lipman, SE Carrasco

9:45  PS44 Vestibular deficits in a southern giant pouched rat
      (Cricetomys ansorgei).
      AL Voigt’, S Nelissen, A Percival, HU Voss, E Lavin, ER Feldman

10:00 PS45 Weight Loss and Unexpected Deaths in a Wild-Caught
       Meadow Vole (Microtus pennsylvanicus) Colony
       S Bruggeman’, JW Dodds

EXHIBITOR TEACH & CHAT

∗ RockStep Solutions
How Modern Hands-Free Vivarium Workflows Increase Data Reliability and Enhance Animal Welfare
10:10 AM – 10:30 AM/Room: Exhibit Hall
Speaker: Austin Lanham, LAT
Description: The modern scientific landscape has charged the researchers and technicians of today with two conflicting goals: to produce more accurate results in less time while advancing the principles of the 3Rs. While these may seem contradictory, utilizing modern lab technology allows institutions to confidently execute a higher volume of reliable studies while eliminating opportunities for user error. Join us to see real-life examples of current technology-enabled hands-free vivarium workflows and the benefits of implementing them in your lab.

∗ VRL Laboratories-USA
Evaluation of aspects of the Sentinel-Free Soiled Bedding (SFSB) approach to Rodent Environmental Health Monitoring
10:35 AM – 10:55 AM/Room: Exhibit Hall
Speaker: J Moll, J Lankasky, R Walters, R Berger, D Pitts, VRL Diagnostics
Description: The switch from live sentinel testing to environ-
**SPECIAL TOPIC LECTURES**

**Charles River Ethics and Animal Welfare Lecture: How Can We Optimize Fish Welfare Using Behavioral Strategies?**

11:00 AM - 12:00 PM/Room: Ballroom G  
Speaker: Lynne U Sneddon  
Moderator: Patricia V Turner  
Facilitator: Juan Slaughter  

Fish experimental models are used across a wide variety of scientific fields. It is vital that we understand how to maintain optimal welfare. Monitoring behavior has many advantages, both in being a non-invasive technique, but also behavioral changes that can provide insight into the well-being and welfare status of fish. We will discuss easily quantifiable indicators of assessing welfare that can be considered operational welfare indicators as they can be evaluated at the tank side. Behavioral approaches can also be useful when investigating the impact of environmental enrichment on welfare. Preference tests provide useful insights into the fish’s “mind” as to what they want in their tank. A variety of studies have explored the impact of enrichment on the welfare indicators of fish and whether providing enrichment has a positive impact on the animal. Enrichment strategies should use a combination of preference testing and measurement of biological and behavioral responses as well as relate these to the logistics of caring for these animals to ensure good biosecurity and hygiene. As fish are important laboratory models, it is vital that we can recognize signs of pain during and after common laboratory procedures. Exploration of behavioral reactions provides compelling data on the efficacy of pain-relieving drugs identifying the route of administration, the dose, and when to re-administer. This empirical data can be used to inform pain management protocols in fish and as such this represents an important step forward in refining experiments using laboratory fish. Participants will obtain knowledge on welfare assessment, enrichment strategies, pain assessment, and pain management in fish. This presentation will highlight the importance of a variety of behavioral strategies in improving welfare in the laboratory. This session should have interest from all AALAS members.

*This Special Topic Lecture is sponsored in part by Charles River.*

**Insights on Public Opinion About Animal Research for Effective Messaging**

11:00 AM - 12:00 PM/Room: Ballroom H  
Speaker: Matthew R Bailey  
Moderator: Jason S Villano  
Facilitator: Eva C Maciejewski  

Public opinion about the use of animals in biomedical research is divided, a trend that has been ongoing for the past fifteen years. Public opinion on this issue also demonstrates that the American public is more likely to support animal research and testing when they understand its context and purpose. Insights from the latest public poll of 1,030 Americans on their personal experiences with COVID-19 and their opinion on animal-based research, especially as it pertains to COVID-19 scientific breakthroughs and response efforts will be reviewed. The poll consisted of ten questions and was conducted by a research opinion company hired by the Foundation of Biomedical Research (fBR) and Johns Hopkins University (JHU).

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**LYNNE SNEDDON PhD - CHARLES RIVER LECTURE**

Dr Lynne Sneddon obtained her Ph.D at Glasgow University, Scotland, studying animal behaviour, physiology and neurobiology in crustaceans in 1998. After a postdoctoral position studying weakly electric fish, Lynne moved to the Roslin Institute where she began characterising nociceptors in fish for the first time with Dr Mike Gentle. Her work was the first to identify signs of pain in fish. This groundbreaking work was covered by the global media and has fueled further studies in the field of fish welfare. Lynne moved to the University of Liverpool in 2002 on an independent fellowship where she has used an integrative approach to understand mechanisms of aquatic animal behaviour and addresses questions in welfare. Her work has demonstrated fish are capable of experiencing pain using techniques in neuroanatomy, physiology and molecular biology. Lynne’s group was also the first to show animal personality in fishes was plastic with bold and shy trout altering their personalities according to positive and negative experiences. Her laboratory has demonstrated that zebrafish enjoy enrichment over barren conditions and these findings have led to a global uptake in the use of gravel images beneath zebrafish tanks. Lynne has also led the development of pain assessment tools as well as providing significant data on the use of analgesia in fishes. She is currently a Convenor of a FELASA working group where the data from her laboratory has been instrumental in guiding the production of pain management protocols. Lynne is also currently producing materials for online training according to European legislation for laboratory carers and researchers in zebrafish biology and pain assessment. In September 2020 Lynne took up a new academic position at Gothenburg University in Sweden where she continues to investigate how the welfare of aquatic animals can be improved extending her work on assessing and alleviating pain to cephalopods and decapod crustaceans. Vox magazine awarded Lynne a position in the Future Perfect Top 50 which named her as the world’s top zoologist using her work to improve the welfare of fishes in 2022.
74% of the respondents had not seen or read any media coverage about the use of animals in understanding COVID-19 and developing the drugs and vaccines used to treat and prevent it. Respondents were almost equally divided in their support or opposition (35% and 32%, respectively) for animal use for COVID-19 vaccine development. 67% of the respondents were not aware of the veterinary specialization of laboratory animal medicine. We postulate that support for animal research would increase significantly if people were made aware of the fields of laboratory animal science and medicine and these experts’ role in assuring the humane care and responsible use of animals. 

As part of the presentation, an audience poll will be conducted. The insights gleaned from the FBR-JHU poll and the audience poll should help the laboratory animal community more effectively communicate with family, friends, and the broader public about their lifesaving work. This presentation should be of interest to all members of the association, including veterinarians, technicians, and administrators.

This Special Topic Lecture is sponsored in part by The Foundation for Biomedical Research (FBR) and The John Hopkins University.

*Use, Abuse, and Presentation of ANOVA (Analysis of Variance) Data*

11:00 AM - 12:00 PM/Room: Ballroom A
Speaker: George J DeMarco
Moderator: Deborah M Mook
Facilitator: Verda Davis

This presentation will focus on the appropriate use and presentation of ANOVA (Analysis of Variance) data although other statistical tests and concepts may be included. It will include a discussion of statistical significance and the need for – and importance of – meeting data conditions for the use of ANOVA. Data presentation will be discussed and include reporting ANOVA data, graphing techniques, and the appropriate use of standard deviation, standard error of the mean, and confidence intervals. Common misconceptions regarding the definition of P, data that does not meet the criteria for significance, and how improper use of statistics contribute to reproducibility problems will be included. The target audience is veterinarians and scientists who publish and/or review manuscripts for publication.
**Panel Discussions**

*As a Veterinary Technician, One Background and Many Paths, How a Veterinary Specialist Can Thrive in Laboratory Animal Medicine*

**12:30 PM - 2:00 PM/Room: 255B**

**Leader:** Summer M Boyd

**Moderator:** Victoria R Elam

**Facilitator:** Jeanette Pearson

**Panelist:** Phillip N Sullivan, Joanna M Swerczek, Madison S Wheaton, Diana S Medina

As a veterinary technician, one can go down a lot of different avenues with their career. For the select few who end up veering down the avenue of Laboratory Animal Medicine, there can be even more branches. While most start through clinical medicine, not everyone stays there. Some individuals will branch into other aspects of laboratory animal medicine such as training, management, regulatory, commercial sales, and even research scientists. Audience members working in Laboratory Animal Medicine will hear from four credentialed veterinary technicians currently working in the field. The discussion will highlight professional development (to include career progression, growth/development, workplace management, and the use of veterinary technician titles in different areas).

*This Panel Discussion is sponsored in part by AALAS Awards Selection Committee.*

*Culture of Care: A Comprehensive Approach to Supporting People and Animals*

**12:30 PM - 2:00 PM/Room: 255E**

**Leaders:** Kirsten Bell and Cindy A Buckmaster

**Moderator:** Cindy A Buckmaster

**Facilitator:** Kirsten Bell

**Panelist:** Stephanie Oldham, Megan Gerhardt, Judy Murray, J Preston Van Hooser

A Culture of Care is an institutional commitment to foster an environment that is respectful and caring toward employees as well as animals used in research. This environment includes supporting the emotional well-being of employees through improved communication and recognition of the criticality of their role, creating awareness of the contribution to science from both humans and animals, defining mechanisms for discussing concerns, and promoting inclusion. In this panel discussion, we will offer tangible examples of how different institutions have implemented a Culture of Care. Areas of focus will include management processes, compassion fatigue resiliency programs, and openness programs across a diverse target audience, including program managers, line managers, compliance and IACUC staff, and IACUC members. Participants will appreciate the diversity of approaches to implementing a Culture of Care. They will also recognize that many programs in their institution can be part of promoting a Culture of Care to employees to enhance employee and animal well-being. Participants will also learn about the availability of resources for compassion fatigue programs and openness initiatives.

*Danio Zoom Live!*

**12:30 PM - 2:00 PM/Room: 255C**

**Leader/Moderator:** Christine Archer

**Facilitator:** Joshua R Barber

**Panelist:** Lauren M Habenicht, Kara Maloney, Michelle L Altemara, Rory Francis

Since early 2020, the Zebrafish Husbandry Association has worked with prominent members of the zebrafish health and husbandry field to assist with questions from the global zebrafish community via an open Zoom discussion. Held every other Friday, discussions range from troubleshooting life support system issues to general health questions to facility design and resource management in the zebrafish space. Zebrafish continue to grow as an important model organism, and as more institutions implement their own zebrafish programs, questions are certain to arise due to a lack of “conventional” knowledge about their needs in a vivarium compared to that of more common mammalian models. During this panel, attendees are welcome to bring any zebrafish-related questions. Panelists will discuss common questions encountered during the Friday Zoom meetings. Panelists will also provide different points of view, like that of a large facility manager, a smaller facility manager, and a facility veterinarian. Participants will learn about both broad and specific aspects of zebrafish husbandry, health, and welfare. Common topics such as diet, larviculture, health issues, and meeting zebrafish user demands will be discussed, and participants will attain information from a diverse range of experts working within the zebrafish husbandry and health space. This session will be of interest to animal care technicians, facility managers, veterinary technicians, veterinarians, IACUC members, and anyone working in a lab animal setting who encounters zebrafish. There will be a special focus on AALAS members who might only be working with zebrafish part-time or helping to cover the species as part of the weekend or holiday work.
This Workshop is sponsored in part by Foundation for Biomedical Research (FBR) and European Animal Research Association (EARA).

**Workshops**

**W-10 Crisis Communication & Media Training for Animal Research Institutions**

12:30 PM - 2:00 PM/Room: 255F  
Leader/Moderator: Stacy L Pritt  
Facilitator: Giera Starkey  
Panelists: Stacy L. Pritt, Carolyn M. Doerning, Steven T. Shipley, Jori K. Leszczynski, Michael W. Hart  

The declaration of the COVID-19 pandemic in March 2020, and the subsequent workplace changes made by a significant majority of institutions in the United States, continue to impact how we work in laboratory animal science. Combined with the increased demand for flexible work and higher pay rates within the workforce that have followed the pandemic, which has resulted in an exceedingly tight labor market for talent, many leaders and managers find themselves creating new ideas and novel programs to attract and keep the best employees for their facilities. This session will explore key themes that emerged during the pandemic that persist today, as well as new and emerging topics that must be addressed to ensure continued support for laboratory animal research. The speakers, all recognized leaders of major components of large institutional research programs, will address how they are changing and innovating to keep their staff productive and engaged. Specifically, unique ideas on employee engagement, retention, talent recruitment, remote and hybrid work, and short-staffing remedies will be shared. Ample time will be provided to gather audience feedback to maximize the impact for attendees. Attendees will include all managers and leaders as well as individuals aspiring to become managers and leaders.

**W-11 Don’t Pet, Palpate! Improve Your Physical Exam Skills and Discuss Treatment Plans for Rodent Cases**

2:00 PM - 5:00 PM/Room: 255F  
Leader: Kirk Leech, Eva C Maciejewski  
Facilitator: Leah J Yonkovich  

This hands-on lab will use simulated learning techniques to develop the skills necessary to assess common health conditions in laboratory rodents with an emphasis on identifying abnormalities on palpation. Special consideration is given to the development of differentials based on physical examination findings and critical thinking with regard to physiologic systems. This wet lab is ideal for veterinary technicians, veterinary students, and veterinarians who want to improve their rodent physical exam and technical skills with an emphasis on palpation techniques and creating differential lists. After completing this course participants should be able to describe key biological features of common laboratory species and demonstrate proficiency in palpating different densities such as fluid, soft tissue, and bone. Participants will also discuss physical examination strategies and list differentials for common health concerns based on history and key exam findings. Experience multiple hands-on stations for practicing palpation skills and apply this knowledge in a series of case-based discussions using a clinical rounds format. All stations will use simulations to achieve learning objectives, no live animals will be used.

**W-12 How to Proactively Prepare for Anti-Research Campaigns to Help Ensure Continued Operations and Minimize Reputational Damage**

1:00 PM - 5:00 PM/Room: 255C  
Leader: Katherine E Brannick  
Faculty: Katherine E Brannick, Michelle L Smith  
Facilitator: Isaac Jimenez  

Workshop Fee: $150  
Workshop Limit: 40

This interactive workshop will help participants identify crisis preparedness strengths within their organizations and highlight areas for improvements. The goal of this highly interactive workshop is to provide a safe and supportive environment in which to explore the tools, resources, and advice for research institutions to be able to significantly diminish or even eliminate negative impacts to individuals or the entire institution in the event of an animal research-related crisis. The fictional scenarios will mirror both traditional and emerging tactics currently being employed by those opposed to animal research. Throughout the exercise, participant experiences might include the development of an overall response strategy, brainstorming ideas to ensure a rapid, effective, and thorough response, the creation of public messaging, identifying spokespeople, and preparing for interviews. The scenarios will be designed to generate additional group discussions about...
several aspects of crisis response including media access, internal and external communications, social media strategies, staff security considerations, and other ways to help educate and build support for critical and necessary animal studies. This workshop will be of interest to veterinarians, scientists, administrators, animal care leadership, institutional officials, and technicians.

This Workshop is sponsored in part by Americans for Medical Progress (AMP).

Exhibit Hall Refreshment Break!
2:00 p.m. – 4:00 p.m.
Sponsored by The Jackson Laboratory

EXHIBITOR TEACH & CHAT

Taconic Biosciences
Recognizing and managing adverse outcomes in myeloid-supportive humanized immune system (HIS) mice
2:10 PM - 2:30 PM/Room: Exhibit Hall
Speaker: Briony Smith, DVM, DACLAM, MS. Associate Director, Animal Quality, Taconic Biosciences, Inc.
Description: Humanized immune system (HIS) mice are powerful tools for studying the human immune system, including efficacy assessment of new immunotherapies. However, advanced HIS models that support development of both human and lymphoid myeloid cells can experience a range of adverse outcomes that limit the useful study window. Adverse outcomes will vary by humanization method, donor and strain and can be directly impacted by housing and husbandry factors. This talk will provide a brief overview of common HIS models and adverse outcomes by model type, with emphasis on HSC-engrafted cytokine-transgenic strains such as the huNOG-EXL and huNSG-SGM3. These HIS models have enormous experimental utility because of the wide array of human cells supported across both lymphoid and myeloid cell types, but they come with the tradeoff of limited lifespans due to a range of adverse outcomes. The presentation will discuss the difference between macrophage-activation syndrome, hemophagocytic lymphohistiocytosis and Graft vs. Host Disease (GvHD), with review of recent data including histopathological analysis of several HIS models. HIS mice are also susceptible to infection by opportunistic organisms, most commonly presenting as urinary tract infections. Learn how to recognize and manage adverse outcomes to maximize study window through proper handling, experimental design and supportive care. The intended audience for this session includes veterinarians, veterinary nurses and anyone involved in planning and executing HIS mouse studies.

Genotyping Center of America
Non-Invasive Genotyping: Considerations for Implementing in your Facility to Improve Animal Welfare
2:35 PM - 2:55 AM/Room: Exhibit Hall
Speaker: Min Lee, Laboratory Manager; Laura Lockwood, Director of Business Development
Description: Genotyping laboratory animals for alleles of interest is a constant necessity in biological research. This typically requires the acquisition of a tissue sample from the animal for DNA extraction. We present here a method of buccal swab sample collection that is less invasive and does not require the use of analgesia or anesthesia. This sampling method produces sufficient quantity of DNA for multiple assay applications including, quantitative PCR, standard PCR, and endpoint PCR. We demonstrate the applicability of this method across multiple age points from pre-wean to adulthood. Additionally, sample collection requires no special handling at the vivarium level. Buccal swabs can be placed directly into deep well plates, kept at ambient air temperature and are stable to withstand 48-hour shipping. Attendees will learn how to collect DNA samples using buccal swabs and how this minimally invasive method improves animal welfare, produces sufficient DNA for multiple types of molecular testing, and provides a means of repeat testing the same animal without the need for pain management.

PLATFORM SESSIONS

Husbandry/Management 2
3:00 PM - 4:00 PM/Room: 150G
Moderator: Derek L Fong
Facilitator: Richard Duru

5:00 PS46 Creating a GLP Framework in an Academic Research Setting
N Young*, C Mathieu, K Brockway, D Mailhiot, G Langan

5:15 PS47 Ballin’ On a Budget: From Stockroom to Vivarium
KM Nestor*

5:30 PS48 New Method to Evaluate the Quality of Life of Laboratory Swine
NE Barton*, K Cook, J Ref, S Kasui, P Mostafizi, S Daugherty, JJ Lancaster, S Goldman

5:45 PS49 Cooperative Care Techniques for Large Swine in a GLP Laboratory Setting
A Rainey*

4:00 PS50 LED Light: An Extrinsic Environmental Factor that Enhances Laboratory Animal Health and Well-being
RT Dauchy*, GL Dobek, LM Dupepe, AF Pierce, GB Voros, JP Hanifin, GC Brainard, SM Hill, DE Blask

Laboratory Investigations 3
3:00 PM - 5:30 PM/Room: 151G
Moderator: Karen R Strait
Facilitator: Maria E Lehto

5:00 PS51 Current Prevalence of Non-Human Primate Pathogens
CJ Balzer*, WL Clifford, TM Albers, RK Dhawan, WR Shek
This seminar will address two areas of the use of miniature swine in research and education. It covers the downsized miniature swine model and its advantages. The seminar will be divided into three parts: background information, meeting the model, and rearing and husbandry. Each presenter will also provide some practical guidance on ways to conduct studies. We expect a broad audience to benefit from these presentations, including laboratory animal veterinarians, attending veterinarians, and other animal technicians, facility managers, graduate students, and scientists interested in miniature swine model research and use.

**SEMINARS**

**Everything You Need to Know About Vivarium Lighting and Research Animal Welfare**  
**3:00 PM – 5:00 PM/Room: Ballroom B**  
**Leader/Moderator: Brianna N Gaskill**  
**Facilitator: Patty Kowal**  
Extrinsic variables, such as temperature, sound, or vibration, are well-established in the literature for altering scientific outcomes. Light, however, a variable that is rarely monitored in a vivarium, is equally as likely to cause data variability. This seminar will provide basic information on light, how it is perceived, the differences between humans and rodents, and why this is important for basic biological functioning. We will focus on the light in the animal facility and illustrate how variability due to location on the rack, type of lighting used, and cage color can affect laboratory rodents and confound research studies. Each presenter will also provide some practical guidance on ways to minimize the impacts of this variable. Participants in this session will learn the basics of light and how it affects basic biology, rodent preferences, and how it applies in a real-world scenario. This information on light, how it is perceived, the differences between humans and rodents, and why this is important for basic biological functioning. We will focus on the light in the animal facility and illustrate how variability due to location on the rack, type of lighting used, and cage color can affect laboratory rodents and confound research studies. Each presenter will also provide some practical guidance on ways to minimize the impacts of this variable. Participants in this session will learn the basics of light and how it affects basic biology, rodent preferences, and how it applies in a real-world scenario. This information will be useful in helping research staff, animal care staff, and veterinarians understand how the spectrum and intensity of light in a typical vivarium can influence rodent welfare as well as the integrity and reproducibility of research outcomes.

**Downsized Miniature Swine – A New Paradigm**  
**3:00 PM – 5:15 PM/Room: Ballroom A**  
**Leader: M Michael Swindle**  
**Moderator: Derek Brocksmith**  
**Facilitator: Vikki Wehmeier**  
The Sinclair Nanopig is a miniature swine comparable to the size of a beagle. It is a game-changer for safety and efficacy studies, but also a significant husbandry and staff ergonomics improvement. This seminar will address two areas of the use of miniature swine in biomedical research. Species selection is critical to the scientist, and it will be addressed from three different perspectives. Relevant anatomic and physiological traits will be compared between miniature swine, canine, and non-human primates (NHP). Compound metabolism and transporters as well as AVA, biomarkers, and immunophenotyping with regard to species selection will be addressed. Answers to frequently asked questions about husbandry and behavior will also be given. Lastly, basic surgical considerations for pharmacology and other modeling will be covered. The topics of this seminar will address day-to-day considerations and problem-solving in the use of this species. Participants can expect to gain knowledge on the proper selection of anesthetics and analgesics, peri/post-op complications, behavior training for ease of handling, and species selection for study conduct. We expect a broad audience to benefit from these presentations, including laboratory animal veterinarians, attending veterinarians, and other animal technicians, facility managers, graduate students, and scientists interested in miniature swine model research and use.

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This Seminar is sponsored in part by Sinclair Bio Resources, LLC.
**Management of Animal Facilities in a Post-Pandemic Era**

*3:00 PM - 5:00 PM/Room: Ballroom H*

**Leader/Moderator:** Laura A Conour  
**Facilitator:** Alan Ley

Staff retention and recruitment. Supply chain issues. Higher prices for everything. Construction and renovation delays. Staffing shortages due to active COVID. Motivational struggles. Compliance issues. Surges in the animal census and research. All of these issues remain in the era of managing an animal care and use program post-COVID. The pandemic forced us to think out of the box to ensure the continuity of animal care and keep our staff engaged and employed, and some of those same struggles continue today. Speakers in this seminar will discuss these issues as it relates to animal facility management and compliance, offer solutions, and discuss how we all remain creative in how we solve problems and ensure that the animals in our care have what they need and the research at our institutions continues to progress.

**Speakers/Topics:**

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<td>3:00</td>
<td>Laura A Conour Welcome and Introductions</td>
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<td>3:05</td>
<td>Brian J Ebert Supply Chain Issues Post COVID</td>
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<td>3:35</td>
<td>David W Mallon We Didn’t Get Budget for 6% Inflation</td>
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<td>4:05</td>
<td>James D Cox Staffing Challenges, Both Recruitment and Retention</td>
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<td>4:35</td>
<td>Laura A Conour The Challenges of COVID beyond the Pandemics</td>
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**Zebrafish Health: Understanding Common Zebrafish Diseases, Their Impact on Research, and Disease Prevention, Monitoring, and Management**

*3:00 PM - 5:00 PM/Room: Ballroom G*

**Leader:** Christine Lieggi  
**Moderator:** Emma Liechty  
**Facilitator:** Michael B Palillo

Zebrafish have become a highly utilized biomedical research model. However, knowledge of common diseases and standard health management practices lag behind other common animal models. This session will bring this information forward, providing critical information necessary for programs to develop or further enhance existing zebrafish health programs. Speakers will review the following: (1) common infectious agents in laboratory zebrafish, disease processes, and the host response to infection that can confound experimental results in areas of zebrafish research, including behavior, development, neoplasia, immunity, and infection studies, (2) strategies for developing a customized importation and quarantine program that minimizes the risk of pathogen introduction to the existing colony, while facilitating scientific collaboration, (3) common non-infectious diseases, surveillance methodology, reporting, and prevention, and (4) practical considerations for the development and implementation of a zebrafish health surveillance program, including sample sources, testing methods, and testing frequency. Participants will leave with a foundational knowledge of recognizing common diseases and how these diseases may impact research, and how to formulate a customized health surveillance and disease prevention program for their institution. The target audience will include laboratory animal veterinarians, facility managers, and technicians supporting the use of zebrafish models.

**Speakers/Topics:**

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<tr>
<td>3:00</td>
<td>Christine Lieggi Welcome and Introduction</td>
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<td>3:05</td>
<td>Marcus J Crim Infectious Agents of Laboratory Zebrafish: Adverse Effects on Biomedical Research</td>
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<td>3:30</td>
<td>Christine Lieggi Developing an Effective Zebrafish Quarantine Program</td>
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<td>3:55</td>
<td>Emma Liechty Non-infectious Disease Surveillance and Prevention in the Zebrafish</td>
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<tr>
<td>4:15</td>
<td>Lauren D Krueger Development and Implementation of a Zebrafish Health Surveillance Program</td>
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*This Seminar is sponsored in part by Zebrafish Husbandry Association (ZHA).*
Steri-Dry™ Dry Heat Solutions for Lab Animal Science Sterilizers

Why Gruenberg Dry Heat Sterilization?
- Extensive Installed Base
- Minimal Maintenance
- Less Floor Space Required
- Proven Validated Sterilization
- Onsite Assembly - No Construction to Move In
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WEDNESDAY
OCTOBER 25

AALAS Ask Me Anything (AALAS Learning Library, ACE Membership Community, CMAR, ILAM, Educational Products, Registry, Publications)

7:30 AM - 1:00 PM, CC, Exhibit Hall BC

Career Center
9-11am & 2-4pm Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)

8:00 AM - 5:00 PM, CC, 254B

Exhibit Hall
9:00 AM - 1:00 PM, CC, Exhibit Hall BC

Exhibit Hall Exhibitor Dismantle
1:00 PM - 10:00 PM, CC, Exhibit Hall BC

First Aid
7:30 AM - 10:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Mothers Room
7:30 AM - 5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Poster Sessions
9:00 AM - 1:00 PM, CC, Inside Exhibit Hall

Poster Sessions - dismantle
1:00 PM - 3:00 PM, CC, Inside Exhibit Hall

Registration
7:30 AM - 5:00 PM, CC, East Registration

Speaker Ready Room
7:30 AM - 4:00 PM, CC, 252A

Technician Fun Fair - Winner Announced
2:00 PM, CC, North Foyer

MEETINGS & EVENTS

AALAS Affiliates Roundtable Conference/ Breakfast (Invitation only; RSVP required)
7:30 AM - 9:30 AM, Hyatt, Aspen

AALAS Foundation & Boot Up for Research
8:00 AM - 11:00 AM, CC, North Foyer

AALAS Foundation Live Auction & Appreciation Reception
6:30 PM - 8:30 PM, Hyatt, Salt Lake C

AALAS Foundation Silent Auction (Auction ends at 1pm)
8:00 AM - 1:00 PM, CC, North Foyer

WORKSHOPS

(8-hour workshop continued Thursday 8:00 AM)

8:00 AM - 12:00 PM/Room: 250D

Leader/Faculty: Lesley A Colby, Susan B Harper

Facilitator: Michelle Adams

Workshop Fee: $200  Workshop Limit: 50

The animal research environment poses a multitude of potential risks to personnel health and safety. In partnership with environmental health and safety professionals, animal care and support personnel are instrumental in identifying and controlling these risks to ensure a safe environment for themselves, their staff, and others who enter or work within animal facilities. This full-day workshop will focus on the identification, assessment, and control of biological, chemical, radiological, and physical hazards commonly encountered in animal research programs. Topics that will be discussed include how to conduct a risk assessment; management of animals administered infectious agents and chemicals; humanized animals; ergonomics; equipment-related hazards; and safe housing and handling of agricultural, aquatic, nonhuman primate, and wildlife species. Facility design and disaster planning, as they pertain to occupational health and safety considerations, will be briefly discussed, while high containment (ABSL3 and ABSL4) will not be addressed. The workshop will be highly interactive, providing opportunities for participants to work in small groups and participate in discussions using web-based polling and survey tools. Through a mixture of case studies, group discussions, and interactive exercises, participants will evaluate “real world” examples and be guided through strategies for identifying potential hazards, assessing the magnitude and extent of induced risks, and developing effective and cost-efficient control measures that protect the safety of workers, animals, and the environment. The targeted audience includes vivarium managers, supervisors, lead technicians, trainers, animal care and veterinary technicians, as well as biosafety professionals.

W-14 The Joy of Training with Dr. WOW: A Cost Efficient and Effective Means to Apply the 3Rs to Hands-On Training of Research Personnel

8:00 AM - 12:00 PM/Room: 250A

Leader/Faculty: Wendy O Williams

Facilitator: Stacey M Meeker and Wanda L West

Workshop Fee: $150  Workshop Limit: 50

Training is an integral part of laboratory animal medicine improving both science and animal welfare. Often, we are tasked with training a diverse array of individuals from different backgrounds and experiences on a multitude of techniques. As trainers, we seek to ensure that our trainees learn gentle handling, in a safe and low-stress environment while also working to ensure the well-being of our animals. The integration of inanimate tools into training programs offers the opportunity to train initial processes, muscle motions, and dexterity in a low-stress setting, allowing trainees to focus on the motions and obtain proficiency prior to working with live animals. Using a multistep process with a combination of inanimate and live animal models often trainees can reach proficiency more quickly and more effectively while minimizing stress both to the trainees and animals. While some translational inanimate training tools can be cost-prohibitive, Dr. Williams has strived to develop creative and cost-effective tools that can be made from readily available
Training ToolsTM can be integrated into animal handling and techniques training to improve student success. The target audience includes technicians, veterinarians, trainers, scientists and any other AALAS attendees involved in teaching animal handling, restraint or techniques. Attendees will have the opportunity to then make and utilize their own tools to better understand how they can be implemented across a variety of settings. Participants will learn how Translational Training ToolsTM can be integrated into animal handling and techniques training to improve student learning and animal welfare and how to create Translational Training ToolsTM from inexpensive readily available materials.

This Workshop is sponsored in part by American College of Laboratory Animal Medicine (ACLAM) / American Society of Laboratory Animal Practitioners (ASLAP) Joint Program Committee.

W-15 Tools to Achieve Sustainable Diversity, Equity, Inclusion and Belonging in the Workplace: A Multiorganization Collaboration

8:00 AM – 12:00 PM/Room: 250B
Leader: Crystal H Johnson
Facilitator: Jessica Hunt
Workshop Fee: Free  Workshop Limit: 50

Diversity, Equity, Inclusion, and Belonging (DEIB) continues to be a societal issue that impacts our workplace and requires actionable steps to ensure meaningful change. Many laboratory animal research affiliations have published DEIB statements and formed committees within their respective organizations. While each of the organizations (AALAS, APV, ACLAM, ASLAP, VOEN) have developed individual plans to move their respective agendas forward, a collaborative approach leads to sustainability and increased impact to achieve like-minded initiatives. This workshop is a joint effort between AALAS, ACLAM, APV, ASLAP, and VOEN to provide an intimate setting for a collegial discussion about diversity, equity, inclusion, and belonging. Building off of the inaugural 2022 workshop, attendees will participate in breakout sessions that foster small group discussions inclusive of real-life case-based scenarios on the DEIB responsibilities of management and leadership in the workplace, unconscious bias and the barriers associated, and parameters for allyship. Participants are expected to gain practical knowledge and understanding of diversity, equity, and inclusion. This interactive workshop will showcase tools that can be applied daily to encourage a more inclusive culture and belonging within the workplace. The target audience includes veterinarians, technicians, animal care staff, researchers, IACUC staff, and vendors.

This Workshop is sponsored in part by American Association for Laboratory Animal Science (AALAS), Association of Primate Veterinarians (APV), American College of Laboratory Animal Medicine (ACLAM), American Society of Laboratory Animal Practitioners (ASLAP) and Vivarium Operational Excellence Network (VOEN).

Exhibit Hall Refreshment Break!
9:00 a.m. – 11:00 a.m.
Sponsored by TBD

**SEMINARS**

**Advances in CRISPR/Cas9 Technology in the Development of Translationally Relevant Animal Models**
8:00 AM – 10:00 AM/Room: Ballroom A
Leader: Zachary T Freeman
Moderator: Brooke D Pallas
Facilitator: Taylor Simmons

Genetically engineered laboratory animal models are important for advancing our understanding of basic science and developing translationally relevant models of human disease. Since it was first used to create knockout mice in 2012, CRISPR/Cas9 has revolutionized the generation of these systems. CRISPR/Cas9 creates double-stranded DNA breaks allowing for direct genomic editing, increasing the efficiency of generating genetically modified animal models. CRISPR has also significantly decreased the time to generate and characterize new genetically modified models. This technology has further stimulated new applications to generate more sophisticated rodent models including the insertion of human disease-associated mutations of interest. These advancements have similarly advanced large animal models allowing for the direct introduction of human genes and mutations in animals such as rabbits, pigs, and non-human primates. CRISPR can create unintended alterations in the genome, and evolution in the technology has significantly decreased these effects. Characterization of CRISPR-created models is an important component of their use to rule out and limit these off-target effects from impacting the overall phenotypes of the models. As an increasing number of models are being generated, an important component is ensuring these models are widely available and efforts are made to decrease replication in the generation of duplicative models. This seminar will provide an overview of the current applications of the latest CRISPR technology in the generation and characterization of genetically modified rodents and large animals. It is intended for a broad audience of laboratory animal professionals working with genetically modified animal models.

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This Seminar is sponsored in part by International Society for Transgenic Technologies and Rat Resource & Research Center.

**Establishing and Evolving a Behavioral Management Program: Goals, Challenges, Past Experiences, and Future Directions**
8:00 AM – 10:00 AM/Room: Ballroom B
Leader: Caroline M Widmaier
Moderator: Amanda R Knight
This seminar will discuss the speakers’ experiences establishing or expanding laboratory animal behavioral management programs at their institutions. Viewpoints from multiple research settings including academia, government, and biomedical industry will be discussed and will cover the unique challenges faced by numerous laboratory species ranging from nonhuman primates to rodents. The seminar will discuss generalized potential challenges when starting a behavioral management program, as well as more specific experiences encountered by the presenters and ideas for overcoming these challenges. Speakers will also explore goals and possible future directions in behavioral management and how to apply these ideas across programs. The target audience includes anyone interested in developing or continuing to expand into a robust animal behavioral management program, including veterinarians, facility managers, and technicians.

Facilitator: Cimarron Schuyler

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**Optimizing Operations via Emerging Technologies**

8:00 AM – 10:00 AM/Room: Ballroom G  
Leader/Moderator: Steven M Niemi  
Facilitator: Bruce Kennedy

Expectations of excellent service by researchers and a lack of skilled vivarium staff are common problems in managing and operating lab animal care programs. Recent advanced technologies offer ways to alleviate those problems while improving efficiency, animal welfare, and workplace safety. This session will feature three speakers accomplished in lab animal behavior, management, and medicine who will review the use of digitally enhanced rodent cages for 24/7 monitoring and data capture. The first speaker will discuss how machine learning can streamline animal room duties and lessen a facility's overall workload and costs. The second speaker will describe how artificial intelligence can improve welfare checks by prioritizing essential cages and enhancing the ability to identify potential welfare warnings in advance, such as aggression and fight wounds. The final speaker will present how automation may reduce ergonomic risks while boosting productivity and cage processing throughput. Each presentation will take no more than 40 minutes, and time will be provided for audience Q&A. The targeted audience includes those responsible for or interested in program and facility management, individual animal and colony health, staff productivity and workplace safety, and animal welfare. We also invite persons involved in or curious about how to apply newer technologies from other business sectors to lab animal care.

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**PLATFORM SESSIONS**

**Animal Welfare, Training, and the 3Rs**

8:00 AM – 9:50 AM/Room: 150G  
Moderator: Nick Van de Velde  
Facilitator: Jaclyn Miller

| 8:00  | PS61 Improving the design of cranial implants for sensory neuroscience in ferrets  
R Vistein, KJ Nielsen |
|-------|---------------------------------------------------------------------|
| 8:15  | PS62 Evaluation of Enrichment Preference of Tree Shrew (Tupaia belangeri)  
SR Gainer, M Smoot, S Achilles’ |
| 8:30  | PS63 MARSEILLE DECLARATION: TOGETHER WE PRIORITIZE ANIMAL WELFARE  
K Kleinschmidt-Doerr, F Bertelsen, JTF Lofgren, N Dudoignon, H Northcote, T Schutt |

**What’s Your Diagnosis 2**

8:00 AM – 10:15 AM/Room: 151G  
Moderator: Douglas K Taylor  
Facilitator: Anneke Keizer

8:00  | PS67 Persistent abdominal distension in a laboratory guinea pig  
S Yang |
8:15  | PS68 Unexpected Mortality in a Captive Wild Caught Crested Anole Colony  
JE Stuckey*, G Barnett, J MacGuire, S Chow, B Ludwig, LA Conour |
8:30  | PS69 Intermittent Lethargy and Epistaxis in a Rhesus Macaque  
EQ Zhang*, J Richig, G Duhamel, K Wharton, R Tierce |
8:45  | PS70 Suspiciously Swollen and Scaly Skin in a Recently Transported T-cell Receptor (TCR) Transgenic Mouse  
J Tsai*, JJ Klug, GE Sanders |
9:00  | PS71 Subcutaneous swelling in a laboratory ferret  
R Alionhart*, J Kopanke, B Lovasz, S Alainz, KE Saunders |
9:15  | PS72 High Mortality in Juvenile Rainbow Trout  
K Esannason*, KM O’Brien, A Carty |
9:30  | PS73 Facial Swelling in an Adult Sprague-Dawley Rat  
K Lewy*, RP Buhrer, T Lamont, IV Vemulapalli |
9:30  | PS74 Mysterious Mass in a Mangabey  
G Kim*, M Stovall, M Roy, M Crane |
9:30  | PS75 Subtle, Unilateral Hindlimb Lameness in a Lesser Egyptian Jerboa  
S Thi*, G Hish, K Eaton |

**EXHIBITOR TEACH & CHAT**

**Cayuse**

Digitizing your Facility Checklist  
10:10 AM – 10:50 AM/Room: Exhibit Hall  
Speaker: Catherine McGuire, CPIA – Solutions Consultant;  
Mark Trachtenbarg - Strategic Account Executive  
Description: Cayuse will demonstrate their application called Resource Scheduling, which was designed to streamline operations around creating schedules for animal care technicians and give supervisors the ability to track and ensure all tasks on facility checklists and spreadsheets are completed. With the use of this unique application, Cayuse can help your facilities automate schedules and remove this administrative burden for facility supervisors.
Contec Professional
Hot Topics in Cleaning & Disinfection
10:35 AM - 10:55 AM / Room: Exhibit Hall
Speaker: Dr. Mark Wiencek
Description: This engaging session will explore three key issues related to better outcomes in cleaning and disinfection: 1) Relaundered vs. disposable wipes and mops, 2) The role of mechanical removal when applying disinfectant to surfaces, and 3) How the composition (e.g., cotton, synthetic, microfiber) of the textile applicator can impact the stability of disinfectants. Recommended for vivarium techs, managers, supervisors, and directors interested in improving cleaning efficiency throughout their facility.

SPECIAL TOPIC LECTURES

Controlling Your Controlled Substances: How to Create a Compliant Controlled Substances Program
11:00 AM - 12:00 PM / Room: Ballroom H
Speaker: Sarah O’Allison
Moderator: Tanya L. Herzog
Facilitator: Audrey Harris
The use of controlled substances (CS) is vital to maintain an animal care program and use in the research environment. Often, CS is required for the appropriate sedation, anesthesia, analgesia, and euthanasia of various animal species. This class of drugs is strictly regulated at both the state and federal levels, with licensing and registration requirements for individuals to purchase, prescribe, and administer. However, there are questions about realistic best practices in the laboratory setting to ensure proper ordering, storage, record-keeping, and disposal of CS. Additionally, there might be times when principal investigators ask laboratory animal veterinarians to provide CS for their research rather than obtain their licenses and registrations. This lecture will describe how an animal care and use program at an academic institution successfully guided researchers to obtain their own licenses and registrations. Additionally, there will be advice for best practices for compliant ordering, receiving, storing, record-keeping, and disposal of CS. The intended audience is veterinarians, veterinary technicians, laboratory technicians, animal facility supervisors, and researchers.

Legal Tips for Internal Compliance and External Reporting to Federal Agencies: What To Do and What Not To Do
11:00 AM - 12:00 PM / Room: Ballroom B
Speaker: Nancy E. Halpern
Moderator: Thomas A. Leach
Facilitator: Emily Weston
Understanding the rights and responsibilities of the biomedical research community to provide accurate information to the public about animal research is increasingly critical to continue to provide safe and efficacious medical interventions to people and animals. This necessarily requires an understanding of not only what is required based on federal laws, but what rights are afforded to those regulated to preserve the ability to conduct invaluable research that saves lives. While not inherently adversarial, there must be an understanding of the roles, rights, and responsibilities of both the enforcement agencies and the facilities they inspect. Regulated entities must cooperate with inspectors and investigators from federal agencies to avoid civil and/or criminal charges for failing to comply with federal laws. Similarly, inspectors and investigators must understand their responsibilities when discussing alleged citations with the regulated community, consider all information and documents provided to dispute their alleged findings and permit sufficient time for meetings with those regulated before final reports are issued. This session will provide the regulated community with tips about how to properly manage information throughout the research cycle. The presentation will include a discussion about the generation of study protocols and standard operating procedures along with advice on how to identify and accurately report events. In addition, we will discuss what must be included

MARCEL I. PERRET-GENTIL, DVM, MS NATHAN E. BREWER LECTURE

Dr. Perret-Gentil is University Veterinarian and Director at the University of Texas at San Antonio as well as Attending Veterinarian for four other institutions. He is President of Perret-Gentil Lab Animal Veterinary Services. He has contributed to 67 papers, articles, abstracts and book chapters and has delivered 494 special presentations. He has held 35 consulting positions including governmental, biotechnology, and institutions of higher education in the U.S. and abroad. He serves as ad hoc Specialist for AAALAC International. His passion is in helping programs worldwide with limited resources develop into robust animal care and use programs.
in such reporting, what should be excluded and when (and how) to appeal an allegedly unjustified citation and respond to a further federal investigation. The presenter is a former animal health official, veterinarian, and attorney who currently represents the regulated community to help ensure that animals intended for use in research facilities are provided humane care and treatment as required by the policies of the research facilities that meet or exceed the requirements set forth by law. This session would interest attending veterinarians; animal health and care staff; principal investigators; compliance staff; IACUC managers and members.

Nathan E. Brewer Lecture: Innovation Does Not Have to Be an Intimidating Word
11:00 AM - 12:00 PM/Room: Ballroom G

Speaker: Marcel I. Perret-Gentil
Moderator: Asa D Cole
Facilitator: Margaret (Peg) Hogan

Innovation is key to making significant contributions to the lab animal field. This lecture expounds on simple but impactful concepts of innovation that are easy for anyone in the field to implement. Examples of easily attained innovative techniques and concepts will be shared to encourage you, no matter where you are in your career, to think outside the box and make impactful contributions. This lecture is geared towards a wide audience in the lab animal field, including veterinarians, technicians, investigators, IACUC personnel, salespersons, and others.

This Special Topic Lecture is sponsored in part by AALAS Awards Selection Committee.
**Panel Discussions**

* Discussion on the 2023 Report of the National Academies Committee on Nonhuman Primate Model Systems

12:30 PM - 2:00 PM/Room: 255B

**Leader:** Kelly A Metcalf Pate  
**Moderator:** Chris R Abee  
**Facilitator:** Alanna Backx  
**Panelist:** Chris R Abee, Szczepan W Baran, Myrtle Davis, Melanie L Graham, Kelly A Metcalf Pate

In 2022, the National Academies of Sciences, Engineering, and Medicine convened an ad hoc committee to examine how nonhuman primate (NHP) models are currently used in National Institutes of Health (NIH)-funded research and how the need for NHP models may change in the future. The committee consisted of experts on NHP model systems as well as experts in new approach methodologies (NAMs). The committee had 5 main objectives, the first being to conduct a review of prior and current research with NHP models and assess how the landscape had evolved since the 2018 NIH Nonhuman Primate Evaluation and Analysis report. Secondly the committee sought to identify which areas of research were likely to require NHP models in the future. The third objective was unique to the committee: To simultaneously explore how NAMs may be used to complement or reduce reliance on NHP models, the readiness of NAMs to fill this need, and how to create opportunity for those working with NHP models and NAMs to work together. This panel will consist of members of the committee who will review the conclusions as released in their spring 2023 report and allow the AALAS community the opportunity to discuss the committee’s report and findings with these representative committee members. The discussion is likely to be of interest to all members of the AALAS community regardless of role.

* Environmental Health Monitoring: A Holistic Approach for All Housing Types

12:30 PM - 2:00 PM/Room: 255C

**Leader:** Megan R LaFollette  
**Moderator:** John J Hasenau  
**Facilitator:** Wai Hanson  
**Panelist:** Megan R LaFollette, Brianné M Hibl, Wendy R Williams, Marnie S Metzler, Caroline Bodi Winn

Environmental health monitoring refers to any technique to monitor colony health without the use of live sentinel animals. Although the evidence for these techniques is mounting and there are more institutions using these approaches, obstacles to implementation remain. In particular, institutions with mixed housing types may find the switch more challenging due to certain techniques (e.g., exhaust dust testing) only being amenable for certain rack types, or due to concerns that operations will be cumbersome. Attendees will get updates from The 3Rs Collaborative’s longitudinal benchmarking survey on prevalence and barriers. Then, in a roundtable session, panelists from different institutions will present data comparing the use of mixed methods such as comparison of exhaust dust testing, testing of sentinel-free soiled bedding, and soiled bedding sentinels. We will review and discuss lessons learned based on media performance, institutional needs, and implementation of changes to their health monitoring programs and outcomes. While no single approach may fit all, we will demonstrate that mixed methods can be applied practically, and helpful resources are available to implement environmental health monitoring at scale. The target audience is anyone interested in rodent health monitoring especially veterinarians, managers, and technicians.

* This Panel Discussion is sponsored in part by The 3Rs Collaborative.

* Evolution of Behavior Management

12:30 PM - 2:00 PM/Room: 255E

**Leader:** Kristina A Bartley  
**Moderator:** Jennifer N Camacho  
**Facilitator:** Chineta Pullin  
**Panelist:** Kristina C Bartley, Jennifer N Camacho, Genevieve Andrews-Kelly

Behavior management has evolved significantly since the original implementation of USDA AWA requirements and has become a specialty within the field of laboratory animal science. Industry-accepted, behavior-management regulatory requirements and guidelines are not supported by formal curricula or resources for training and personnel specializing in lab animal behavior management. The purpose of this panel is to compare, contrast and highlight novel methods of behavior management and outcome measures to meet the expectations of the Animal Welfare Act and the Guide for the Care and Use of Laboratory Animals. The intended audience is veterinarians, enrichment coordinators, behaviorists, and those invested in improving and evaluating behavior management procedures or promoting a culture of care. As behavior management and our understanding of laboratory animal welfare evolve, it is becoming increasingly important to harmonize our knowledge and plan for consistent training of behavior professionals. Animal behavior is a critical measure of welfare, but it can be challenging to evaluate on a consistent scale. The organizers of this panel seek to create an open dialogue with the research community to address this challenge. The American Association for Laboratory Animal Enrichment and American Association for Laboratory Animal Science provide resources and training opportunities to improve and promote continued animal welfare science and current behavioral management techniques and evaluation methods.

* The Anesthesia/Analgesia Puzzle: Putting All the Pieces Together by Answering YOUR Questions!

12:30 PM - 2:00 PM/Room: Ballroom G

**Leader/Moderator:** Rebecca A Johnson  
**Facilitator:** Kim Klukas  
**Panelist:** Rebecca A Johnson, Cholawat Pacharinsak

This historically famous panel discussion will answer audience questions about the newest yet most practical anesthetic and analgesic techniques used in laboratory animal species. Attendee dialogue will begin with a panelist-led presentation of previously submitted questions and progress to a real-time question-and-answer session. We aim to focus on common yet challenging anesthetic cases in the research setting that will help the research team put “all the puzzle pieces together” with regard to anesthesia/analgesia. Topics will depend on audience questions but may include novel and validated pain scoring systems and advances in clinical anesthetic and analgesic techniques (including innovative use of pharmacologic agents). The most useful anesthetic monitoring systems, as prompt and accurate diagnosis and treatment of physiological disturbances during anesthesia, are paramount to improving animal morbidity, mortality, and experimental outcomes. Participants should understand appropriate and current lab animal anesthetic techniques and how to properly recognize and treat acute and chronic pain states in various laboratory animals using the most up-to-date clinically available analgesic techniques. The information gained will be valuable for all veterinary personnel caring for laboratory animal species through-
out a laboratory procedure, including those responsible for providing pre- and intra-procedure anesthetic techniques and personnel relied upon for post-procedural care and analgesic monitoring.

The Path Forward for Openness and Expanded Public Communication about Animal Research

12:30 PM - 2:00 PM/Room: 255F
Leader: Paula A Cliford
Moderator: Nicole Navartil
Facilitator: Amanda Sparks
Panelist: Jennifer LS Lofgren, Sally Thompson-Iritani, Jim Newman

The US Animal Research Openness (USARO) Initiative is a collaborative effort to expand public communications by research organizations about how, when, and why animal studies are necessary. The primary goal of this initiative is to foster meaningful public conversations about the critical role of animals in research, teaching, and testing. Participating institutions are encouraged to be clear about how animals, as well as alternative technologies, are needed to develop safe and effective treatments and gain essential insights into how living systems operate. At this current point in time, groups opposed to the use of animals in research are increasingly influencing levels of public support. This poses a critical threat to future advancements benefiting humans and animals alike. This session will provide an update on the progress of the USARO initiative. It will feature two organizations identified as USARO “exemplars.” Representatives from both organizations will share their experience in expanding animal research openness at their institutions as well as gaining leadership buy-in to be recognized by the USARO Initiative as a model for other institutions. In addition to providing an initiative status update, we will address several common questions, such as how to respond to claims by animal research opponents effectively, the costs associated with expanding openness, how to get institutional approval, and the best practices for communicating about animal studies. Participants will learn the progress of the nationwide effort to expand public communications by research organizations and how to participate; specific examples of how institutions are expanding openness efforts and ideas on how to gain leadership buy-in; and answers to common questions raised when seeking institutional support for increased public education and communication about animal research. This session would benefit Veterinarians, Scientists, Administrators, Animal care leadership, and Institutional officials.

WORKSHOPS

W-16 Not Just a Document: The Art of Crafting SOPs That Work

1:00 PM - 5:00 PM/Room: 250C
Leader/Faculty: Amy L Dryman
Facilitator: Michelle Farkas
Workshop Fee: $150  Workshop Limit: 50

This workshop will cover how to build SOPs so that they are fit and functional for your team and program. We will explore SOP anatomy and function, solve the riddle of when is an SOP not an SOP, and dive into how to develop and then write an SOP that’s a useful tool and reference. While we won’t get from the first draft to a finalized tool, we will examine key points to keep in mind when developing, writing, editing, and finalizing SOPs. Participants will get the chance to put those points to the test during the workshop. The audience for this session is anyone tasked with writing SOPs for their program or interested in learning to create an SOP from scratch. This workshop is not intended for an audience looking to learn how to cover GLP specifics.

W-17 Teaching Monkeys to Cooperate with Restraint: Using Positive Reinforcement Training and Temperament

(8-hour workshop continued Thursday 8:00 AM)
1:00 PM - 5:00 PM/Room: 250E
Leader: Jane E Perlman
Faculty: Jennifer L McMillan, Kris Colemen, Mollie A Bloomsmith
Facilitator: Lisa Houser
Workshop Fee: $250  Workshop Limit: 50

The workshop includes 8 hours of instruction on using positive reinforcement training (PRT) to teach monkeys to cooperate with various restraint procedures and provide information about utilizing temperament testing to assist in the selection of subjects and planning for their training. Participants will learn approaches to training laboratory primates to cooperate with restraint for sample collection (e.g., blood) and administration (e.g., injections) and for chair restraint. PRT is an important refinement in the care of nonhuman primates and an effective means of improving their welfare. However, animals respond differently to restraint and measuring temperament provides insight into how individuals might respond to these procedures, allowing for individualized and more effective training plans. The goals are to review animal training terminology and techniques; teach PRT techniques as they apply to restraint procedures, such as the use of the cage squeeze-back mechanism and chair restraint; teach methods to assess and quantify temperament in monkeys and to use this information to develop individualized training plans. Participants will learn how to establish a foundation for successful restraint training using PRT, and how to incorporate alternative techniques such as negative reinforcement to meet research timelines. They will learn to identify monkeys who are engaged in the training process and how to increase the involvement of monkeys who seem uninterested in training. Participants will learn how to shape restraint behaviors and apply desensitization techniques, maintain trained behaviors over time, and transfer trained behaviors among multiple staff members. Participants will learn how temperament can impact training approaches and the anticipated timelines for training to cooperate with restraint. Understanding the intersection of individual differences in temperament and animal training will aid in the design of more efficient animal training programs. This workshop is designed for those with basic knowledge of animal training terminology and techniques and who have animal training experience including behavior specialists, animal caregivers, research technicians, animal managers, veterinarians, and investigators.

This Workshop is sponsored in part by Britz and Company, Lonir, Carter2Systems, The 3Rs Collaborative (3RSC), and NCG3s.


1:00 PM - 5:00 PM/Room: 250B
Leader: Logan Fehrenbach, Raphael A Mallbrue
Faculty: Mary E White, Mike B Palillo, Logan R Bern, Alexander G Kramer, Toi A Collins
Facilitator: Jennifer Hickerson
Workshop Fee: $150  Workshop Limit: 50

The Zebrafish Husbandry and Facility Management 101: “The Basics” Workshop will provide attendees with introductory hands-on experience working with zebrafish in a research setting. The target audience is laboratory animal professionals (i.e., technicians, veterinarians,
researchers) who are new to working with zebrafish or searching for a refresher course to review current practices. Attendees will gain exposure to daily husbandry, clinical, and operational duties from laboratory animal veterinarians and aquatic technical staff to accomplish the following learning objectives: History of Zebrafish Research and Role in Biomedical Research, Introduction to Zebrafish Biology, Introduction to Zebrafish Husbandry, Zebrafish Facility Management, Zebrafish Nutrition and Feeding Programs, Biosecurity and Health Surveillance Programs and Regulations, Policies, and Guidelines Pertaining to Zebrafish in Research. The workshop will incorporate a series of interactive lectures focused on the listed objectives (i.e., case studies and virtual video simulations; no live animals will be used). Attendees will also receive hands-on experience with basic husbandry techniques such as setting up rotifer polycultures and basic water quality testing.

This Workshop is sponsored in part by VRL Animal Health Diagnostics.

PLATFORM SESSIONS

**Clinical 2**

3:00 PM – 4:45 PM/Room: 150G

**Moderator:** Lon V Kendall

**Facilitator:** Kelly A Jimenez

### 3:00

**PS76** High-mortality epizootic *Mycobacterium ulcerans* ecovar Lilandii in a colony of Zaire Dwarf Clawed Frogs (*Hynemochirus boettgeri*)

M Boulanger', J Keller, M Hoenerhoff

### 3:15

**PS77** Armenian hamsters (*Cricetulus migratorius*): A new host for *Corynebacterium bovis* infection

A Michelson', K Walton, C Cheleuitte-Nieves, B Geist, I Miranda, NS Lipman

### 3:30

**PS78** Novel demonstration of *Corynebacterium bovis*-associated lesions and interface dermatitis in NIH-Foxn1nu rats (*Rattus norvegicus*)

MN Campbell', I Miranda, NS Lipman

### 3:45

**PS79** Incidence of dystrophin mutations in swine (*Sus scrofa domestica*): novel porcine stress syndrome implications for physiology during anesthesia

JS Corrigan', J Mares, J Hutzler, D Burmeister

### 4:00

**PS80** Efficacy and Effects of High-dose Carprofen after Plantar Incision in B6 Mice

RM Cotton', ED Alamaw, K Casey, K Jampachaisri, C Pacharinsak, M Huss

**Laboratory Investigations 4**

3:00 PM – 5:00 PM/Room: 151G

**Moderator:** Heather A Zimmerman

**Facilitator:** Lisa Steiner

### 3:00

**PS81** Don't Stand So Close to Me: Do Aging Adult Male Rats Prefer to be Alone or in Pairs?

DL Hickman', A Horvath, BA Skales

**SEMINARS**

**Importance and Challenges of Animal Models with Unusual Species**

3:00 PM – 5:00 PM/Room: Ballroom A

**Leader/Moderator:** Sylvia I Gografe

**Facilitator:** Margaret (Peg) Hogan

This seminar will captivate the audience with an introduction to scientific, husbandry, and species-specific facts about a few uncommon research species! Independent of your role in your institution’s animal care and use program you can glean an insight and learn from the inventiveness and solutions found by your colleagues to facilitate research with these models, while keeping the animals comfortable in captivity. The speakers will not only focus on the important research contributions of these species, but will also discuss the unique husbandry requirements, behavior, anatomy/physiology, common health conditions and safety and regulatory challenges. Fat-tailed dunnarts (*Sminthopsis crassicaudata*), often called “marsupial mice,” are numerous throughout parts of Australia but only about 200 of them exist in the first captive-bred colony in the U.S. Learn about this small carnivorous mammal as an emerging research model, where unique clinical and husbandry tasks include pouch checks for new joeys and preparation of a protein-rich diet ranging from meatballs to scrambled eggs. Did you know that the phenomenon of bright, conspicuous colors and patterns of poisonous frogs is called “aposematism”? Although this feature is intriguing, it adds to the unique care requirements when working with “poison dart frogs” as does their small size, swiftness, and the need for live
preg. The opposite challenge regarding size will be explained when presenting on whitetail deer (Odocoileus virginianus) and Reeves muntjac (Muntiacus reevesi), especially when needed to maintain them entirely indoors due to concerns of environmental contamination with a prion disease model. Nevertheless, finding a newborn fawn in the morning lets one forget the difficulties. After the talk about the opossum (Didelphis virginiana) you will certainly understand why the only North American marsupial is such an interesting creature. It has more than 50 teeth and, even with poor eyesight, it is a fast runner. Studies from snake venom toxicity to gastrointestinal surgery have also been conducted with these critters.

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**Lost in Translation: Addressing Extrinsic Factors In Research Reproducibility**

**3:00 PM – 5:00 PM/Room:** Ballroom B  
**Leaders:** F Claire Hankenson and John J Hasenau  
**Moderator:** John J Hasenau  
**Facilitator:** Dawn Hidenfelter

Using animal studies efficiently and effectively is predicated on our understanding of animal biology and pathobiology, how that biology relates to the human systems being modeled, and how the studies are conducted and reported. This seminar will highlight and review various factors in the animals’ environment and experience (aka extrinsic factors) that should be disclosed to increase understanding of the general relevance of animal studies and research outcomes. As our research community and the general public become increasingly aware of how experimental designs differ, clarifications will help increase global comprehension of scientific nuances inherent to research. Animal housing and husbandry practices are critical for reproducible science, yet these details are rarely included in manuscripts by scientific journals due to word limitations and publication constraints. Animal environment and how data are collected significantly impact both experimental outcomes and reproducibility. Various extrinsic factors and behavioral adaptations that influence rodent thermoregulation and the subsequent translatable nature of many rodent models of human disease will be discussed. Animal handler interactions with animals will also be reviewed in the context of rigor and reproducibility. The adoption of specific research journal guidelines, covering improvements in the reporting of relevant extrinsic factors and including guidance on overcoming journal constraints, will be presented. Above all, considerations for prioritizing animal welfare will be highlighted in the discussions of biomedical research. This seminar builds on the 2021 report from the NIH Advisory Committee to the Director (ACD) Working Group on Enhancing Reproducibility and Rigor in Animal Research. The target audience includes all individuals engaged in research involving animal models, including animal facility managers and directors, lab animal and research technicians, staff, veterinarians, IACUC members, and scientists.

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**Mouse Resources: All Your Needs for Optimal Mouse Models**

**3:00 PM – 5:00 PM/Room:** Ballroom H  
**Leaders:** Craig L Franklin, Jim M Amos-Landgraf  
**Moderator:** Jim M Amos-Landgraf  
**Facilitator:** Stephanie Fowler

Mouse models are critical for almost all areas of human health and disease investigation and comprise most animal models in contemporary biomedical research. With the advent of genome editing technologies such as CRISPR/Cas9, the number of available models has dramatically increased over the past several years. With this model, explosion came many challenges to the laboratory animal science community, including model procurement and sharing, model integrity, and pathogen biosecurity to optimize reproducibility, space availability, and disaster preparedness. The NIH-supported Mutant Mouse Resource and Research Centers (MMRRCs) serve the scientific community in addressing these challenges by aiding investigators in finding, distributing, and cryopreserving scientifically valuable, genetically engineered mouse strains. Moreover, these centers have developed tools to ensure the genetic integrity of mouse strains and troubleshoot scenarios where model phenotypes are not as expected. In this seminar, facility managers, procurement/shipping agents, laboratory animal veterinarians, and all mouse users will learn about how the MMRRC can best aid in optimizing your mouse model needs.

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**Ongoing Changes Within the Animal Research Oversight Environment**

**3:00 PM – 5:00 PM/Room:** Ballroom G
Leader/Moderator: B Taylor Bennett  
Facilitator: Brandon Morton

This past year has been a busy one when it comes to keeping up with issues that impact the animal research oversight environment. There continues to be an unprecedented number of bills introduced at the state and federal levels with the potential to affect animal research. There have been revisions to the Animal Welfare Regulations and a notice of proposed revisions. At the same time, the process for addressing the proposed actions in the joint Report on Reducing Administrative Burden for Researchers: Animal Care and Use in Research (released 8/28/2019) continues and, as part of its strategic plan, AAALAC is exploring a move of their office to Europe. In addition, there are ongoing discussions on the process for updating the Guide for the Care and Use of Laboratory Animals. The FDA will join the panel this year to discuss the indexing program for minor species, including most laboratory animal species. All of this either has had or will impact how animal care and use programs are managed going forward. This seminar will provide the attendees with an opportunity to hear from representatives of the USDA, OLAW, AAALAC International, the DOD, FDA, and NABR regarding these ongoing issues and possible changes within their organizations and to discuss with those representatives how their organizations’ activities impact the environment in which we work and what changes to expect in the future. Questions for the speakers can be submitted to btbdvm@yahoo.com. The target audience will be those who need to keep current with the regulations and requirements for conducting animal-based biomedical research.

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<td>4:10 Dorothy Bailey</td>
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This Seminar is sponsored in part by USDA, NIH, DOD, AAALAC International, FDA and NABR.
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THURSDAY MORNING

AALAS 74TH NATIONAL MEETING

SEMINARS

**Consideration of the Microbiome as a Research Variable**

**8:00 AM – 10:00 AM/Room:** Ballroom B  
**Leader:** Loni A Taylor  
**Moderator:** Tracy H Vemulapalli  
**Facilitator:** Ryan P Buhrer

Understanding the gastrointestinal microbiome profile of our laboratory animals, and the potential variables influencing its composition, is of the utmost importance. This is due to the microbiome’s many physiologic impacts on the host and therefore the effect the microbiome could have on research conducted in animal models. Many human studies have recently been published demonstrating associations between microbiome composition and physiologic processes including vaccine response, neurologic diseases, neurodegenerative diseases with amyloid plaque accumulation, intestinal illnesses, liver illnesses, metabolic disease leading to obesity and type 2 diabetes mellitus, and neoplasia predisposition such as post-menopausal breast cancer. While studies in large animal models are limited, associations in pet dog populations have been made between microbiome composition and obesity and cancer. There is substantial research pointing to this connection in small animal models as well. There is also an increasing realization that microbiota has co-diversified with mammals during evolution and that conventional laboratory mice lack host-microbe interactions that are physiologically important. This has resulted in approaches to return the natural microbiota to laboratory mice, which will be discussed. Participants will learn testing options and modalities for the assessment of animal microbiome, the effects of the GI microbiome on large animal models in research, the effects of subclinical infections of the GI microbiome, and the effects of wild mouse microbiota on host immune responses and metabolism.

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**Integrated Digital Data Systems in the Animal Care and Use Program**

**8:00 AM – 10:00 AM/Room:** Ballroom H  
**Leader/Moderator:** Emma Liechty  
**Facilitator:** Nicole M Pach

Whether public or private, animal care programs are challenged to provide diverse operational functions in a highly regulated environment. Collection and integration of data from multiple programmatic areas improves efficiency, reduces error, and supports evidence-based clinical and business decision-making. In this

WORKSHOPS


*(8-hour workshop continued from Wednesday 8:00 AM)*  
**8:00 AM – 12:00 PM/Room:** 250D  
**Leader/Faculty:** Lesley A Colby, Susan B Harper  
**Facilitator:** Michelle Adams

See Wednesday at 8:00 AM for pricing and description.


*(8-hour workshop continued from Wednesday 1:00 PM)*  
**8:00 AM – 12:00 PM/Room:** 250E  
**Leader:** Jaine E Perlman  
**Faculty:** Jennifer L McMillan, Kris Coleman, Mollie A Bloomsmith  
**Facilitator:** Lisa Houser

See Wednesday at 1:00 PM for pricing and description.  
*This Workshop is sponsored in part by Britz and Company, Lomir, Carter2Systems, The 3Rs Collaborative (3RsC), and NC3Rs.*

**2023/2024 AALAS Program Committee**

2:15 PM – 5:00 PM, Hyatt, Powder Mountain

**AALAS Executive Committee Meeting**

9:00 AM – 11:00 AM, Hyatt, Deer Valley

First Aid  
7:30 AM – 5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Mothers Room  
7:30 AM – 2:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

Registration  
7:30 AM – 12:00 PM, CC, East Registration

Speaker Ready Room  
7:30 AM – 1:00 PM, CC, 252A

Career Center  
9-11am Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)

8:00 AM – 2:00 PM, CC, 254B

**THURSDAY OCTOBER 26**

9AM – 11AM Career Center

9-11am Veterinarian Job Fair sponsored by ACLAM, APV and ASLAP (see mobile app for companies participating)

8:00 AM – 2:00 PM, CC, 254B

**First Aid**

7:30 AM – 5:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

**Mothers Room**

7:30 AM – 2:00 PM, CC, Exhibit Hall Level between Escalators and Room 150

**Registration**

7:30 AM – 12:00 PM, CC, East Registration

**Speaker Ready Room**

7:30 AM – 1:00 PM, CC, 252A

**Registration**

7:30 AM – 12:00 PM, CC, East Registration

**Speaker Ready Room**

7:30 AM – 1:00 PM, CC, 252A

**2023/2024 AALAS Program Committee**

2:15 PM – 5:00 PM, Hyatt, Powder Mountain

**AALAS Executive Committee Meeting**

9:00 AM – 11:00 AM, Hyatt, Deer Valley
We describe how our large academic institution has integrated multiple systems beginning with an electronic IACUC protocol, and incorporating animal orders, imports, exports, requests for veterinary and husbandry services, facility management, and medical record systems. Animal Operations (AOPS) is the hub of our integrated system receiving data from IACUC protocols, tablet computers, and medical records systems. Tablets located within animal holding rooms are a data entry point for select functions which has reduced the need for paper and manual data entry. Data collected within AOPS is transferred to two medical record systems, one for USDA-covered animals and the other for rodent health reports. These integrations have allowed us to take a ‘point of care’ approach to data collection, using the tablet computers located in each animal room. We describe the process of tablet and database development, as well as the integration of data into user-friendly business intelligence reporting tools. During the presentation, we will share challenges faced and provide example analytics for business and husbandry operations, rodent veterinary care, veterinary service requests, and controlled substance distribution. The final seminar discusses data security, storage, and platform development. The target audience includes facility managers, veterinarians, and business operations experts.

### Speakers/Topics:

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<th>Time</th>
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<tbody>
<tr>
<td>8:00</td>
<td>Emma Liechty Welcome and Introductions</td>
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<td>8:05</td>
<td>Alex Bosch Tablets and Animal Operations</td>
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<tr>
<td>8:30</td>
<td>Archer W Curry Rodent Health Database &amp; Rodent Clinical Analytics</td>
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<tr>
<td>8:55</td>
<td>Stephen I Levin Service Requests &amp; Controlled Substances</td>
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### Making the 3Rs More Than a Checkbox: Developing a 3Rs Culture at Your Organization

**8:00 AM – 10:15 AM/Room:** Ballroom G

**Leader:** Sally Thompson-Iritani  
**Facilitator:** Jeanette Pearson  
**Speakers/Topics:**

- **Megan R LaFollette:** Welcome and Introduction
- **Sally Thompson-Iritani:** 3Rs Culture in an Academic Setting
- **Megan R LaFollette:** 3Rs Resources
- **Elizabeth A Nunamaker:** 3Rs Culture and Philosophy
- **Lisa Rehm:** 3Rs Culture in an Industry Setting
- **Patricia V Turner:** 3Rs Culture in a CRO

**This Seminar is sponsored in part by 3RsC.**

### Platform Sessions

#### Husbandry/Management 3

**8:00 AM – 9:30 AM/Room:** 150G  
**Moderator:** Sharoll L’Italien  
**Facilitator:** David M Hampton

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<tr>
<th>Time</th>
<th>Topic/Presenter</th>
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<tbody>
<tr>
<td>8:00</td>
<td>PS90 Welfare Wednesday: A Weekly Installment for Continuous Animal Welfare Training</td>
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<tr>
<td>8:15</td>
<td>PS91 Reducing Errors and Increasing Operational Efficiency Using Modern Cloud Study Management Solutions</td>
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<tr>
<td>8:45</td>
<td>PS93 The “Aunting” System – Improving Survival in Immunocompromised Mouse Strains Post-Weaning</td>
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<td>9:00</td>
<td>PS94 Thinking out of the box to get into the dirt: Constructing a visible burrow system habitat for rats</td>
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<td>9:15</td>
<td>PS95 Dealing with a flood in an aquatic facility: how to keep the head above the water</td>
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#### Laboratory Investigations 5

**8:00 AM – 10:15 AM/Room:** 151G  
**Moderator:** Stara N Robertson  
**Facilitator:** Madison S Wheaton

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<th>Time</th>
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<td>8:00</td>
<td>PS96 Musings on the Microbiome: Does Water Delivery Source Make a Difference?</td>
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THURSDAY MORNING

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<th>Time</th>
<th>Session Title</th>
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<tbody>
<tr>
<td>8:15</td>
<td>PS97 Neuroblastoma Cell Line Engraftment in 48 Hours Post-Fertilization</td>
<td>PZerbeishif Larvae</td>
<td>Ballroom B</td>
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<td>JM Lawrence*, S Zhu, FD Duke Boultyn</td>
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<td>8:30</td>
<td>PS98 Age at Intravenous Administration of AA9 and an Engineered Variant, AALCAP-Mac, Influences Transduction Efficiency in the CNS of C57BL/6 Mice</td>
<td>JS Frankel*, MG Langrehr, HA Born, BA Jeffrey, EM David, TL Goode, J Hordeaux, JM Wilson</td>
<td>Ballroom H</td>
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<td>8:45</td>
<td>PS99 Histocompatibility as a function of inbreeding in miniature swine</td>
<td>E Manelli*, E Gunes, H Mulder, S Patwardhan, J Hong, P Jordache, M Sykes, D Sachs, J Weiner</td>
<td>Ballroom G</td>
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<tr>
<td>9:00</td>
<td>PS100 Comparing Different Strategies to Reduce Hepatocellular Damage in Obese Common Marmosets</td>
<td>M Brown*, L Feller, J Trupkiewicz, J Iizi</td>
<td>Ballroom H</td>
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<td>9:15</td>
<td>PS101 Effects of LED lighting on fecundity in C57BL/6 mice</td>
<td>JE Stuckey*</td>
<td>Ballroom B</td>
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<td>9:30</td>
<td>PS102 A comparison of fluorescent versus LED lighting on reproductive success in laboratory zebra finches (Taeniopygia guttata)</td>
<td>AG Backx*, A Wu, A Tanner, MS Fee, N Fabian</td>
<td>Ballroom H</td>
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<td>9:45</td>
<td>PS103 Effect of Tunnel Handling to Reduce Fighting in Aggressive Male Mice</td>
<td>K Eagleson*, J Del Valle, M Granzow, M Gordon</td>
<td>Ballroom B</td>
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<td>10:00</td>
<td>PS104 Treatment of ulcerative dermatitis restores immune cells to homeostatic levels in mice</td>
<td>D Yoakum*, PM Marcovecchio, DJ Araujo, L Padgett, R Wu, S Sharma, CC Hedrick</td>
<td>Ballroom B</td>
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SPECIAL TOPIC LECTURES

*Is Your Data FAIR? Applications of Institutional Data Management Systems to Improve Data Access and Integrity

11:00 AM – 12:00 PM/Room: Ballroom B
Speaker: Sharron M Kirchain
Moderator: Timothy J Scott
Facilitator: Ella Torian

FAIR data is FINDABLE, ACCESSIBLE, INTEROPERABLE, and REUSABLE. Originally published in Scientific Data in 2016, the FAIR Guiding Principles for scientific data management and Stewardship focus on ways to transform data into digital formats and automated processes to improve the utility and reliability of these assets. The application of FAIR data systems will be described in academic and industry settings. REDCap is a web-based application that was originally built by Vanderbilt University in 2004 and is now available through a consortium to more than 6,000 academic research and hospital institutions. We will take the audience through our in-house build process and implementation of REDCap for electronic animal health records at a large academic research hospital. Digital and Data Ecosystem (DDE) is an in-house built data capture and management system to enable cross-functional augmented analysis, modeling, and reporting. We will walk through the phases of implementation from the build of the repository of three FAIR data sources (external/public, partnered/licensed, and internal/local) to data extraction, integration, and finally transformation for enhanced scientific analysis. These examples of data management systems in academic and industry settings demonstrate how FAIR data management is essential to attaining a 3Rs culture and ensuring our stewardship of animal-based research data through the entire scientific lifecycle from basic science discovery to the realization of therapeutic and preventive medicine in patients.

Key Planning Concepts in the State-of-the-Art Non-Human Primate Research Facility

11:00 AM – 12:00 PM/Room: Ballroom B
Speaker: E Scott Kreitlein
Moderator: Marcel I Perret-Gentil
Facilitator: Steve C Hackman

In the aftermath of the most impactful public health crisis imposed on humanity in recent decades and the threat of a future global pandemic have resulted in a resurgence of research and vaccine development. Government regulations require that vaccines be tested under strict guidelines and protocols to ensure efficacy and safety. This testing must be performed with the objective of assuring the treatment, health, and welfare of the animal is held to the highest possible standard. Perhaps the most challenging species to house, maintain, and utilize in drug testing and scientific research is non-human primates (NHPs). They are also the most critical in the drug approval process given their genetic similarity to humans. For some years now, their demand has far exceeded their availability for a variety of reasons. Recognizing the shortage, this year, the National Institutes of Health offered organizations and institutions that utilize NHPs the opportunity to compete for special funding with the goal of increasing NHP availability. With that background as a foundation, this special topic presentation will focus on the planning, design, and construction of facilities that specialize in non-human primates. Issues discussed will be various housing scenarios, including the interior, exterior, and a combination for both research and breeding. The guidelines and recommendations under which they must be planned and constructed will be delineated for both US and European standards. Participants – ranging from facility managers to veterinarians and technicians – will learn about the increased need for this research, the guidelines, standards, regulations, and adaptable elements of planning and design that support a successfully constructed and operated facility.

Unified Ethical Principles for Global Collaboration

11:00 AM – 12:00 PM/Room: Ballroom G
Speaker: Sally Thompson-Iritani
Moderator: Megan Lafollette
Facilitator: Mary Sauer

As research programs progress and global communication networks continue to increase there is a need for a shared understanding and set of principles to help guide confidence and support for international collaborations. The purpose of this presentation is to propose a common framework for international researchers when they require animal models to support their scientific discoveries. The rationale for providing this guidance is to foster global collaborations with the confidence of a commitment to a foundational set of principles for the assessment of their work. This presentation will review an analysis of the 3Rs and the proposed unified ethical framework to support international collaborations and the standardization of ethical principles regarding the use of animal models. This approach combines the common guiding principles that are relied on for clarifying when the use of animal models is necessary and the thoughtful approach to this consideration. These principles include (1) the 3Rs: Reduction, Refinement, and Replacement; (2)
This session will be of interest to principal investigators, lab animal professionals (LAPs), research faculty & staff, animal caregivers, and the lab animal science community.

Emerging Animal Rights Trends Across the US and UK: Understanding the Situation and Combating the Misinformation

12:30 PM - 2:00 PM/Room: 255E
Leader: Shelly Carballo
Moderator: Cindy Buckmaster
Facilitator: Shane West
Panelist: Jim Newman, Wendy J Jarrett

The 2020s have been a pivotal and highly active decade for the animal rights movement in both the United States as well as the United Kingdom. In the U.S., an infiltration by People for the Ethical Treatment of Animals successfully resulted in the closure of a Virginia research animal breeding facility. Activist-inspired federal legislation has caused significant public misunderstanding about the current capabilities of non-animal alternatives and the likely timeline for their implementation. At the same time, campaigns targeting the source of lab animals are jeopardizing necessary health research and the development of new therapies. In the United Kingdom, activists have launched aggressive, sustained campaigns targeting a wide variety of research facilities. These campaigns have even featured lab animal thefts, vandalism, arrests, and legal charges. Presentations by representatives from both countries will provide attendees with a global view of the issue as animal rights tactics are frequently exported both ways across the Atlantic. This presentation will provide an overview of the current threats to biomedical research using animals. It will also provide actionable ideas and advice from international experts in the U.S. and U.K. on what facilities can do to better prepare themselves and combat these new, more aggressive campaign tactics. During the Q&A period, attendees will be invited to ask questions and receive advice related to their individual organization’s risk levels and their pathways across the Atlantic.

Designing the Future Vivarium

12:30 PM - 2:00 PM/Room: 255C
Leader/Moderator: Dana M LeMoine
Facilitator: Kristin Killoran
Panelist: CJ Arnett, Robert W Engelman, Massimo Ferrari, Harry Lim

What does the future look like for research animal facilities? We must consider ways to adapt to changing workforce demands, shifting research needs, evolving institutional visions, and environmental sustainability goals. The solutions may be intrinsic to optimized facility designs or achieved via technological enhancements such as automation, robotics, and data capture. Our panelists from research institutions will provide their boots-on-the-ground experiences with designing facilitative, adaptable research facilities, renovating existing vivaria to meet future demand, and implementing new technologies. Vendor representatives on this panel will provide their perspectives on market trends, discuss the biggest challenges facing our field, and share how flexible solutions may be tailored to meet your own institution’s unique needs. Learn how efficient facilities, improved workflows, and technology can not only enhance animal welfare, support the 3Rs principles, and facilitate scientific progress, but also improve employee engagement and motivation. This session is primarily targeted toward facility managers, program directors and other personnel involved in planning facility renovations/upgrades or new facilities. This will be an interactive session with ample time dedicated to audience questions. Panelists will cover aspects across species including rodents, zebrafish, rabbits, swine, and NHPs.

PANEL DISCUSSIONS

Conversations on How to Create an Inclusive Environment for Animal Caregivers in Lab Animal Science

12:50 PM - 2:00 PM/Room: 255B
Leader: Preston Van Hooser
Moderator: Bruce W Kennedy
Facilitator: Jade Arnold
Panelist: Deanne C Buffum, Arnold Arluke, Holly M Nguyen, Terry L Fritter

Imagine that you go to work every day, put in long, physically exhausting hours, and go home only to feel uncertain about your work. You spend your days feeling invisible, only to be seen and heard by the research animals in your care. You know you are assigned this important caregiver role, but you are not connected in any way to the significance of these animals or their purpose in advancing biomedical research. If this is difficult to imagine, then you are likely not an animal caregiver in the field of laboratory animal science. Conversations on How to Create an Inclusive Environment for Animal Caregivers in Lab Animal Science is about having open discussions with the animal caregiver community in a way that they will feel seen, heard, and acknowledged for their critical role in supporting your important research. We would like to utilize this panel discussion to raise awareness about the exclusion of animal caregivers in research, generate ideas on how to build their relationships with the research community and implement practices that will turn around the feelings of uncertainty and isolation in their work. We want animal caregivers to understand and feel connected to the important contributions that researchers are making every day to improve the health and well-being of our society. The information gathered during this panel discussion will be assembled and published as a resource for the global lab animal community. We hope participants will learn what it means to be inclusive for all parts of the research team, realize how our actions as researchers may inadvertently make animal caregivers feel unappreciated as well as create a globally positive culture on how to make animal caregivers feel acknowledged, respected, and part of the overall research team. This session will be of interest to principal investigators, lab animal professionals (LAPs), research faculty & staff, animal caregivers, and the lab animal science community.

The 3Vs: Good Science, Good Sense, and Good Sensibilities: (5) the 3Vs: Construct, Internal and External Validity; (4) the 4Fs: Fundamental Principles of the necessity of biomedical and animal research and minimization of pain and distress, and (5) the 6 Principles that encompass a harm-benefit and minimization of harm premise. Further incorporation of additional tools such as a preamble to this would be a more formal use of the Basel Declaration which clearly states a commitment to science and animal welfare. This presentation will cover the important role of individual accountability and commitment by acknowledging a set of statements such as the Basel Declaration. This proposal will provide suggestions for future incorporation on how the declaration can be integrated into one’s work and assist with an open dialog on the use of animals in research. This session will interest veterinarians, veterinary technicians, animal care personnel, researchers, administrators, and IACUC staff. The learning objectives include discussing the evolving global oversight of animal research, learning how to apply unified ethical principles to collaborative programs, and learning about tools for commitment and accountability to provide common understandings i.e. Basel Declaration.

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various hurdles to lessening risk. This session will be of interest to veterinarians, administrators, animal care leadership, institutional officials, and animal care staff.

*This Panel Discussion is sponsored in part by Americans for Medical Progress (AMP).*

**How Home Cage Monitoring is Transforming Drug Development by Addressing Translational Gap**

12:30 PM - 2:00 PM / Room: 255F

**Leader:** Szczepan W Baran  
**Moderator:** Megan R. LaFollette  
**Facilitator:** Samantha Edell  
**Panelist:** Stefano Gaburro; Szczepan W Baran, Megan R. LaFollette, Natalie A. Bratcher-Peterson, Sean Maguire

Concerns from various stakeholders are rising related to the lack of translation of preclinical rodent studies to human clinical trials. Although the root causes of this lack of translation are multifactorial, standard behavioral and physiological monitoring approaches are one likely contributor. A valuable tool to overcome this challenge is home cage monitoring technologies & digital biomarkers that allow continuous, longitudinal, and non-invasive animal assessment. In recognition of these technologies’ current impact and future potential, two global initiatives have emerged, COST Action TEATIME in Europe and the 3Rs Collaborative’s Translational Digital Biomarkers Initiative in the USA. Each initiative aims to increase understanding, harmonize qualification and benchmarking processes, and share experiences related to home cage monitoring and digital biomarkers. This roundtable will discuss the critical progress each initiative has made, how they collaborate, and how attendees can benefit from engagement with these technologies. Participants will share practical examples of home cage monitoring technologies in drug discovery and development. Attendees will learn (1) the potential of home cage systems to enhance rigor, standardization, and replicability of preclinical science along with improving animal welfare; (2) home cage systems use cases in different disease models, and (3) the added value of home cage systems in the translational process and translational digital biomarkers. The target audiences for this presentation are researchers, research staff, IACUC members, animal care staff, veterinarians, and vivarium managers that are interested in translational digital biomarkers.

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### AALAS 74th National Meeting, 2023

**Location:** UT

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**Exhibitor Teach & Chat**

**Refreshment Lounge**
**ANIMAL WELFARE, TRAINING, AND THE 3RS**

**P100 Creating a Corporate Compassion Fatigue Awareness Program through a Preventative Medicine Approach**  
D O’Connell*, C Allen, L Holzwarth

**P101 Learning from Reported Critical Incidents to Develop a Culture of Care for Animal and Human Wellbeing**  
SJ Bischoff*, A Enkelmann

**P102 Implementation of Online Training For the Promotion of Well-Being in Laboratory Animal Personnel**  
N Celeste*, M Huss

**P103 The Lesser Known Benefits of Laboratory Animal Enrichment Programs**  
JA McGrath*, A Brown, E Becerra, A Ostdieck, D Mailhiot

**P104 How are Apples and Oranges weighed in practice? On the incoherent implementation of the Harm-Benefit-Analysis as a requirement of the EU Directive 2010/63/EU.**  
D Hajosi*, H Grimm

**P105 Tail Dosing and Bleeding Revisited: Toppling 35 Years of Dogma**  
A Xue*, D Wagner, G Zhang, E Gosselin, N Johnson, R Kastenmayer, E Gangl

**P106 Cisterna Magna Ports in Rhesus Monkeys Then and Now**  
BE Smith*, DB Gilberto, HA Corcoran, GR Sitko, JM Beech, JA Werner, JJ Hughes, WE Smallridge, LK Handt, TL Gray, SL Motzel

**P107 Where the Honeysuckle Grows...Utilizing Browse in Non-human Primate Enrichment Programs**  
E Dougher*

**P108 Cola-boar-ation: Teaching Chronic Surgical Pigs to Participate in Their Own Care With Use of PRT**  
MM Abbateillo*, A Hines, P Gordnier

**P109 Reducing the use of live animals in training by building cost efficient and realistic feeling venipuncture training aids.**  
AJ Gregy*, MB Behinke

**P110 Moving up: Evaluation of Space Orientation on the Progression of Cynomolgus Macaques Through a Training Protocol**  
BN Gaskill*, M Burns, G Andrews-Kelly

**P111 Fostering Culture of Care Through Continuous Learning and Improvement**  
K Bell*, L Sheldrake, J Harrington, T Edstrom, S Albeyer Larsdotter, S Kuester, R Mason, D Pao

**P112 Training Validation and Staff Incentivization, A Plan to Keep Your Staff Happy and on Track**  
EC Brooks*, M Weiss, J Hickman-Davis, V Bergdall

**P113 Thinking Inside the Box: Restraint chair enhancements utilized in transitioning toxicology studies from open to closed restraint chairs.**  
M Page*, C Ferrecchia, M Nevor

**P114 Surveying IACUC Members on Ethical Deliberation and the Label ‘Ethics Committee’**  
M Rassette*

**P115 Feasibility of Awake Imaging Utilizing a Fluoroscopy Transport Cart**  
S Mustonen*, E Holmquist, J Smith

**P116 Evaluation of a Novel Anesthesia Apparatus to Perform Breath Holding in Ferrets During Computed Tomography and Magnetic Resonance Imaging**  
RA Byrum*, K Cooper, J Laux, P Sayre, A Crane, J Wada, V Mani, M St. Claire

**P117 Sheep Cuddlers Program Contributes to Animal Welfare and Compassion Satisfaction**  
C Zegre Cannon*

**P118 Ferret Cranial Implant Management**  
M Carlson*, J Sciurba, J Kopanke, R Alionhart, KE Saunders

**P119 Using a Culture of Care to Accelerate a 4Rs Approach in Biomedical Research**  
PV Turner*, J Murray, C O’Malley, EA Nunamaker, W Frieling

**P120 Establishing an Innovative Approach for Documenting Semi-Annual Facility Inspections Deficiencies and Conducting IACUC Member Inspection Training**  
C Starkey*

**P121 Externships to Employment- Forming Collaboration with Local Veterinary Technology Program to Foster Career Opportunities in Biomedical Research**  
JJ Ludwig*, S Allison

**P122 Optimizing the impact of habituation for Masked Inhalation Dosing through Positive Reinforcement Training of Laboratory Gottingen Minipigs**  
T Baiz*

**P123 Ferret Enrichment Toy Type Preference Associated with Increased Positive Species Specific Behaviors**  
K Mecenas, Wk Beah*

**P124 Click It To Trick It: Sheep Training and its Positive Impact on Long Term Residency**  
BL Morones*

**P125 Reduction, Refinement, and the FDA Guinea Pig Maximization Sensitization Test**  
S Fowler*, T Moore, A Tillman, K Allmann, D Eaker, C Zegre Cannon, K Crappnell

**P126 Validating the Use of Box Training as a Refinement to Rabbit Handling**  
AG Kinally*

**P127 Welfare and Enrichment of Yucatan Pigs Post Spinal Cord Injury**  
E Carefoot*, B Fingiez

**P128 Development of An Enrichment Device for Guinea Pig in a Production Room.**  
S Langeli*, S Gauthier

**P129 Establishing a New Method of Bone Marrow Isolation to Significantly Improve Donor: Recipient Ratio In A High Throughput Environment**  
C Smith, A Brigman, K Coppage, C Clouse*, C Currie, F Zhao

**P130 Easing Compassion Fatigue**  
S Oldham*, K Bell, K Nacel, E Straley, L Sheldrake, G Harkins, A DeSantis, R Kastenmayer

**P131 Novel Enrichment Devices for Pregnant Ewes and Lambs**  
S Stephens*, O Hughes, M Dapore, CM Doerning

**P132 Evaluation of abnormal behaviors in two singly-housed macaques pre and post social introduction: a case study**  
M Vogel*, K Thurman, A Sorrells

**P133 Managing Social Contact for Macaques on Infectious Disease Projects**  
JP Thom*, RU Bellanca, SW Lee, GH Lee, V Nelson

**P134 A practical Approach to the Assessment of Mouse Enrichment Types in a Large Research Program**  
JN Camacho*, W Chan
P135 Implementing Desensitization as Part of Rat Toxicology Studies
C Richard*, T McShane

P136 Fully Automated Micromanipulation: Genetic Modification of Mice by Automated Solution Injection
T Eto*, H Ueda, R Ito, T Takahashi, T Watanabe, M Goto, Y Sotomaru, N Tanaka, R Takahashi

P137 Modified Rabbit Sling for Forelimb Orthopedic Procedures
JM Collins*, L Bird

P138 A Spotlight on Rodent Enrichments Role in Openness, Transparency and Culture of Care
M Gerhardt*, K Greatsinger, H Whiles, J Arnold, J Cooney-Walsh

P139 Implementing the 3Rs by Establishing a Training Rabbit Colony
K Harringer*, R Hudson, AK Darbyshire

P140 Novel Method for Repairing Female Rabbits After Two Week Separation
A Napolitano*, M Muniz, P Shipkova, F Landry, D Shuster, R Donocoff

P141 Current Demographic Makeup of IACUC Members in the United States
M Rassette*

P142 Institutional Officials Consortium (IOC): An Industry Consortium for Collaboration in Animal Welfare, the 3Rs, and Openness about Biomedical Research
JL Lofgren*, A Myers, M Burns, J Polling, D O’Connell, C Winnicker

P143 Refining Rat Management Programs Through Stakeholder Focus Groups
C O’Malley*, PV Turner

P144 Tunnel Handling Mice Has Minimal Impact On Cage Change and Cage Wash Time
H Arnott*, K Wood, K Snead, J David, L Garcia Menendez

P145 Comparison of Plastic and Metal Oral Gavage Needles in C57BL/6 Mice

P146 Refinements in Rabbit Cage Change Procedure
A Napolitano*, M Muniz, P Shipkova, F Landry, D Shuster, R Donocoff

P147 Assessing Stress Impact and Subcutaneous Dosing Effectiveness of a Scruffing Restraint Device in C57BL/6J Female Mice
KE Benjamin*, J Dunbar, H Kim

P148 Training Rats to Voluntarily Change Cages Using a Tilt Technique
CA Payne*, LV Kendall, JK Willis

P149 Use of Colony Metrics to Reduce Excess Animal Production in a Dynamic Biotechnology Environment

P200 Feeding Patterns Of Infant and Juvenile Rhesus Macaques (Macaca mulatta) Living in Large Outdoor Captive Breeding Groups
K Bagley*, J Ramsey, K Ethun

P201 Jaundice and Hepatic Necrosis in Axolotls (Ambystoma mexicanum)
B Varian*, Y Lee, EB Jordan, N Parry, S Erdman, A Garcia

P202 Canine Distemper Outbreak in Commercial Ferret Population in 2022
CA Johnson-Delaney*

P203 A Novel Method of Health Monitoring in Laboratory Zebras, a Ferretish
AK Darbyshire*, V Johnson, A Horvath, A Leon

P204 Evaluation of Live Insect Feed as a Potential Pathogen Source in an SPF Rodent Facility
S Johnson*, R Erickson

P205 Comparison of Butorphanol-Azaperone-Medetomidine with Tiletamine-Zolazepam-Xylazine for Sedation of Pigs (Sus scrofa domesticus)
A Bernardini*, WR Williams

P206 Clinical Management of Complications Secondary to Experimental Administration of Doxorubicin in Swine

P207 Management of Fur Mites (Rutiodora lennina) in California Deer Mice (Peromyscus californicus)
VM Capria*, C Freed

P208 Presumptive Methyl Methacrylate Toxicity in a Cohort of Northern Tree Shrews (Tupaia belangeri) with Cranial Implants
S Achilles, J Foote, R Grytz, DE Collins*

P209 The Chinchilla Consortium: A Chinchilla Clinical Case Report
MV Capria*, C Freed

P210 Treatment of Syphacia obvelata in a Prairie Vole (Microtus ochrogaster) Colony without Breeding Cessation
K Shrum-Hammer*, MM Walker, J Hurd, E McCullagh, AB Wathen

P211 Waterhouse-Friderichsen syndrome and acute death in a post-operative piglet (Sus scrofa domestica)
C Morrill*, JG Vilches-Moure

P212 Sclera-embedded Search Coils: Removal Complication and Successful Treatment
EQ Zhang*, R Tierce, K Wharton

P214 Ferret Kit Revival Following Natural Parturition and Hysterectomy
A Napolitano*, M Muniz, P Shipkova, F Landry, D Shuster, R Donocoff

P215 Novel Pancreatic Neoplasm in a Female Zebrafish (Danio rerio)

P216 Multimodal anesthetic and analgesic regimen for laparotomy in pregnant ferrets
MM Granko*, AJ McLuckie, RA Ober

P217 Novel Restraint Method for Topical Treatment of California Deer Mice (Peromyscus californicus)
VM Capria*, C Freed

P218 Polyglucosan Body-Associated Cardiomyopathy in New Zealand White Rabbits: A Case Series
LH Streb*, EA Ihms, R Gruenwald, CV Lohr, JL Sargent, T Polley, AG Armien, PS Ribooyaparat

P219 Multimodal anesthetic and analgesic regimen for laparotomy in pregnant ferrets
MM Granko*, AJ McLuckie, RA Ober

P220 Novel Pancreatic Neoplasm in a Female Zebrafish
AR Guy*, I Sidori, SE Woods

P221 Novel Restraint Method for Topical Treatment of California Deer Mice (Peromyscus californicus)
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P226 Multimodal anesthetic and analgesic regimen for laparotomy in pregnant ferrets
MM Granko*, AJ McLuckie, RA Ober

P227 Novel Pancreatic Neoplasm in a Female Zebrafish
AR Guy*, I Sidori, SE Woods

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OPPORTUNITIES TO SUPPORT THE AALAS FOUNDATION

AF Virtual Silent Auction

The AALAS Foundation is excited to announce its Silent Auction at the National Meeting in Salt Lake City, Utah. All auction items will be on display at the Foundation’s Booth at the National Meeting; however, all bidding will be conducted via mobile device. This means that even if you are unable to attend the AALAS National Meeting, you will still be able to participate and bid on the fabulous auction items that will be up for bid!

If you are attending the National Meeting, you will pick up your winning auction items in person. If you are not attending the AALAS National Meeting, you will need to pay a shipping charge and your items will be shipped to you at the conclusion of the National Meeting.

Here’s the link to view all the items up for bid and to begin bidding on your favorite auction items: https://aalas2023.ggo.bid

Online bidding for the Silent Auction ends Wednesday, October 25th at 1:00 p.m. MST.

All auction proceeds benefit the Foundation’s public outreach efforts.

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AALAS FOUNDATION NATIONAL MEETING BOOTH

Stop by the AALAS Foundation’s Booth in the Salt Lake City Convention Center and make your donation! Anyone contributing $50 or more will receive a stuffed rattlesnake giveaway! Anyone making a minimum $5 donation will receive a “Celebrate the Rat” lapel pin!

AALAS FOUNDATION BOOTH HOURS:

Sunday, October 22, 9am – 5pm
Monday, October 23, 8 a.m. – 5 p.m.
Tuesday, October 24, 8 a.m. – 5 p.m.
Wednesday, October 25, 8 a.m. – 1:00 p.m.

CELEBRATE THE RAT!

Help us celebrate the rat and its contributions in mental health research!

Stop by the AALAS Foundation Booth and make a $5 minimum donation and receive a “Celebrate the Rat” lapel pin.
Anyone making a $10 or more online donation to the AALAS Foundation between November 1, 2023 and December 31, 2023 will receive a lapel pin – while supplies last.

Thanks to Charles River Laboratories for sponsoring our 2023 Celebrate the Rat Public Outreach Program!

APPRECIATION RECEPTION & LIVE AUCTION

Wednesday, October 25th, 6:30 pm - 8:00 pm at the Hyatt Hotel, Ballroom C

The Foundation holds its annual Appreciation Reception honoring the volunteers and benefactors who generously support the AALAS Foundation. This year’s theme is “The Wild West” so be sure to wear your favorite casual Western attire! Join us for complimentary appetizers and participate in our Live Auction conducted by auctioneer-extraordinaire, Brian Ebert! Cash bar available.

This reception is open to all National Meeting attendees and is made possible through the generous support of the following sponsors:

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AALAS FOUNDATION “BOOT UP FOR RESEARCH” CONTEST

“The Boot Up for Research” contest is in full swing! There are 73 contestants registered in this fun event to benefit the AALAS Foundation. Be sure to stop by the “Boot Up for Research” contest booth and check out all of the fabulous creative entries and do not forget to “vote”/donate on behalf of your favorite cowboy boot. A “vote” is a donation to the AALAS Foundation. The entry raising the most money by October 25, 2023 at 11:00 am MST, will be the winner of its Category. There are four Categories – Individual, Branch, Corporate and Institution/Organization.

You may also “vote”/donate on behalf of your favorite entry at https://www.aalas.org/national-meeting/meeting-features/boot-up-for-research

The “Fan Favorite” winner will be determined by the entry whose photo receives the most “likes” on the AALAS Foundation’s Facebook page. Be sure to visit the AALAS Foundation’s ‘Boot Up for Research’ photo album and “like” your favorite entry to help it win the “Fan Favorite” award. The deadline to “like” your favorite cowboy boot photo is Wednesday, October 25th at 11:00 am MST.

All winners will be announced, and prizes awarded, at the AALAS Foundation’s Appreciation Reception to be held on October 25th at Hyatt Hotel, beginning at 6:30 p.m.
2023 AREA PROGRAM
The AALAS Foundation is excited to host sixty Salt Lake City area high school students at its AREA Program at this year’s National Meeting in Salt Lake City, Utah. This important educational program is being sponsored, in part, by Pfizer, and will take place on Tuesday, October 24th, from 9:30 a.m. to 1:30 p.m. in the Salt Lake City Convention Center.

In addition to our sponsor, Pfizer, we are thankful to the following AREA Program Exhibitors and volunteer Speakers and Tour Guides participating in this year’s AREA Program:

2023 AREA PROGRAM SPEAKERS
Lisa Kelly
Dr. Chandra Williams
Melissa Dragon
Kaitlyn Benjamin

2023 AREA PROGRAM EXHIBITORS
Americans for Medical Progress
Avidity Science
bioBubble, Inc.
BioSafe Engineering
Hilltop Lab Animals, Inc.
InfoEd Global
Inotiv
Labex of MA
Techniplast
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2023 AREA PROGRAM TOUR GUIDES
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Vaneesha Ali
Rachael Alionhart
Brian Anderson
Shateenah Barnes
Mia Benkenstein
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Whatever you’re researching, we’re here with an entire suite of services to help ensure you get accurate results, every time.
Learn about recent actions taken by the AALAS Board of Trustees and provide feedback to AALAS national leadership by attending your district membership meeting, conducted by your district trustees. They will lead discussion on recent board decisions, issues, policies, and procedures. Check the list to see which district you’re in and who your trustees are; for example, individuals living in Maryland belong to District 3. District membership meetings will be held Monday, October 24, from 5:15–6:15 p.m.; International members of AALAS will have a designated meeting room as well and will meet at the same time as the districts.

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**Branches:** Appalachian, Florida, Mid-South, Research Triangle, Southeastern
**States:** Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, US Commonwealth of Puerto Rico
**Trustee:** Mark Sharpless

### District 5
**Branches:** Central Ohio, Indiana, Kentucky, Michigan
**States:** Indiana, Kentucky, Michigan, Ohio
**Trustee:** Stacy Cantrell

### District 6
**Branches:** Central Illinois, Chicago, Iowa, Minnesota, Nebraska
**States:** Illinois, Iowa, Minnesota, Nebraska, North Dakota, South Dakota, Wisconsin, Wyoming
**Trustee:** Stephen Levin

### District 7
**Branches:** Kansas City, Louisiana, Mid-Missouri, Mile High, Oklahoma, Texas
**States:** Arkansas, Colorado, Kansas, Louisiana, Missouri, New Mexico, Oklahoma, Texas
**Trustee:** Amy Pierce

### District 8
**Branches:** Arizona, Hawaii, Northern California, Northern Rocky Mountain, Oregon, Sacramento Valley, San Diego, Southern California, Mountain West, Washington
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# EXHIBITORS BY CATEGORY

## AALAS 74TH NATIONAL MEETING

### Animal Welfare, Regulatory Compliance, and Public Education
- Animal Welfare Institute
- USDA Animal Welfare Information Center
- ZooPharm/Wedgewood Pharmacy

### Biomedical Research, Medicine, and Methodology
- Animal Housing Institute
- Animal Husbandry Institute
- Arcoplast

### Facility Design, Management, and Operations
- Animal Model Suppliers
- Animal Monitoring
- Animal Husbandry
- Avidity Science
- BioServ
- BioInfoRx, Inc.
- Danio Lab
- Genotyping Center of America
- Hilltop Lab Animals Inc
- Innotiv
- Ivaki Aquatic
- Lab Products LLC
- LabDiets
- LBS (serving Biotechnology)
- Life Science Products, Inc.
- Medline Industries, LP
- Mispro
- Swiftscience
- Iaconic Biosciences
- The 3Rs Collaborative (3RsC)
- The Jackson Laboratory
- Transnetx
- Turner Scientific
- USDA Animal Welfare Information Center
- VRL Diagnostics
- Zebrafish Husbandry Association
- Zeigler Bros Inc

### ETC
- Anesthesia and Euthanasia
- Allentown
- Animal Care Systems, Inc.
- Animal Identification & Marking Systems, Inc.
- Braintree Scientific, Inc.
- Colonial Medical Supply Co., Inc.
- Kent Scientific Corporation
- Lab Products LLC
- Lab Products LLC
- MAI Animal Health/Vetercorder
- PLAS-LABS
- Shoe Cover Magic
- Stoelting Co

### Animal Care Systems, Inc.
- Animal Welfare Institute
- Aquaneering Inc.
- Arcoplast
- bioBUBBLE, Inc.
- Braintree Scientific, Inc.
- Britz & Company
- Carter2 Systems, Inc.
- Danio Lab
- Esco Technologies, Inc
- Gnotobiotic Containment Solutions
- Innove
- Ivaki Aquatic
- Lab Products LLC
- Lab Products LLC
- Lenderking Caging Products
- LGI Animal Care Products, Inc.
- Life Science Products, Inc.
- Lithgow Laboratory Services
- NKP-Isotec USA
- PLAS-LABS
- RACs - Ridgian Animal Care Systems
- Research Diets, Inc.
- RVM
- SCANBUR
- Shepherd Specialty Papers
- Shinya Medical Instrument Co., Ltd
- Sika Corporation
- Sinclair Bio Resources, LLC
- Suburban Surgical Co Inc
- Tecniplast
- The 3Rs Collaborative (3RsC)
- The Andersons Lab Bedding
- Thoren Caging Systems
- Turner Scientific
- USDA Animal Welfare Information Center

### Animal Housing
- Allentown
- Animal Care Systems, Inc.
- Animal Welfare Institute
- Arcoplast

### Animal Model Suppliers
- Alpha Genesis Inc
- Charles River
- Danio Lab
- DiaSys Diagnostic Systems US AllC
- Eln Hill Labs
- Hilltop Lab Animals Inc
- Innotiv
- Lab Animal Breeders Assn.
- Marshall BioResources
- New England Ovis
- Oak Hill Genetics, LLC
- Pregas
- Premier BioSource (formerly S&F Farms)
- Sinclair Bio Resources, LLC
- Iaconic Biosciences
- The Jackson Laboratory

### Animal Monitoring
- Alfa Wassermann Diagnostic Technologies
- Allentown
- Animal Care Systems, Inc.
- Avid Identification Systems
- Avidity Science
- BioVolume
- Braintree Scientific, Inc.
- BSI US
- Charles River
- Colonial Medical Supply Co., Inc.
- Danio Lab
- Genotyping Center of America
- IDEXX BioAnalytics
- Innotiv
- Ivaki Aquatic
- Kent Scientific Corporation
- Lomir Biomedical Inc
- MAI Animal Health/Vetercorder
- Mouse Specifics, Inc.

### Animal Husbandry
- Allentown
- Animal Housing
- Animal Model Suppliers
- Animal Monitoring
- Animal Husbandry
- Arcoplast

### Books, Periodicals & Publications
- Animal Welfare Institute
- Institute for Laboratory Animal Research
- Scientists Center for Animal Welfare (SCAW)

### Exhibitors by Category

#### Animal Housing
- Allentown
- Animal Care Systems, Inc.
- Animal Welfare Institute
- Aquaneering Inc.
- Arcoplast
- bioBUBBLE, Inc.
- Braintree Scientific, Inc.
- Britz & Company
- Carter2 Systems, Inc.
- Danio Lab
- Esco Technologies, Inc
- Gnotobiotic Containment Solutions
- Innove
- Ivaki Aquatic
- Lab Products LLC
- Lab Products LLC
- Lenderking Caging Products
- LGI Animal Care Products, Inc.
- Life Science Products, Inc.
- Lithgow Laboratory Services
- NKP-Isotec USA
- PLAS-LABS
- RACs - Ridgian Animal Care Systems
- Research Diets, Inc.
- RVM
- SCANBUR
- Shepherd Specialty Papers
- Shinya Medical Instrument Co., Ltd
- Sika Corporation
- Sinclair Bio Resources, LLC
- Suburban Surgical Co Inc
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- Animal Monitoring
- Animal Husbandry
- Arcoplast

### Books, Periodicals & Publications
- Animal Welfare Institute
- Institute for Laboratory Animal Research
- Scientists Center for Animal Welfare (SCAW)
### Lighthouse Environmental Infection Prevention
- Phone: 212 4

### Lithgow Laboratory Services
- Phone: 202 5

### Medline Industries, LP
- Phone: 162 1

### Newco Distributors, Inc.
- Phone: 260 8

### Pharmacal Research Laboratories, Inc
- Phone: 181 2

### Quip Laboratories
- Phone: 230 8

### RICA Surgical Products, Inc.
- Phone: 1 301

### Rochester Midland Corporation
- Phone: 250 8

### Sealive, Inc. & Mitokogyo Co., Ltd.
- Phone: 123 2

### Shinva Medical Instrument Co., Ltd
- Phone: 262 4

### Shoe Cover Magic
- Phone: 131 2

### Sika Corporation
- Phone: 123 3

### SPIRE INTEGRATED SOLUTIONS
- Phone: 13 06

### Sterile Science
- Phone: 153 2

### STERIS Life Sciences
- Phone: 20 27

### Tecniplast
- Phone: 23 16

### Tutttnauer USA
- Phone: 21 28

### Vegetable Safety
- Phone: 23 38

### VRL Diagnostics
- Phone: 21 25

### Eastern Virginia Medical School
- Phone: 25 34

### Institute for Laboratory Animal Research
- Phone: 27 33

### International Council for Laboratory Animal Science
- Phone: 27 35

### Laboratory Animal Manager Association Laboratory Animal Welfare Training Exchange (LAWTE)
- Phone: 28 24

### Life Science Products, Inc.
- Phone: 20 32

### Medline Industries, LP
- Phone: 16 21

### New England Ovis
- Phone: 24 37

### Quip Laboratories
- Phone: 23 08

### SAI Infusion Technologies
- Phone: 18 33

### Scientists Center for Animal Welfare (SCAW)
- Phone: 27 32

### Somark Innovations
- Phone: 12 28

### The SRs Collaborative (3RsC)
- Phone: 27 37

### Thoren Caging Systems
- Phone: 18 06

### USDA Animal Welfare Information Center
- Phone: 26 36

### Zebrafish Husbandry Association
- Phone: 28 32

### Lascar Electronics
- Phone: 12 27

### Medline Industries, LP
- Phone: 16 21

### New England Ovis
- Phone: 24 37

### Oak Hill Genetics, LLC
- Phone: 27 06

### Optimize Courier, LLC
- Phone: 31 05

### Sinclair Bio Resources, LLC
- Phone: 21 25

### American Society of Laboratory Animal Practitioners (ASLAP)
- Phone: 28 06

### Animal Care Training Services (ACTS)
- Phone: 28 12

### Animal Identification and Marking Systems, Inc.
- Phone: 16 12

### Animal Welfare Institute
- Phone: 26 32

### Association of Primate Veterinarians (APV)
- Phone: 28 10

### BASi Research Products
- Phone: 24 13

### Bio Serv
- Phone: 21 32

### BioSAFE Engineering
- Phone: 24 33

### Braintree Scientific, Inc.
- Phone: 14 00

### Colonial Medical Supply Co., Inc.
- Phone: 15 13

### Danio Lab
- Phone: 24 33

### DiaSys Diagnostic Systems USA LLC
- Phone: 23 39

### E-Z Systems/Euthanex Corp.
- Phone: 27 00

### Fine Science Tools
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### Gnotobiotic Containment Solutions
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### HoDog Patient Warming
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### Lascar Electronics
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### Lomir Biomedical Inc
- Phone: 17 06

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- Phone: 18 38

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- Phone: 19 07

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### PLAS-LABS
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### RACS - Rigidplan Animal Care Systems
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### Rapid Lab
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### RWD Life Science
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### SAI Infusion Technologies
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### Shoe Cover Magic
- Phone: 15 12

### Somark Innovations
- Phone: 12 28

### Suburban Surgical Co Inc
- Phone: 18 24

### Swiftscience
- Phone: 13 13

### TBJ, Incorporated
- Phone: 14 11

### Tutttnauer USA
- Phone: 21 28

### Unified Information Devices (UID)
- Phone: 14 04

### Verona Safety
- Phone: 23 13

### ZooPharm/Wedgewood Pharmacy
- Phone: 22 18
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Frederick, MD 21703-2920
United States
301-696-9626
301-696-9627
http://www.aaalac.org

AAALAC International promotes the humane treatment of animals in science, research and education through voluntary assessment, accreditation and education programs. More than 1,040 institutions in 50 countries have earned AAALAC accreditation, demonstrating their commitment to responsible animal care and use.

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847-674-7066
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aesol.com

Alfa Wassermann Diagnostic Technologies
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United States
781-632-1549
www.allometrics.com

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http://www.alphagenesisinc.com

Alpha Genesis Inc. (AGI) is a direct provider of nonhuman primates to the biomedical community. AGI is dedicated to high-quality management and oversight of its primate colonies and is one of the few providers to offer both U.S.-bred and imported nonhuman primate research models, conditioned to meet your specific research needs. Proven breeding programs and AAALAC accredited facilities translate into care and preparation of nonhuman primates that far exceeds industry standards.

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Alternative Design Manufacturing & Supply, Inc. offers an extensive line of laboratory animal housing for species large and small. We have a full range of material handling and processing equipment. Custom metal fabrication is welcome. For 30 years we have built a reputation for quality products and custom solutions. When service, innovation, and quality matter, contact the original Alternative, backed by an industry-leading warranty program!

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Booth 2806
9190 Crestwyn Hills Dr
Memphis, TN 38125-8538
United States
901-333-0498
901-753-0046
http://www.aslap.org

The American Society of Laboratory Animal Practitioners is a professional member association open to ALL veterinarians, veterinary residents, and veterinary students who are engaged in or interested in promoting and supporting laboratory animal practice. ASLAP is the only organization that directly represents laboratory animal practitioners within the American Veterinary Medical Association.

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Booth 2806
9190 Crestwyn Hills Dr
Memphis, TN 38125-8538
United States
901-333-0498
901-753-0046
http://www.aslap.org

Animal Care Systems, Inc.
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Centennial, CO 80112-3978
United States
720-283-0177
http://www.animalsystem.com

Animal Care Systems, in partnership with ARES Distribution, specializes in providing the highest quality equipment for the vivarium and the laboratory for all your research applications. Animal Care Systems was founded in 1997 by a PhD, DVM Neuroscientist and our consultative representatives strive to continually innovate and search for new product lines to provide diverse solution-oriented equipment and services, while remaining focused on animal and personnel welfare.

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607-324-6753  
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AIMS laboratory animal tattoo identification systems have been used for over 40 years to identify research animals of any age safely and permanently. Specialized tattoo kits are available for mice & rats, neonates, and large lab animals. AIMS tattooing procedures are used extensively to rapidly genotype animals before weaning. Each tattoo kit comes with comprehensive equipment and self-training instructions. On-site tattoo certification training courses are also available.

Animal Welfare Institute  
Booth 2632  
900 Pennsylvania Ave SE  
Washington, DC 20003  
United States  
202-337-2332  
202-446-2131  
http://www.awionline.org  
The Animal Welfare Institute, a non-profit organization founded in 1951, works to improve the housing, handling and care of animals in research. Please visit our booth for a variety of complimentary books and other materials on ways to refine the housing and handling of animals in research and to learn about our funding opportunities and online dialogue forum.

AnimalCare Software, LLC  
Booth 1639  
11625 Custer Rd., Ste 110 276  
Frisco, TX 75035  
United States  
817-994-9378  
www.animalcaresoftware.com  

Aquaneering Inc.  
Booth 2204  
7960 Stromesa Ct  
San Diego, CA 92126  
United States  
858-578-2028  
858-689-9326  
http://www.aquaneering.com  
Aquaneering is an internationally recognized leader of aquatic housing for zebrafish, Xenopus frogs, and other aquatic species used in medical research, as well as the manufacturer of the largest zebrafish systems in the world. Aquaneering offers unmatched knowledge of highly advanced filtration technologies pioneered within the aquaculture industry, notably our no-maintenance filters that assure undetectable levels of ammonia and nitrites.

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United States  
206-937-0392  
https://aquaticenterprises.com/  

Arcoplast  
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United States  
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Arcoplast architectural wall and ceiling systems are designed for highly specialized facilities with strict requirements for environmental control. Arcoplast panels are composed of a solid glass and resin composite matrix with a smooth, high gloss antimicrobial gel coat surface finish. Arcoplast wall and ceiling panel joints are assembled with the innovative, patented spline system and the panel joints and coving sections are finished with a permanent A-1010 Bio-Seal finishing compound.

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Art’s Way Scientific is a leading producer of technical turnkey research, vivarium, and diagnostic laboratories. Art’s-Way designs, develops, manufactures, and installs a complete custom engineered building for laboratory animal research, biocontainment, public health, food safety, and general laboratory space requirements. www.buildingsforscience.com
The Association of Primate Veterinarians (APV) is an international organization of approximately 500 veterinarians concerned with the health, care, and welfare of nonhuman primates. We provide mechanisms to disseminate information and speak collectively as primate veterinarians on matters regarding nonhuman primates and to promote fellowship among primate veterinarians.

For more than 23 years a-tune has helped academia, pharmaceutical, biotechnology, chemical and material science organizations simplify the complexities of data management for research compliance. Today, its flexible, all-in-one data management software and applications are relied on by over 100 world-renowned universities, 140 research institutions, and 5 of the top 7 pharmaceutical organizations.

AVID has a variety of solutions for implementing a microchip and scanning program at your vet clinic or facility. From our patented microchips and scanners to our world-class pet recovery service, AVID provides the necessary products and services for a successful recovery and increase return-to-owner rates in your community.

Avidity Science enables science to improve the quality of life, providing essential solutions and unrivaled service. Edstrom Automated Watering delivers water 24-hours, saving labor and costs. Hydropac individual cage watering reduces ergonomic risk and costs of bottle cleaning, filling and manipulation. Watchdog EX control and monitoring delivers data readings, alarming, and reports to ensure animals are safe and secure. BMD5 RFID technology automates data gathering, recording, and validation.

BASi Research Products

BASI is a manufacturer of high quality, awake animal sampling products. The Culex® automated blood sampling systems enhance animal welfare and subsequent data quality by reducing stress for animals and humans involved. We are known for our support and creativity in making your studies possible. Come see why!

Benchling

Johnny Truong is an Event Marketing Manager at Benchling, a life science software company that is accelerating the speed of science. He has 9+ years of wet lab experience and over 6+ years of experience using Benchling for electronic note-taking, molecular biology design, and data management. Before Benchling, he completed his Ph.D in Chemistry & Chemical Biology at the University of California, Berkeley in 2019.

Beta Star Life Science Equipment

Beta Star is an autoclave design, manufacture, and service company serving the sterilization needs of the biotech, laboratory, pharmaceutical, and vivarium industries. Our equipment is designed, manufactured, and factory tested at our Pennsylvania headquarters using nonproprietary components for serviceability and low cost of ownership. Our mission today, and tomorrow is to deliver Simple. Reliable. Sterilization™.

BMDI Maxair Systems manufactures the MAXAIR CAPR which is a NIOSH approved powered air purifying respirator. The CAPR is a fully integrated unit that has the fan motor blower in the helmet that allows for multiple configurations to meet your respiratory protection needs. The MAXAIR CAPR System provides unique advantages in user comfort and convenience, and overall affordability while optimizing respiratory and contact protection for healthcare workers.
Bio-Serv has been serving the research community for 50 years, and our mission is to create and provide products that meet the unique challenges associated with working with research animals. Our experts in lab animal nutrition and animal welfare understand the requirements of caring for research animals and are dedicated to meeting the ever-changing needs of the research community. Having developed many unique enrichment devices and formulated thousands of diets, we are here to assist you.

BioBUBBLE provides creative solutions for environmental challenges in the research world. We custom design and manufacture an affordable line of HEPA-filtered modular cleanrooms and containment enclosures for anything from germ-free and gnotobiotic to BSL 2, 3 and 4 applications. HEPA-filtered support equipment includes: anterooms, air showers, bedding disposal units, transport carts, and air diffusion units. Facility design consultation services are available.

BioInfoRx provides standard and custom software as a service (SaaS) to academic, non-profit, and commercial research laboratories, and small biotech and pharmaceutical companies.

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BioSAFE Engineering is the global leader in the design, manufacture, installation, and service of waste treatment equipment used in research facilities, healthcare, industry, and science to eliminate the threat of hazardous or infectious agents. Our team of visionary engineers specialize in using advanced scientific applications to create unique non-incineration methods that treat and dispose of biological and medical waste in both liquid and solid forms. We are your sustainability resource.

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Cayuse provides a connected research administration cloud platform with solutions that covers the entire research lifecycle, including pre-award, post-award, risk management, and resource management.

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UID provides RFID solutions that help generate quality data faster, accurately and consistently. We combine advanced RFID technology with novel software to facilitate the identification and tracking of animals and lab items. We provide readers and implantable transponders for animal ID and temperature collection in mice, rats and larger animals, an inventory system for efficient management of controlled substances, and a rodent home-cage system for remote monitoring of temperature & activity.

USDA Animal Welfare Information Center

Booth 2636
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Beltsville, MD 20705
United States
540-333-1950
https://www.nal.usda.gov/programs/awic

AWIC was established at the USDA’s National Agricultural Library in 1986 under the Animal Welfare Act. AWIC’s products and services aim to help the regulated community with employee training and promote the humane care and use of animals by providing information on 3Rs alternatives (replace, reduce & refine). Some key products include: • "Meeting the Requirements of the Animal Welfare Act" workshops • Animal Welfare Act History Digital Collection • 3Rs alternatives literature search support

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ZooPharm/Wedgewood Pharmacy has acquired Wildlife Pharmaceuticals and its wholly-owned pharmacy subsidiary, ZooPharm, a veterinary compounding pharmacy. ZooPharm has become the leader in the development, compounding and delivery of highly specialized formulations and is dedicated to providing anesthesia and pain management medications for companion animals, lab animals, non-domestic species, resident wildlife, and captive exotic breeds. Stop by booth 1823 to learn more!
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New for National Meeting 2023

ETC: EXHIBITOR TEACH & CHAT

Take part in AALAS’ newest National Meeting addition – ETC: Exhibitor Teach & Chat! This new program is an extension of our extremely popular Demo Day, but in-person!

FEATURED COMPANIES:

**Monday, October 23:**
- **Lomir Biomedical Inc.** 10:10am - 10:30am
  Acclimation Strategies for Jacketed Laboratory Animals - A Summary

- **Allentown, LLC.** 10:35am - 10:55am

- **Inotiv** 2:10pm - 2:30pm
  Animal Welfare, Care, and Furthering the 3R’s in Immunodeficient Rodents: A Vendor’s Perspective

- **Wedgewood Pharmacy/Zoo Pharmacy** 2:35pm - 2:55pm
  Cultivating Quality: The Evolution and Excellence of Extended Release Medication Production at Wedgewood Connect

**Tuesday, October 24:**
- **Rockstep Solutions** 10:10am - 10:30am
  How Modern Hands-Free Vivarium Workflows Increase Data Reliability and Enhance Animal Welfare

- **VRL Laboratories - USA** 10:35am - 10:55am
  Evaluation of aspects of the Sentinel-Free Soiled Bedding (SFSB) approach to Rodent Environmental Health Monitoring

- **Taconic Biosciences** 2:10pm - 2:30pm
  Recognizing and Managing Adverse Outcomes in Myeloid-supportive Humanized Immune System (HIS) Mice

- **GenoTyping Center of America** 2:35pm - 2:55pm
  Non-Invasive Genotyping: Considerations for Implementing in your Facility to Improve Animal Welfare

**Wednesday, October 25:**
- **Cayuse** 10:10am - 10:30am
  Digitizing your Facility Checklists

- **Contec Professional** 10:35 - 10:55am
  Hot Topics in Cleaning & Disinfection
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**PS1 Optimizing Rat Handling Practices: What Do the Rats Want?**

C O’Malley, E Paterson, J Kyle, SE Thurston, H Tambadou, O Ekundayo, J Pilouvieli, C Collomny, PV Turner

1Global Animal Welfare and Training, Charles River Laboratories, Wilmington, MA; 2Charles River, Mattawan, MI; 3Discovery Services, Charles River, Kuopio, Finland; 4Veterinary Care, Charles River, Senneville, Canada

In mice, there is clear evidence that tail handling is aversive and can negatively impact mouse welfare as evidenced by behavioral and physiological outcomes. However, there is little research on preferred handling methods in rats. The goal of this research was to compare behavioral and physiological responses to different handling methods in rats to determine which method is least aversive. Two studies were conducted. In Study A, 96 Crl:CD(SD) Sprague Dawley rats (48m, 48f; 42-48 days old at study start) received minimal handling once a week at cage change over 4 weeks and were randomly assigned to 1 of 4 handling methods (tail, tunnel, body, towel). Response to humans was assessed using a voluntary human approach test (latency to approach, s, and duration of time in contact (s) were measured). Anxiety-like behavior was assessed using an elevated plus maze (time spent in open arms (s)/total time in open and closed arms (s)) was used as a measure of less anxiety. Blood was collected for glucose, corticosterone, and hematology parameters. In Study B, 132 Crl:CD(SD) Sprague Dawley rats of 2 age groups were used (1: 96 total, 46m, 46f, 61-133 d of age; 2: 36m, 11-12 mo of age). Rats received handling twice daily for 9 days and were randomly assigned to 1 of 3 handling methods (tail, tunnel, body). Response to handling was assessed using voluntary human approach test and blood glucose levels. Data were analyzed with linear mixed models with handling treatment and sex as fixed effects and animal nested within cage as a random effect. Neither study showed different behavioral or physiological responses to handling treatment (P>0.05). These results suggest that rats may not be as sensitive to handling method as mice or that the handling methods used in this study were not perceived as aversive. Future studies will use more frequent handling to try to understand preferential and aversive handling in rats.

**PS2 Post-Mortem Study on the Effects of Routine Handling and Manipulation of Laboratory Mice**

Kl. Gardiner, C Assenmacher, M Lanza, J Tarrant, E Blankey, E Radaelli

1Pathobiology, University of Pennsylvania, Philadelphia, PA; 2ULAR, University of Pennsylvania, Philadelphia, PA; 3Comparative Pathology Core, University of Pennsylvania, Philadelphia, PA

Routine handling and manipulation of laboratory mice are necessary components of many research studies, but if performed incorrectly, have the potential to cause stress and physical harm to the mice. In addition to being a welfare issue, this can also lead to unintended consequences in terms of experimental outcomes. The pathological effects of these interventions are poorly documented and have been previously assumed to have a negligible effect on experimental variables. In that context, we provide a comprehensive post-mortem overview of the main pathological changes associated with routine interventions (i.e., restraint, blood drawing, and intraperitoneal injections) of laboratory mice, emphasizing presumed traumatic osteoarticular lesions. A total of 1000 mice from various studies were included, with 864 animals being heavily manipulated and 136 being handled for routine husbandry procedures only. The most common lesions observed were associated with blood collection or intraperitoneal injections and a series of traumatic osteoarticular lesions likely resulting from restraint. Osteoarticular lesions were found in 62 animals (61 heavily manipulated; 1 unmanipulated) with rib fractures and avulsion of the dens of the axis being over-represented. Histopathology and micro-CT confirmed the traumatic nature of the rib fractures. To reduce and ideally prevent these lesions from occurring, enhanced training of research personnel on gentle mouse handling, restraint, and phlebotomy techniques could help reduce the impact on animal well-being and enhance study reproducibility.

**PS3 Quantifying Blood Loss Volume of Submandibular Venipuncture in Mice Using Contrast-enhanced CT**

H Arnot, J David, L Garcia Menendez, K McCutcheon, N Noorbesht

Comparative Medicine, Amgen, Simi Valley, CA

Submandibular sampling is a method of blood collection in mice in which the plexus is punctured and blood is collected. Post-collection pressure is applied to the sampling site to achieve hemostasis. Bleeding by this technique occurs rapidly and allows for volume loss in the perivascular tissues, fur, and collection tubes. This study quantifies the volume of blood loss to subdermal and extracorporal spaces during submandibular bleeding. Five naïve, six-week-old BALB/c mice were assessed. CT images of the head were acquired using a 100um voxel size before and after submandibular sampling. A region of interest (ROI) was manually drawn around the submandibular region. Blood within and outside of the submandibular vasculature was quantified using connected thresholding based on the known radiodensity of the imaging contrast agent. Unaccounted blood loss in the punctured cheek was compared to the non-punctured cheek (internal control) using a one-sided student’s t-test. Preliminary results showed an increase in blood volume in the punctured cheek versus the non-punctured cheek post-bleed, indicating subdermal hemorrhaging. Contrast-enhanced CT is an effective method for measuring blood loss not previously accounted for following venipuncture technique that may have utility to refine IACUC blood collection standards and quantify individual skill and novel blood collection techniques.

**PS4 Nest Quality as an Early Indicator for Pregnancy in C57BL/6 Mice**

A. Valentyn, F Estrada, L Burgess, M Moura

Translational Models, Eisai, Cambridge, MA

Frequent handling and manipulation of pregnant mice and their cage can lead to stress and reduced breeding performance. Nests, which can be assessed cage-side without manipulating the cage or dam, are an excellent indicator of pregnancy status and are often linked to maternal care of pups and positive breeding outcomes. Using a novel nest scoring system based on integration of nesting material, we were able to accurately assess pregnancy status for 28 matings (16 first- or second-time dams), without cage manipulation, as early as E6. Mating trios were housed together for 4 days, after which period female mice were housed singly in a clean cage and provided a pouch of nesting material (crinkled brown paper strips) and a shelter (a hut or tunnel). Nests were scored daily using a numerical scoring system from 1-4, based on nest material manipulation and incorporation of enrichment, and nest scores were used as a basis for predicting pregnancy. Generally, pregnant females created high-scoring (3 or higher) nests earlier in the pregnancy than non-pregnant females, who often failed to make complex nests. One of the key indicators of pregnancy was the instincitual shredding of the shelter enrichment and thorough incorporation with other nesting materials. This behavior was more pronounced in cages provided with tunnels.
than in cages provided with huts, corresponding to a higher predictability at earlier timepoints. Using cage-side nest scoring, pregnancy was determined with 89% accuracy at E9 or earlier. This assessment reduced the need to manipulate the cage and handle the dam during gestation, potentially alleviated handling-associated stress on animals, and was an effective method for early pregnancy prediction.

PS5 Enhancing the Visual Environment of Indoor Housed Laboratory Nonhuman Primates to Reduce Stress and Maladaptive Behavior

JC Rodgers1, C Cheleuitte-Nieves2, ET Chan1
1RARC, Weill Cornell Medicine, Bronx, NY; 2RARC, Memorial Sloan Kettering, New York, NY

Nonhuman primates (NHPs) housed in indoor laboratory environments are generally exposed to nondescript visual stimuli. This environment is not ideal for a species whose primary sensory modality is visual. To provide a more naturalistic visual environment that would potentially improve their welfare, this study assessed a passive natural visual stimulus. A cohort of four (2 males, 2 females) 5-6-year-old cynomolgus macaques (Macaca fascicularis) and a cohort of eight (5 males, 3 females) 4-5-year-old African green monkeys (AGM, Chlorocebus aethiops) were exposed to 4 videos depicting scenes of natural landscapes projected onto a 10” x 5” screen placed on an unobstructed animal room wall. Scenes were projected from 7:00 – 18:00hr, 7 days/week (one nature scene/week). Stress indicators and behavior were assessed by comparing weekly urine cortisol:creatinine ratio levels and ethograms from video recordings (3x/week) of each NHP before (baseline: 4 weeks), during (4 weeks), and after removal (4 weeks) of the visual enrichment. The macaque cohort had a baseline urine cortisol:creatinine ratio of 0.00015 ± 0.00005 μmol/L (mean ± SE) which increased to 0.00017 ± 0.00003 μmol/L during nature scene projection, and a return to baseline levels of 0.00015 ± 0.00002 μmol/L post-scene projection. Similarly, the AGM cohort had a baseline of 0.00010 ± 0.00001 μmol/L, 0.00014 ± 0.00002 μmol/L during nature scene projection, and a return to 0.00010 ± 0.00001 μmol/L during post-scene projection. Significant differences were found between treatments or between females vs. males in either cohort. Although this finding may suggest no impact on this stress hormone, a clear trend where cortisol levels increased during scene projection and returned to baseline post-projection was observed in both cohorts. The biological significance of this trend is unclear but other factors, e.g., projector management, experimental/clinical interventions, may have played a role. Conversely, preliminary behavior analysis showed an increase in positive behaviors such as allogrooming, playing, and cuddling, and a decrease in threatening behavior during the nature scene projection and the post-projection period.

PS6 Evaluation of Alternative Communication Button Devices to Access Preferred Activities in Juvenile Swine

DA Herrera1, K Thurman, N Nodland, A Sorrells
Neuralink, Fremont, CA

In the United States, raised slats or tenderfoot flooring are the most prevalent housing modalities used in swine agriculture and research. These traditional housing methods may limit the expression of species-typical behaviors and reduce access to agency, choices the animal can make within their environment. Wild counterparts, Sus scrofa, naturally engage with their environment through foraging behaviors such as rooting and grazing for more than 50% of their awake day, behaviors traditional housing setups do not easily accommodate. In a preference test evaluating straw versus no straw, research swine consistently chose the straw bedding condition. Therefore, straw bedding on a solid floor was chosen as the standard housing condition for swine at our facility. It was further hypothesized that allowing the animals to choose various types of foraging material throughout the day could increase the time spent engaging in natural behaviors such as foraging activities. To further evaluate this, five juvenile swine were taught to associate words with various foraging substrates (straw, shredded paper, beet pulp, and mushroom compost) utilizing an alternative communication button device. Videos were then collected and scanned in four different settings to measure frequencies and total durations of foraging behaviors (foraging, tail wagging, frenetic activity periods, and flehmen responses). Additionally, behaviors known to be incompatible with efficient and safe work by husbandry staff members were collected (pacing, biting, jumping, and freezing). When communication buttons were utilized, opportunities for the juvenile swine to engage with preferred materials increased, resulting in increased cumulative durations and frequencies of foraging behaviors. Furthermore, the frequency and duration of pacing and freezing were lower in button sessions than in other cognitive stimulating events and baseline behavior. Frequency of behaviors incompatible with efficient and safe work by husbandry staff members were also reduced in communication button sessions. Further research should be conducted to confirm the use of communication buttons as an enrichment device for swine and to validate the development of word associations with the button.

PS7 Awake Electrocardiogram Recordings Using a Cage–side Commercial Device: A Medical and Welfare Refinement

S O’Keefe1, T Hong, K Thurman, S Baker, A Sorrells
Research Services Organization, Neuralink, Union city, CA

Cardiac abnormalities are a common clinical morbidity in captive populations of rhesus macaques. Diagnosis and follow-up monitoring of these conditions with diagnostic equipment currently requires sedation. The need for sedation may persuade many clinicians to limit follow-up frequency to reduce the overall impact on the animals. In addition, the drugs used for sedation can both mask and induce cardiac abnormalities that can interfere with clinical interpretation and potentially result in misdiagnosis. At home medical devices have become increasingly popular for human patients dealing with similar diagnoses. One such product is a commercially available device for obtaining and recording a 30 second trace of a single lead electrocardiogram. We hypothesized that rhesus macaques could be operantly conditioned using positive reinforcement techniques to perform cage side awake electrocardiogram exams using the commercially available device, and this would result in diagnostic quality single lead recordings. We hypothesized that these recordings could be used to aid diagnosis of arrhythmia in awake macaques. In this study, 17 male rhesus macaques were operantly conditioned to place their fingers, 1-3 of each hand, on a mobile electrocardiogram device cage side utilizing positive reinforcement techniques in order to obtain accurate awake heart readings. Animals voluntarily performed this behavior on cue with a high degree of reliability for the 30 second recording interval. The recordings obtained were of sufficient quality to be able to determine normal cardiac electrical activity on a lead I recording trace. In addition, the device was also used on one awake animal that had previously been diagnosed with tachyarrhythmia of unknown origin under anesthesia. In this animal, we were able to determine that this arrhythmia was also present in the awake resting state. This was done without the need for more invasive monitoring such as jackets and Holter monitors and led to
a change in our therapeutic strategy. Our work shows that animals can be trained to perform awake cage side electrocardiograms to voluntarily participate in their own improved veterinary care.

**PS8 Chlamydia muridarum Associated Pulmonary and Urogenital Disease and Pathology in a Colony of Enzootically-Infected Il12rb2 deficient and Stafft Knockout Mice**

N Mishkin1, S Carrasco2, I Miranda2, C Cheleuittie-Nieves2, R Ricart Arbona3, C Wingert4, J Sun2, NS Lipman1

1Tri-Institutional Training Program in Laboratory Animal Medicine and Science, New York, NY; 2Center for Comparative Medicine and Pathology, Memorial Sloan Kettering Cancer Center and Weill Cornell Medicine, New York, NY; 3Department of Immunology, Memorial Sloan Kettering, New York, NY

**Chlamydia muridarum** (Cm) has recently been reported to be unknowingly prevalent in laboratory mouse colonies, but clinical disease has only been associated with experimental infection of mice used to investigate human Chlamydial infections or following cohousing of NSG mice with Cm-shedding mice. Clinical disease and pathology were observed in 2 genetically engineered mouse (GEM) strains with impaired interferon-y signaling and the CD4+ T cell responses in a colony of various GEM strains known to be colonized and shedding Cm. Experimentally naive, underconditioned and hunched, B6;129S1-Ifnar1tm1Dlv/J mice (n=5) were used for necropsy. Mild-to-moderate multifocal peribronchial lymphoplasmacytic and histiocytic bronchopneumonia with bronchiolar epithelial cell degeneration and intralesional Cm inclusions were observed in 2 mice: the remaining mouse had focal peribronchial lymphocytic and histiocytic infiltrates. Immunohistochemistry (IHC) for Cm MOMP-1 antigen demonstrated positive staining in bronchiolar epithelial cells correlating with inflammation as well as in small and large intestinal surface epithelial cells in all 3 mice. The other affected strain was a breeding pair of B6;129S1-Ifnar1tm1Dlv/J mice with poor fecundity. At necropsy, the male had severe unilateral hydrophrosis, moderate rhinitis/tracheitis/pneumonia, and minimal-to-mild gastroenteritis and typhlocolitis. The dam had severe unilateral metritis/salpingitis/perianal steatitis, mild-to-severe bilateral hydrophrosis, severe cystitis, moderate-to-severe arteritis, mild-to-moderate rhinitis/tracheitis/pneumonia, minimal-to-mild gastroenteritis and typhlocolitis, and a renal urothelial papilloma. IHC showed positive staining in epithelial cells at the gastric limiting ridge, small and large intestines, as well as in the urinary bladder, ureter, and papilloma of the dam. Given that Chlamydia is a known cause of infertility in humans, breeding issues were likely attributable to Cm. The robust inflammation associated with Cm inclusions in the papilloma indicates the possibility that Cm contributed to the lesion. Given we previously observed significant morbidity and mortality in Cm infected NSG mice, these cases further highlight the importance of excluding Cm from laboratory mice.

**PS9 Eradication of Chlamydia muridarum from Laboratory Mice: Aberrant and Not So Elementary**

MB Palillo1, N Mishkin1, JA Palillo2, A Mourino3, M Aiydin1, S Carrasco2, JR Fahey1, NS Lipman3, R Ricart Arbona3

1Center of Comparative Medicine & Pathology, Tri-Institutional Training Program in Laboratory Animal Medicine and Science, New York, NY; 2Neurological Clinical Research Institute, Massachusetts General Hospital, Boston, MA; 3Center of Comparative Medicine & Pathology, Memorial Sloan Kettering Cancer Center and Weill Cornell Medicine, New York, NY; 4Molecular Diagnostic R&D Laboratory, The Jackson Laboratory, Bar Harbor, ME

Chlamydia muridarum (Cm), a reemergent, moderately prevalent (academic colonies), Gram-negative, intracellular bacterium, that causes subclinical to severe clinical disease in laboratory mice, dependent on the host’s immune status. Subclinical infection, which is persistent, modulates both innate and adaptive immune responses, potentially impacting the animal’s research use. Eradication of Cm can be challenging as aberrant bodies can form in response to antibiotic therapy, resulting in treatment failure. A study was conducted to evaluate various antibiotics regimes with the aim of eradicating Cm from both immunodeficient and immunocompetent laboratory mice. NSG mice were cohoused with experimentally infected, Cm-shedding BALB/c mice for 14 days modeling a natural route of exposure. Four groups of 8 infected NSG mice were treated for 7 days with either 0.08% sulfamethoxazole & 0.016% trimethoprim (1MS) in water, or feed impregnated with 0.0625% doxycycline, 0.124/0.025% 1MS, or 0.12% amoxicillin. The estimated ingested dose for a 25.5 g mouse was approximately 160/32 mg/kg, 119 mg/kg, 236/48 mg/kg, and 228 mg/kg, respectively. A control group was provided standard water and feed. All antibiotic treated NSG mice were euthanized with clinical disease consisting of dehydration, hunched posture, >20% weight loss, and dyspnea 21-40 days (32.6 ± 4.2 mean +/- SD) post treatment (DPTx) as compared to 14-33 days (25.75 ± 5.9) for the controls. At necropsy, all mice had multifocal histiocytic and neutrophilic bronchointerstitial pneumonia and/or bronchiolitis with bronchial and alveolar epithelial cell degeneration with prominent intraluminal chlamydial inclusion bodies. Subsequently, groups of 8 C57BL/6J, BALB/c and NSG mice infected with Cm, as described, were treated with 0.124/0.025% 1MS feed for 7 (BALB/c and B6) or 21 days (NSG). Immunocompetent mice were negative, whereas all NSG mice were Cm positive by PCR 14 DPTx and euthanized. These results provide insight into the difficulties of eradicating Cm from immunodeficient mice, providing additional evidence that Cm should be an excluded agent.

**PS10 Chronic Wound Management in an Aged Female Macaque**

R Coley1, K Coda

Research Animal Resources, University of Minnesota, Minneapolis, MN

A 20-year old, 8.5 kg, female rhesus macaque (Macaca mulatta) with a recent history of reduced mobility presented with full thickness lesions of the ischial callosities and the plantar aspect of the hind feet bilaterally. Due to her clinical history and the presentation of the lesions, the wounds were suspected to have been traumatic in origin with progression and development of new lesions secondary to the changes in mobility causing pressure necrosis. Treatment was initiated with topical silver sulfadiazine cream and Manuka honey on all lesions during the inflammatory phase of wound healing as well as distal limb bandaging and tie over bandaging of the ischial callosities. Delays in wound healing to the proliferative phase prompted incorporation of calcium alginate as the primary dressing to encourage granulation tissue formation. The new dressing quickly helped create a healthy, even layer of granulation tissue in the wound beds. Despite the presence of healthy granulation tissue, delays in epithelialization of the wounds again prompted a new approach. A borate-based ointment containing copper and zinc was applied topically to each bandage change. Literature from rodent models suggests borate-based microfiber glass promotes angiogenesis and epithelialization, and in vitro studies show borate-based microfiber glass with the addition of copper and zinc has antimicrobial and anti-biofilm effects. The delays in wound healing during the various stages were suspected to be due to the locations of the lesions, secondary bacterial infections, and the age and mobility of...
the animal. With the introduction of wound dressings and topical agents selected to enhance the specific phase of wound healing and therapeutic interventions to increase mobility, progression to the next phase of wound healing occurred rapidly. After extended wound care management employing these targeted strategies, all wounds have fully resolved. This presentation will discuss the various phases of wound healing, unique considerations relevant to each phase, and techniques for management of chronic wounds in limited mobility nonhuman primate patients.

PS11 The Use of Acupuncture for Treatment of a Lame Goat
J Yang1, A Slate, LS Palley
Center for Comparative Medicine, Massachusetts General Hospital, Charlestown, MA

Acupuncture has been introduced into laboratory animal medicine for over a decade. Its benefits include enhanced analgesia, improved wound healing, and as a treatment for various diseases. However, this technique has not gained wide acceptance or application in laboratory animal medicine for a variety of reasons including lack of training opportunities and peer reviewed literature, resistance to incorporate complementary therapeutics, being a possible confounding study variable, and difficulty in applying the technique to some of the laboratory animal species. This presentation illustrates how acupuncture was successfully integrated into the clinical management of a research animal. A 3-year-old female Spanish Cross goat was used to investigate the efficacy of bone marrow aspirate concentrate (BMAC) on chondral injury in the setting of acetabular labral repair. After acetabular capsulotomy of the left hip joint, she demonstrated persistent lameness and pain. The differential diagnosis for the cause of chronic pain is the post-operative complication in a surgical procedure to create acetabular labral injury. The clinical signs were managed with chronic use of NSAIDs and opioids in conjunction with passive range of motion exercises for over a month with little to no improvement. The decision to add acupuncture treatment to her pain regime was made with the investigator since it is non-invasive and will have minimal to no impact on the study goal. Her clinical condition significantly improved through subjective observation after one dry needle and two series of electro-acupuncture (EAP) treatments. Opioid treatment was then discontinued until the study endpoint. A brief discussion on the fundamental principal of Traditional Chinese Veterinary Medicine diagnosis, treatment, selection of acupuncture points will be discussed through this case. The audience will gain a general picture of how to select potential clinical cases for acupuncture treatment in a laboratory animal setting and increasing the laboratory animal veterinarian’s awareness of the use of acupuncture for the management of pain.

PS12 Panniculomatous-like Lesions and Mortality Associated with Nannizziopsis arthrosporiodes in Central American Boas and other Species within a Breeding Colony
CA Johnson-Delaney1,2
1Colony Health Support, NW Zoological Supply, Edmonds, WA; 2Health Programs, Washington Ferret Rescue & Shelter, Edmonds, WA

A shipment of Central American Boas (Boa constrictor imperator) (CAB) arrived infested with mites from a reptile vendor in the US. Within two weeks, proliferative lesions resembling papillomas began appearing on all surfaces on the majority of snakes including lips, eyes, body, and head. Many began dying with clinical signs of dehydration and severe wasting. Molecular testing along with histopathology and necropsy demonstrated pathology due to Nannizziopsis arthrosporiodes. This fungal species had not been isolated from snakes prior to this outbreak. The lesions differ in appearance from the typical Nannizziopsis sp. lesions in lizards. Lesions were keratinophilic with underlying ulcerations and necrosis in the epidermis and dermis. The fungus is highly contagious and was passed to additional snake species in different rooms within the entire breeding facility, prior to clinical signs appearing in the CABs. Spread was likely through fomites and personnel traffic patterns. Nannizziopsis sp. can be difficult to treat and eradicate. A program for treatment and prevention in other reptile species in the facility will be discussed. These cases illustrate why quarantine procedures are necessary in any facility receiving shipments from vendors where multiple imported species are housed. Nannizziopsis sp. as a pathogen in reptiles will be discussed.

PS13 Type 2 Diabetes Mellitus in Tupaiota belangeri (Northern Tree Shrew)
AP Lamacchia1,2, KL Gardiner2, KM O’Brien2
1ULAR, University of Pennsylvania, Philadelphia, PA; 2Pathobiology, University of Pennsylvania, Philadelphia, PA

Three older adult, singly housed, northern tree shrews presented for a range of clinical signs within a 1-year period, including lethargy, hind limb lameness, decreased visual acuity when performing tasks, polyuria, and polydipsia. Diagnostics included point of care blood glucose and ketone measurements, as well as urine dipstick readouts. These three shrews were found to have varying degrees of hyperglycemia, glucosuria, and ketonuria. The combination of these clinical signs and diagnostics led to a previously undescribed, presumptive diagnosis of diabetes mellitus type 2. Management of this disease process included modification of baseline diet to a feline diabetic management chow, as well as transitioning from their typical frugivorous diet to vegetable and protein sources such as peas, carrots, mealworms, and eggs. Additional medical intervention included metformin dosed at 10 mg/kg based on human and non-human primate literature. Bi-weekly blood glucose readings and urine dipstick measurements were used to track diabetic management and potential relapse. Using these techniques, animals were able to be clinically managed for 3-8 months from initial diagnosis, with demonstrable reduction in blood glucose values. Diagnosis of type 2 diabetes mellitus was confirmed through terminal blood collection measuring plasma insulin levels, as well as HbA1c measurements, CBC, and chemistry analysis. Post-mortem and histopathological examinations were performed, and main findings included pancreatic islet cell lipodisosis, glycogen vacuolation of the pancreatic, biliary, and renal ductules or tubules, and glomerulosclerosis. Streptozotocin-induced type 1 diabetes has been previously described in tree shrews, which provided the literature characterizing their normal versus diabetic hematologic values; however, this is the first report of spontaneously occurring type 2 diabetes in this species and may present opportunities for future translational model development.

PS14 Animal Research: A Risky Business?
TJ Jameson1, K Stepney2
1Animal Welfare and Veterinary Services, Labcorp, Harrogate, United Kingdom; 2Operations, Labcorp, Huntington, United Kingdom

Our desire to maintain the highest standards of animal welfare and scientific conduct can make us feel challenged by the need to control our complex and dynamic working environment. In response, we may find ourselves considering what could go wrong. However, this raises the questions of where do I start, how to identify these risks, who should I involve, how do I assess them, what should I do
about them and how can I achieve this across multiple species, research projects, multiple facilities, and continents? This presentation details how a global research organization decided to approach animal welfare and compliance risk management. It will explain how we developed partnerships across the organization to leverage existing knowledge of risk management principles and how we applied them to the complex world of animal research. During the presentation we will explain our journey so far, what we have achieved, the principles employed, how we approached approach cultural change, the methods, tools developed and key lessons learned.

**PS15 Photobiomodulation Therapy Implementation in an Outdoor Nonhuman Primate Breeding Colony**

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Photobiomodulation therapy, otherwise known as PBM therapy or laser therapy, has been shown in many species to be beneficial for adjunctive management of inflammatory conditions including acute and chronic pain. This adjunctive therapy can decrease time for wound healing and may reduce the need for additional therapeutics. These photochemical effects improve cellular metabolism at low level stimulation and provide analgesia with high level inhibition - a biphasic dose response. PBM therapy is used widely in human medicine and has recently been defined in veterinary medicine. The indications for use and expected outcomes are better described in companion animals than they are in traditional laboratory animals and no guidelines or recommendations have been described for nonhuman primates. Here we discuss the implementation of laser therapy in a large breeding colony of Rhesus macaques, focusing on the indications, frequency of therapy, and unique challenges. Species-specific considerations include sedation-only administration, a thorough evaluation of the social implications of hospitalization, and pregnancy status. Attention to the cost of equipment, application time, and disinfection between animals housed in pathogen-defined groups should also be considered. Management of these concerns is demonstrated using clinical cases that are presented in a large outdoor NHP breeding colony.

**PS16 Examining the Relationship between Self-efficacy and the Implementation of Lean Methodology while Working in an Animal Care and Use Program**

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Via our investigation since 2022, Animal Caretakers (ACTs) in our facility have expressed concerns regarding their ability to accurately assess mouse health while conducting daily cage-side observations. With the current nesting substrate, the mice are able to build large, robust nests that commonly decrease visibility of the cage occupants, resulting in lower than desired self-efficacy of the ACTs when performing this task. Lower than desired self-efficacy of key personnel in an animal care and use program (ACUP) can negatively influence workplace morale, quality of work, efficiency, and customer service. Although Lean management techniques are being used to improve the animal care processes (i.e., husbandry and animal health assessment) of lab animal programs, the use of these techniques on staff self-efficacy and problem-solving abilities have not been well documented. In this pilot study, we examined the relationship between self-efficacy and the implementation of Lean methodology while conducting cage-side observations by using a mixed method design involving qualitative and quantitative assessments. Participants included ACTs that work in our rodent barrier facility. Results from preliminary analyses of the final data sets suggest that most (n=5/5; 100%) participants experienced increased self-efficacy when performing the daily cage-side observation task and had a better understanding of Lean methodology after participating in the study (n=5/6; 83%). Qualitative responses aligned with quantitative data and revealed that implemented improvements resulted in increased ACT confidence levels, as well as positive feelings of advocacy due to the presence of a Lean coach. There appeared to be no change in problem-solving abilities in this short-term application of Lean. In summary, our study highlights several benefits to incorporating Lean methodologies in an animal care and use program. Future studies will focus on investigating potential barriers to incorporating Lean processes in this setting in the context of using Lean to address other program needs.

**PS17 Results from the ACLAM-ASLAP 2022 Workforce Demographic and Salary Survey of Laboratory Animal Veterinarians**

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The American College of Laboratory Animal Medicine (ACLAM) and the American Society of Laboratory Animal Practitioners (ASLAP) continue to perform periodic surveys of the workforce demographics, salary, and other employment parameters for the laboratory animal medicine specialty field of the veterinary profession. With ACLAM and ASLAP’s continued interest in broadening the survey to include race, ethnicity, and other demographics, expanded employment information, and inclusion of veterinarians employed in this sector who are not members of ACLAM nor ASLAP, the questionnaire was modified in 2021 and again in 2023 to generate summaries and assess trends for each year prior, respectively. The 2025 Qualtrics web-based survey was distributed to all ACLAM, ASLAP, and American College of Animal Welfare (ACAW) members and posted on related websites and social media sites in 2023, allowing for 38 days of response time. As of this abstract submission after 24 days of the survey being open, 173 completed responses had been received. Overall, 91% and 68% of these individuals were ACLAM and ASLAP members, respectively, and 6% of the respondents were neither ACLAM nor ASLAP members. Forthcoming results from this survey will include the total annual gross professional income of full-time laboratory animal veterinarians stratified by ACLAM diplomate status, the years of post-DVM laboratory animal medicine experience stratified by gender, demographic characteristics and trends, and other findings. Additional results will summarize race and ethnicity, geography (including possible state-based reporting), training program completion, employer and job role details, and cross-response analysis. New for 2023, inquiries into additional demographic data,
remote work options, and career interests in remaining employed in the field of laboratory animal medicine will also be explored. A salary calculator, developed from a multivariate analysis of the data, will be presented for use. The salary calculator and presented data will provide information for hiring and strategic planning for institutions, as well as individuals.

**PS18 Advocating for Aquatic Technician/Vivarium Employees to Upper Administration (Salary, Educational Experiences, Conferences, Job Levels, Retention, Work Life Balance, etc.)**

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This platform session will review methods and strategies on how to effectively advocate for animal technical staff who work directly with aquatic species (i.e., zebrafish & xenopus). It is no secret that technical staff who work aquatic species face several unique challenges when compared to their counterparts. These positions also typically require very specialized training. Topics such as salary increases, professional development, promotion opportunities, and employee retention will be presented.

**PS19 Careers in Laboratory Science: Shareable Videos for the Promotion of Diversity in Laboratory Animal Science**

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Developing a diverse and inclusive laboratory animal science community can help with ongoing staffing and support concerns by ensuring a wide potential pool of potential individuals who would be interested in pursuing careers in laboratory animal science. Ensuring that the literature available to help promote career pathways in laboratory animal science is inclusive can help achieve this goal. The AALAS Foundation has created a series of videos that highlight Careers in Laboratory Science with laboratory animal professionals in a variety of career pathways with diverse backgrounds. In this session, the panel will demonstrate how they can be used to promote the diversity of career options in laboratory animal science and medicine. The targeted audience will be anyone who is interested in promoting careers in laboratory animal science, to audiences of any age.

**PS20 Pharmacokinetics and efficacy of extended-release buprenorphine for post-operative pain management in the domestic ferret (Mustela putorius furo)**

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Buprenorphine hydrochloride (bup-HCl) is a common injectable opioid analgesic. In ferrets, bup-HCl must be administered every 8-12 hours to maintain therapeutic plasma levels. Extended-release analgesics offer multiple advantages, including reducing animal handling and injection frequency, improving compliance, and limiting the possibility of breakthrough pain. Although the efficacy of extended-release buprenorphine formulations has been demonstrated in other species, their use in the domestic ferret has not been investigated. In this study, we evaluated the pharmacokinetics of a compounded polymeric formulation of buprenorphine (bup-ER) with a duration of action between 48-72 hours in multiple common laboratory animal species, and a pharmaceutical-grade, FDA-indexed liposomal suspension (bup-XR) with a duration of action up to 72 hours in mice and rats. Two doses each of bup-ER (0.12 mg/kg and 0.2 mg/kg) and bup-XR (0.2 mg/kg and 0.6 mg/kg) were administered subcutaneously to 12 young adult female ferrets. All doses achieved therapeutic plasma levels in 30 minutes. Results revealed that high-dose bup-XR maintained therapeutic levels for 72 hours, followed by high-dose bup-ER (48 hours), low-dose bup-XR (~24 hours) and low-dose bup-ER (~12 hours). We also compared the analgesic efficacy of a single high-dose bup-XR (0.6 mg/kg SC) to bup-HCl (0.02 mg/kg SC every 10-12 hours for 3 days) by performing clinical assessment after routine ovariohysterectomy. Ferrets receiving bup-HCl had significantly higher respiratory rate and posture scores in the first 24 hours post-operatively than those that received high-dose bup-XR. Ferrets receiving bup-HCl were also more likely to react to surgical incision palpation overall. It is of note that sterile injection-site abscesses developed after administration of high-dose bup-ER (50%, 6/12) and high-dose bup-XR (10%, 2/20). This study demonstrates that a single dose of bup-XR (0.6 mg/kg SC) is a safe and effective analgesic option in ferrets, with a duration of action of up to 72 hours. The administration of bup-XR in pet and laboratory ferrets offers a refinement to analgesia in this species.

**PS21 Pharmacokinetics of an Extended-release Buprenorphine in Female Yorkshire Swine (Sus scrofa domestica)**

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Given their anatomical and physiological similarities to humans, swine are the most widely used large animal translational model in biomedical research. Despite the use of swine as a surgical model, precise dosing regimens for commonly used analgesics, such as buprenorphine, are currently lacking in this species. A newly available extended-release formulation of buprenorphine (XRB) is FDA-indexed and approved for use in mice and rats; however, no studies have examined the efficacy and pharmacokinetic parameters of XRB in swine. The goal of this study was to determine the pharmacokinetics of the newly available XRB in swine. We hypothesized that after a single subcutaneous administration of XRB in adult swine, buprenorphine plasma concentrations would be above the therapeutic threshold of 0.1 ng/mL for up to 96 h. XRB was administered once, subcutaneously to 12 young female Yorkshire swine at low and high doses (0.12 mg/kg and 0.2 mg/kg) and bup-XR (0.2 mg/kg and 0.6 mg/kg) were administered subcutaneously to two separate cohorts of adult female Yorkshire swine at low and high doses (0.2 and 0.4 mg/kg, respectively; n = 3 and 2). Blood was collected from an indwelling jugular catheter prior to and after XRB administration (15 total time points). Individual animal data indicated all animals reached therapeutic buprenorphine plasma concentrations by 8 h post administration. Average plasma buprenorphine levels for both the low- and high-dose cohorts reached therapeutic concentrations starting at 90 min after XRB administration and were maintained above therapeutic concentrations throughout the 96 h study period. In the low-dose cohort, the average half-life was 212 ± 107.1 h, while the half-lives in the high-dose cohort was 63.8 h and 48.9 h. These results support our hypothesis and indicate that all animals maintained therapeutic plasma buprenorphine levels beginning at 8 h and maintaining past 96 h. Thus, XRB at 0.2 or 0.4 mg/kg
provide therapeutic levels of plasma buprenorphine and therefore its use should be further explored in swine.

PS22 Transdermal Mirtazapine Pharmacokinetics in Rhesus Macaques (Macaca mulatta)
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Decreased appetite is a common clinical problem in captive rhesus macaques (Macaca mulatta), Mirtazapine, a tetracyclic antidepressant originally developed for humans, has shown promise as a safe and effective promoter of weight gain and appetite in several veterinary species including rhesus and cynomolgus macaques. While mirtazapine is available in oral formulations, transdermal delivery in macaques with reduced appetite may improve patient compliance by allowing quick, painless, topical application. Here we report the pharmacokinetics of a single dose of a widely available transdermal mirtazapine veterinary formulation in six rhesus macaques, 0.5mg/kg of transdermal mirtazapine ointment, an efficacious dose in previous macaque work, was applied to the caudal pinnae of three female and three male young adult macaques, with 11 serum collections performed at 0, 0.5, 1, 3, 6, 8, 12, 24, 36, 48, and 72 hours post-dosing. Our data indicate transdermal mirtazapine is absorbed at a lower level in rhesus as compared with published values in domestic cats (rhesus peak serum concentration 1.2 ± 0.3 ng/mL), while drug half-life is longer than reported in cats (rhesus 15.5 ± 9.75 hours after administration and may require up to seven days of serial dosing to reach steady state. While previous work indicates clinical efficacy of this dosing in macaques, further investigation is warranted to determine if rhesus may benefit from higher recommended doses than companion animal species.

PS23 Alfaxalone as a Total Intravenous Anesthesia Protocol in New Zealand White Rabbits (Oryctolagus cuniculus) Improves Cardiovascular Stability Compared to Isoflurane
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Isoflurane is commonly used for anesthetic maintenance in rabbits, but inhalant anesthetics can cause dose-dependent cardiovascular depression and significant hypotension, decreasing its anesthetic quality. Another alternative, alfaxalone, has been studied for induction in rabbits with rapid onset and a short duration of action but has not been evaluated as an option to replace isoflurane for anesthetic maintenance. This study compared Total Intravenous Anesthetic Maintenance protocols (TIVA) using alfaxalone against isoflurane. Twenty-four male New Zealand White rabbits were assigned to one of three treatment groups; isoflurane alone, alfaxalone with buprenorphine, or alfaxalone with midazolam. All rabbits were premedicated with buprenorphine SC (0.02mg/kg) and induced with alfaxalone IM (6mg/kg). Following intubation, rabbits were maintained for 1 hour on either isoflurane (2.5%) or alfaxalone Constant Rate Infusion (CRI) (0.2mg/kg/min). For rabbits on the alfaxalone CRI, boluses of buprenorphine (0.01mg/kg IV or SQ) or midazolam (0.1-3mg/kg SQ) were given upon induction or adjuctively as needed dependent on positive tail–pinch responses that were conducted at 10, 15, 30, and 45 minutes. Heart rate, non-invasive and invasive blood pressure, respiration, end-tidal carbon dioxide (ETC02), percent oxygen saturation (SpO2), and temperature were recorded every 5 minutes. Blood gas was analyzed at t0, t30, and t60. Surgical plane or anesthesia was characterized by lack of positive response to a tail–pinch and was reached in all anesthetic groups. Results showed significant reduction in mean heart rate of the alfaxalone groups while mean invasive blood pressure was increased compared to the isoflurane groups. However, respiration in the alfaxalone groups was decreased with associated increases in ETC02 levels. There were no significant differences noted between alfaxalone treatment groups. Our preliminary findings indicate alfaxalone given as a TIVA maintenance protocol could be considered as an anesthetic alternative to isoflurane with improved cardiovascular stability though respiratory monitoring or management would be warranted.

PS24 Comparison of Two Different Formulations of Alfaxalone to Anesthetize Cynomolgus Macaques (Macaca fascicularis) for Plethysmography
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Plethysmography is employed in nonhuman primates (NHPs) to calculate respiratory minute volume (MV) and determine the exposure time required to deliver an aerosol at the target dose. Anesthetic drugs can impact breathing parameters like steady state minute volume (SSMV) central to aerosol dosing. Alfaxalone–midazolam combinations (AM) provide superior parameters for plethysmography in cynomolgus macaques. An obstacle to the use of AM is the volume required to anesthetize via intramuscular (IM) injection. A more concentrated formulation of alfaxalone will reduce injection volumes and refine AM protocols. The purpose of this study was to compare AM using the Indexed 10 mg/mL (AM10) formulation versus an investigational 40 mg/mL (AM40) formulation for IM administration in cynomolgus macaque undergoing plethysmography. We hypothesized that AM10 and AM40 would show no difference in quality of anesthesia (QA), duration of anesthesia, SSMV, accumulated minute volume (AMV), and side effects. We also hypothesized that female macaques would have a longer duration of anesthesia versus males using both formulations. The study used 15 cynomolgus macaques comprised of eight females, and seven males. NHPs were compared between two separate and randomized anesthetic events no less than one week apart. Each animal served as its own control. Anesthetized NHPs were placed in a sealed plethysmography chamber and minute volume measurements were calculated every 10 seconds to determine SSMV. Once SSMV was achieved for 20 minutes, the trial ended. There were no statistically significant differences between AM10 and AM40 for duration of anesthesia, SSMV, AMV, side effects, or QA. AM40 had a significantly smaller injection volume. Females did not show a significantly longer median duration of anesthesia using either of the alfaxalone formulations. Overall, AM40 offers a more humane anesthetic than AM10 for plethysmography in cynomolgus macaques.

PS25 Venipuncture Site Influences Blood Drop Volume in C57Bl/6 Mice
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Many experiments require the collection of serial blood samples from mice. However, the size of mice limits the volume of blood that may be safely collected as a survival procedure. In IACUC protocols, investigators may report the volume of blood they collect...
from mice as a number of drops. Many institutions, including ours, use an anecdotal conversion factor (e.g., 1 drop mouse blood = 25 µl) to ensure that these research protocols remain in compliance with institutional blood collection guidelines. To our knowledge, previous work has not experimentally determined the volume of a mouse blood drop and how this volume may be influenced by venipuncture site, needle size, animal user, or mouse sex and weight. In this 10-week experiment, two animal users bled 15 male and 15 female C57BL/6 mice from three sites (facial, saphenous, and tail vein). In our crossover design, mice were divided amongst 5 groups (n=6): left and right tail vein, left and right saphenous vein, and facial vein. Using institutional guidelines for gauge sizes, venipuncture was assigned so that either a 25 or 27 gauge needle was used for saphenous venipuncture and either a 20 or 23 gauge needle was used for tail venipuncture. Facial venipuncture was only performed with 20 gauge needles. A single blood drop produced from each site was weighed, and the volume of each drop was determined using the average blood density determined from 8 mice that were terminally bled at the end of the study. Only venipuncture site significantly influenced blood drop volume, with no significant effects of needle gauge, animal user, or mouse sex or weight on blood drop volume. Facial vein puncture produced the largest drop volume (mean: 21.7 µl), followed by the saphenous vein site (mean: 9.97 µl) and tail vein site (mean: 4.96 µl). Additionally, the facial vein was associated with more post-collection hemorrhage and morbidity, including seizures that required euthanasia of one mouse. The results of this study suggest that blood collection from saphenous and tail veins optimizes both serial collection of small-volume blood samples and animal welfare.

**PS26 Pharmacokinetics of Injectable Buprenorphine and Meloxicam in the Naked Mole-Rat**

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Unique characteristics of the naked mole-rat (NMR) have made it increasingly popular as a laboratory animal. They are used to study cancer, circadian rhythm, pain, longevity, aging, and many other fields of research. Currently, the analgesic dosing regimens used in the NMR mirror those used in other rodent species. However, there is no pharmacokinetic (PK) data supporting the use of injectable analgesics in the NMR. Therefore, we conducted two independent PK studies to evaluate two commonly used analgesics in the NMR: buprenorphine (0.1 mg/kg SC) and meloxicam (2 mg/kg SC). In each study, blood was collected at 8 timepoints after subcutaneous injection of buprenorphine or meloxicam (0 [pre-dose], 15min, 30min, 1hr, 2hr, 4hr, 8hr, and 24hrs). Three NMRs were used per timepoint for a total of 24 animals per PK study. We found plasma concentrations of buprenorphine were highest between 15 and 30 minutes post-injection. These levels remained above the human therapeutic threshold (1 ng/mL) for at least 8 hours. Plasma concentrations of meloxicam were highest between 30 minutes and 1 hour post-injection. These levels remained above the extrapolated dog and cat therapeutic threshold levels (390–911 ng/mL) for up to 24 hours. No skin reactions were seen in association with injection of either drug. In summary, this data supports the dosing of buprenorphine (0.1 mg/kg SC) and meloxicam (2mg/kg SC) in the NMR at a minimum frequency of once every 8 and 24 hours respectively. Further studies should be performed to evaluate the clinical efficacy of these drugs by correlating plasma concentrations with post-operative pain assessments.

**PS27 Assessment of Oral Albendazole and Fumagillin in the Treatment of Pseudoloma neurophilia in Adult Zebrafish**

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*Pseudoloma neurophilia* (Pn), the causative agent of the most commonly-reported zebrafish disease, is a microsporidian parasite that confounds research by inducing behavioral and physiological changes in zebrafish. While there is no treatment for *Pn*, albendazole and fumagillin have been used to treat microsporidian infections of other species. To investigate the efficacy of oral albendazole and fumagillin in the treatment of *Pn*, we performed a pilot study that demonstrated the safety and palatability of novel gel-based diets containing fumagillin or albendazole in adult AB zebrafish. In a subsequent study, approximately 250 adult AB zebrafish (previously infected with *Pn*) were treated with these medicated diets for 4 weeks. Fish were randomly allocated to one of five experimental groups: (1) albendazole at 2 mg/kg, (2) fumagillin at 15 mg/kg, (3) combination treatment of both albendazole 2 mg/kg + fumagillin 15 mg/kg, (4) infected control, or (5) uninfected control groups. At four different timepoints (weeks 0, 5, 10, and 16 of the study), fish were euthanized via MS-222 immersion and whole-body qPCR performed to assess for *Pn* prevalence across treatment and control groups. There were no statistically significant associations between treatment group and *Pn* prevalence at any timepoint, although potentially biologically significant reductions in *Pn* prevalence occurred in the combination therapy group at weeks 5 and 16 where *Pn* prevalence was reduced by 25% and 23%, respectively, compared to baseline prevalence for this group. Additionally, at week 5 in the albendazole group, the *Pn* prevalence was reduced by 25% compared to baseline prevalence results for this group. High-performance liquid chromatography (HPLC) analyses of the medicated feeds recovered less albendazole (approximately 46% of the expected concentration) and more fumagillin (approximately 235% of the expected concentration), highlighting the importance of validating medicated feed concentrations to ensure feed safety, efficacy, and consistency. While *Pn* remains challenging to eradicate and control, results from this study warrant further investigation into the utility of albendazole and fumagillin as potential treatments for this pathogen.

**PS28 Creation of a Swine Model of Oral Angioedema**

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Angioedema, a sudden swelling often caused by allergic reactions, commonly affects the face, particularly the lips and tongue. Swelling in this area may be life threatening, especially if breathing is obstructed. In addition, angioedema in the oral cavity may affect absorption of locally administered medication. Though swelling has been induced in the skin of miniature swine (MS) using histamine injections, there is no large animal model of angioedema in this target area (i.e., oral cavity). Thus, an animal model is needed to further investigate facial angioedema pathophysiology and treatments. It was hypothesized that histamine would induce swelling and erythema in the lips and tongue, similar to what is
observed in skin irritation models. To test this hypothesis, 6 male Yucatan MS were injected in the mucosa of the inner lip (left and right) and into the tongue with 20 ul of histamine dihydrochloride at each site and at varying concentrations. The following concentrations were used (one animal dosed at each): 25, 125, 500, 1000, 5000, and 10,000 ug/ml. Animals were anesthetized with isoflurane to ensure accuracy of dose administration and measurements. Calipers were used to measure tissue swelling, and Draize scores were performed to monitor erythema and edema around each injection site. The animal dosed at 10,000 ug/ml displayed the desired reaction, and an additional 4 animals were dosed at this concentration to ensure reproducibility of results. For the total of 5 animals dosed at 10,000 ug/ml, the majority of swelling in both the lips and tongue occurred within the first 30 minutes (average change from baseline = 3.82 mm for the lips; 3.32 mm for the tongue). Lip thickness continued to mildly increase over 90 minutes, whereas swelling in the tongue decreased in 90 minutes, though not back to baseline. Draize scores showed increased erythema and edema starting at 10 minutes. Animals received diphenhydramine during anesthetic recovery to reduce any remaining swelling. All animals recovered uneventfully. Thus, histamine dihydrochloride serves as a suitable agent for inducing angioedema in the tongue and lips of MS and can serve as a valuable large animal model for assessing treatments of angioedema and investigating the impact of angioedema on drug absorption.

**PS29 A System to Monitor Health and Exploratory Behavior Reveals that Starved Gut-Associated Bacteria Do Not Induce Peritonitis in Myeloperoxidase-Deficient Mice**

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Accurate and objective monitoring of laboratory animal behavior and health is critical in biomedical research, especially when mouse models manifest as subclinical signs of disease. Traditional methods, which rely on laborious/costly/observer-based evaluations, present challenges, such as potential biases/insensitivity to subtle changes. Herein, we developed and validated a novel real-time caging system to automatically monitor behavior and health using a mouse model of peritonitis with gut wall-associated bacteria (GWAB). To validate our monitoring system to quantify the disease severity in mice (n=20 different lines/arrangements), we set to assess the effect of bacterial starvation on the potential pathogenic induction of peritonitis by GWAB. First, we developed an automated system to provide real-time tracking of mice and their traffic to areas designated as ‘food’ and ‘water’ to infer health and exploratory behavior, activity levels, and social preferences. Then, to validate its relevance, we used GWAB isolated from cavitating microlesions in Crohn’s disease (i.e., E. coli, Parabacteroides distasonis) which we ‘starved’ in phosphate buffered saline, 24 hours prior to intraperitoneal injection in 20-week-old SPI–myeloperoxidase-deficient (knockout) mice. Then, a time-series analysis was employed to assess differences in mouse behavior over 5 days. Two human observers assessed animal health and scored the disease severity in each mouse over time. Of interest, none of the starved bacteria induced severe peritonitis in mice as expected based on the observers’ assessments. However, our system detected a significant temporary decrease in the mice activity and interest in food and water post-injection, which lasted approximately 6h (5-10h). The system also detected a gradual recovery in animal mobility which almost completely normalized by the end of the study when animals were euthanized to harvest peritoneal macrophages for polarization assays. Our findings highlight the significant benefits of automated monitoring systems over traditional observer-dependent evaluations and illustrate that starved GWAB may not be pathogenic.

**PS50 Impact of Aspen versus Corn Cob Bedding on Reproductive Measures in a Transgenic Mouse Model of Cystic Fibrosis**

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Corn cob is prevalently used as bedding for laboratory mice, Mus musculus. However, it has been associated with disrupted estrogen pathways in deer mice, which could have various downstream effects on reproduction and disease model survival. A popular, alternative bedding option is aspen wood, which comes in a variety of particle sizes. Laboratory mice prefer aspen bedding when given a choice between it and corn cob. However, it is unknown if aspen improves reproduction indices in inbred mice, or if it is better tolerated by disease models. Therefore, this study aimed to determine if aspen bedding (with large aspen chips) could improve reproduction in C57BL/6J mice, using a transgenic model of cystic fibrosis as an example. Trio breeder cages were set up on either corn cob, aspen chips, or aspen shavings (n=6) when the mice were 6-8 weeks old. Cages were monitored until the dams reached 7 months of age for the following measures: latency to first surviving litter, number of litters, litter size, litter survival, individual pup survival, pup weight between 5 and 40 days old, and time of pup puberty onset. Most measures were not impacted by bedding. However, pups housed on aspen reached puberty sooner than those housed on other bedding (F, 122 = 7.56; P<0.001). Pups raised on aspen cob also weighed more than those raised on corn cob before reaching puberty (F, 124 = 6.30; P=0.002). This data shows that C57BL/6J mice have similar reproductive indices across aspen and corn cob bedding. Aspen chips could be advantageous for increasing pup weight. However, all dams were raised on corn cob before the study began, which could have had unassessed effects on development.

**PS51 Early Antibody Response and Viral Neutralization Correlate with Reduced SIV Infiltration in the CNS of Pigtail Macaques (M. nemestrina)**

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Simian immunodeficiency virus (SIV) infection in pigtail macaques (Macaca nemestrina) is a valuable model for AIDS pathogenesis, especially in the central nervous system (CNS). This model closely resembles HIV infection in humans, exhibiting diverse immune responses and disease progression between individuals. We hypothesized that differences in the adaptive immune response to SIV drive inappropriate innate activation within the CNS, leading to poor clinical outcomes such as encephalitis. SIV-specific antibody titers and cytokine production in longitudinal plasma samples and cerebrospinal fluid (CSF) were measured in juvenile males (n=36) from baseline through 84 days post-infection using ELISA and an MSD U-PLEX assay, respectively. CNS involvement was evaluated through combined immunohistochemistry (IHC)/ in situ hybridization (ISH) staining of basal ganglia for apoptosis-associated speck-
ABSTRACTS OF PLATFORM SESSIONS

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The functional activity of plasma antibodies was examined using in vitro neutralization. Macaques that developed encephalitis showed pronounced CNS inflammatory pathology, including elevated CSF cytokines, increased AS expression, and higher brain viral loads. Plasma antibody response to SIV was predictive of CNS outcome as early as 21 days post-infection, with differences between outcome groups becoming more apparent over time. Plasma immunoglobulin from macaques with encephalitis displayed limited neutralization capacity compared to those without encephalitis. These findings underscore the critical role of the early adaptive response in determining long-term clinical outcomes of SIV, particularly in relation to CNS involvement. Robust early antibody responses appear to protect the CNS from viral infection and nongenomic inflammatory activation. Understanding early B and T cell responses during acute SIV infection can provide insights into mitigating nongenomic inflammation and addressing chronic inflammatory changes observed in individuals with HIV. These findings contribute to our understanding of HIV CNS pathogenesis and highlight potential areas for further research.

**PS32 Immunogenicity of the mXCL1-PyCSP Fusion Protein Prime-and-Trap Malaria Vaccine**

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Malaria is a life-threatening parasitic disease caused by Plasmodium spp. and is transmitted by female Anopheles spp. mosquitoes. Annually, there are nearly 250 million cases worldwide causing over 600,000 deaths, primarily in children under 5 years of age in sub-Saharan Africa. Currently, no highly effective and efficacious (>80–90%) vaccine exists, hence the development of such a vaccine against human malaria infection is of paramount importance. The chemokine ligand XCL1, also known as lymphotoxin, binds to its chemokine receptor XCR1. Recent studies have shown that XCL1-antigen fusion proteins efficiently induce CD8+ T cell responses by preferentially delivering antigens to cross-presenting dendritic cells expressing XCR1. In this study, we evaluated the immunogenicity of a fusion protein of the murine XCL1 chemokine and the Plasmodium yoelii circumsporozoite protein (mXCL1-PyCSP) in our “Prime-and-Trap” vaccine in a murine model of malaria. We hypothesized that this fusion protein vaccine would increase immunogenicity compared to the traditional unfused PyCSP vaccine. Forty male and forty female BALB/c mice (n = 80) aged 4-6 weeks old were immunized via DNA gene gun on Day 0. On Day 28, the mice were euthanized, and their spleens harvested and screened for interferon-γ-producing T cell responses using enzyme-linked immunospot (ELISPot) assays. In both male and female cohorts, the mXCL1-PyCSP groups generated significantly higher numbers of spot forming units (SFU) per million splenocytes compared to the PyCSP groups (p < 0.0001). In summary, the mXCL1-PyCSP fusion protein vaccine significantly increased immunogenicity compared to the unfused PyCSP vaccine. Future research will evaluate protection induced by the mXCL1-PyCSP fusion protein vaccine compared to the traditional unfused PyCSP vaccine in our Prime-and-Trap immunization/challenge model to determine if incorporating XCL1 offers advantages to this vaccine approach.

**PS33 Analysis of Gross and Histopathologic Changes from Repeated Celiotomies in African Clawed Frogs (Xenopus laevis)**

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African Clawed Frog (Xenopus laevis) oocytes are used in biomedical research to study cellular biology, toxicology, and embryology. Repeated survival surgical oocyte collection is commonly performed to access high quality, viable oocytes for research procedures and to reduce the number of animals used in research. Despite this common practice, there is no evidence-based limit for the total number of survival celiotomies that can be performed. To provide an improved reference a retired colony of frogs (n = 33) previously used for surgical oocyte collection, was euthanized for gross and histopathologic evaluation. Animals received anywhere from 4-11 celiotomies (average 6.5 ± 2.3) and were between 69-1646 (average 427± 251) days from their last surgery. Body weight, residual external skin sutures, and abdominal wall sutures were counted, and all skin and abdominal wall musculature that had been operated on was collected for histopathology. Tissues submitted were examined for evidence of abnormal anatomy or changes indicative of painful processes (e.g. granulation tissue, histiocytic infiltrate, fibrosis). After a standardized scoring system was developed, histopathology lesions were scored according to severity and then compared to experimentally naïve, age-matched controls (n = 4). Results indicate that skin pathology score was significantly predicted by number of surgeries (P < 0.005), however it was not predicted by the number of suture placements (P > 0.001). Abdominal pathology score was significantly predicted by number of abdominal sutures placed (P < 0.001) and by the number of surgeries (P < 0.001). Neither abdominal nor skin pathology was predicted by the number of days since the last surgery (P > 0.2). As expected, the results indicate that as the number of surgeries and abdominal sutures placed increases, there is a greater likelihood of developing histopathologic changes that correspond to painful processes in mammalian species. This study provides an improved reference for the development of institutional guidelines for Xenopus survival surgical oocyte collection.

**PS34 Effect of Gut Microbiota Transfer Methods on DSS-Induced Colitis Disease Severity**

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Differences in the gut microbiota (GM) of research mice can significantly impact model phenotypes. Previous studies in our lab demonstrated that methods of GM transfer also affect the severity of dextran sodium sulfate (DSS)-induced colitis in mice. Co-housing mice to transfer GM leads to greater disease severity compared to embryo transfer or cross-fostering methods. Additionally, transfer of low-richness GM into recipients with higher richness GM is associated with more severe colitis when compared to GM transfer in the opposite direction. However, it was unclear if disease was exacerbated by the stress of co-housing, or the later transfer of fecal material relative to other methods. To answer this question, we compared co-housing to fecal microbiota transfer (FMT) and bedding transfer. C57BL/6 mice from two suppliers with known differences in GM richness were used as recipients of two donor GMs differing in richness, via co-housing or a combination of FMT and bedding transfer. FMT groups were gavaged once per week

**PS35**

**Analysis of Gross and Histopathologic Changes from Repeated Celiotomies in African Clawed Frogs (Xenopus laevis)**

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1 Department of Surgery, University of Chicago, Chicago, IL; 2 University of Illinois College of Veterinary Medicine, Urbana, IL

African Clawed Frog (Xenopus laevis) oocytes are used in biomedical research to study cellular biology, toxicology, and embryology. Repeated survival surgical oocyte collection is commonly performed to access high quality, viable oocytes for research procedures and to reduce the number of animals used in research. Despite this common practice, there is no evidence-based limit for the total number of survival celiotomies that can be performed. To provide an improved reference a retired colony of frogs (n = 33) previously used for surgical oocyte collection, was euthanized for gross and histopathologic evaluation. Animals received anywhere from 4-11 celiotomies (average 6.5 ± 2.3) and were between 69-1646 (average 427± 251) days from their last surgery. Body weight, residual external skin sutures, and abdominal wall sutures were counted, and all skin and abdominal wall musculature that had been operated on was collected for histopathology. Tissues submitted were examined for evidence of abnormal anatomy or changes indicative of painful processes (e.g. granulation tissue, histiocytic infiltrate, fibrosis). After a standardized scoring system was developed, histopathology lesions were scored according to severity and then compared to experimentally naïve, age-matched controls (n = 4). Results indicate that skin pathology score was significantly predicted by number of surgeries (P < 0.005), however it was not predicted by the number of suture placements (P > 0.001). Abdominal pathology score was significantly predicted by number of abdominal sutures placed (P < 0.001) and by the number of surgeries (P < 0.001). Neither abdominal nor skin pathology was predicted by the number of days since the last surgery (P > 0.2). As expected, the results indicate that as the number of surgeries and abdominal sutures placed increases, there is a greater likelihood of developing histopathologic changes that correspond to painful processes in mammalian species. This study provides an improved reference for the development of institutional guidelines for Xenopus survival surgical oocyte collection.
PS53 SARS-CoV-2 Doggybone DNA Vaccine Is Immunogenic and Protective in Immunosuppressed Hamsters (Mesocricetus auratus) Following Viral Challenge

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Vaccine platforms used to immunize for COVID-19 include nucleic acid, protein, and viral vector. DNA advantages include rapidity of design and production, thermostability, and adaptability for emerging viral strains. The novel doggybone DNA (dbDNA) platform consists of enzymatically produced DNA that is more rapidly manufactured and scalable than plasmid DNA (pDNA). We hypothesized that dbDNA vaccines delivered needle-free would be as immunogenic and protective as COVID-19 in Syrian hamsters (Mesocricetus auratus) as a previously tested pDNA vaccine. Animals (n=6/group) were vaccinated intramuscularly with spike-based nCoV-S(JET) pDNA, dbDNA(SJET), dbDNA(ST-JET), or control DNA at two doses (0.2, 0.05 mg) using a needle-free jet injector at 0 and 3 weeks (week). Blood was drawn from the vena cava 3 and 5 weeks to measure serum neutralizing antibody (nAb) and protection. Hamsters were challenged with 1000 PFU SARS-CoV-2 intranasally and immunosuppressed with cyclophosphamide at 1 (140 mg/kg), 2 (100 mg/kg), and 5 (100 mg/kg) days post-infection (dpi). Hamster body weights were measured daily for 9 dpi, followed by intracardiac terminal blood collection for nAb response and lung harvest for histopathology, viral RNA (RT-PCR) and infectious RNA (plaque assay) quantitation, and RNA labeling (ISH). Animals developed a nAb response with the exception of one hamster in the 0.05 mg dbDNA(SJET) group, with highest titers in the nCoV-S(JET) and dbDNA(SJET) groups and a significantly increased titer in the nCoV-St-JET group compared to controls after the second vaccination (p < 0.05). Statistically significant differences in body weights were observed in all hamsters vaccinated at the 0.02 mg dose. Lung viral and infectious RNA were decreased in vaccinated hamsters and the 0.05 mg group showed a decreased protective effect. Lung histopathology and ISH labeling similarly showed the 0.02 mg dose as more protective. Hamsters in the 0.02 mg groups mounted nAb against viral variants of concern, with the highest titers observed in the nCoV-S(JET) group. In conclusion, the dbDNA platform was effective and efficacious, performing similarly to pDNA in a hamster model of COVID-19.

PS56 Developing Patient-derived Xenografts (PDX) Models to Evaluate Immunotherapies Targeting Human and Canine T Cells

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Even though there have been many improvements in developing cancer therapeutics, only a small number make it through FDA approval. To combat the need for better preclinical models, we have developed PDX models of human non-small cell lung cancer (NSCLC) and canine osteosarcoma (OSA) by surgically implanting resected tumors subcutaneously in NOD scid gamma (NSG) mice (KN Suvilesh et al., Molecular Cancer (BMC), March 2022). To date, 26 NSCLC and 2 canine OSA tumors have been implanted. By using immunohistochemistry and quantifying mRNA levels, NSCLC PDXs retained expression of primary tumor-matched diagnostic pathological markers such as PD-L1, TTF, and HLADR over 10 generations. NSCLC PDX tumors and spleens in the NSG mice have also retained passaged tumor-associated CD3+, CD4+, and CD8+ human 1 cells over several generations without causing graft versus host disease. We then used both metastatic and non-metastatic NSCLC PDX tumors to test the potential therapeutic efficacy of a novel T cell targeting molecule, anti-human CD3e monovalent Fab fragment (Mono-OXt-Fab) and compared tumor growth results with those of established anti-human PD-L1 mAb therapy. In our non-metastatic model, 10 mice received IgG-control and 10 received the mono-fab treatment. We observed that PDX-NSG mice treated with mono-fab had a significantly reduced tumor burden (p<0.01) and increased survival over control-IgG-treated mice (p<0.05). This experiment was repeated with a metastatic NSCLC model and our mono-fab was combined with anti-human PD-L1 mAb therapy. In our non-metastatic model, 10 mice received IgG-control and 10 received the mono-fab treatment. We observed that PDX-NSG mice treated with the combination treatment showed significantly reduced tumor burden (p<0.005) and increased survival over control-IgG-treated mice (p<0.005). For our dog osteosarcoma PDX model, the passaged tumors share the same histologic phenotype as the parental tumor over three generations so far. We have also generated growth curves using caliper measurements and produced gross images demonstrating growth of canine bone tumor in NSG mice after subcutaneous implantation. In summary, our PDX models are effective at representing parental tumor characteristics and serve as an in vivo model for studying new cancer treatments.
PS37 Inappropriate Head Holding and Inappetence in a Rhesus Macaque (Macaca mulatta)

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A 22-year-old 15.3 kg male, intact, singly housed Rhesus macaque (Macaca mulatta) was examined for a decade long history of intermittent head holding and inappetence. In 2006, the monkey underwent surgery for a headpost and recording cylinder implant that had complications with the skin surrounding the sites. A surgery to correct the skin defect was attempted later in that year. Throughout 2009, multiple attempts were made to correct the issue, however unsuccessful, and the cylinder was removed. Shortly thereafter, he was frequently noticed to be holding the headpost with his feet, soft stool, decreased appetite, testing ability and quiet mentation. He was then sedated for a workup which also revealed a grade 3/6 heart murmur. An echocardiogram performed at that time was unremarkable. Multiple similar clinical signs between 2015 and 2019 were reported, and in January of 2020, the monkey’s headpost was removed. Additional diagnostics were performed in 2022 after numerous reports of head-holding and inappetence. The laboratory reported visual deficits on behavioral testing. A CT with contrast was performed and considered unremarkable at the time. Following an episode of ataxia, trembling, inappetence and head holding, an MRI was performed and revealed a 1.2 cm mass located within the pituitary, expanding the sella turcica and touching the optic chiasm. Reevaluation of the CT scan identified a similar lesion. Based on these findings and poor prognosis, the macaque was euthanized. Gross pathology identified a highly vascularized and nodular pituitary macroadenoma expanding the sella turcica with mild asymmetric compression of the optic chiasm. Histology confirmed a pituitary macroadenoma. No other gross or histologic abnormalities were noted.

PS38 Lethargy and Hyporexia in a 4-Month-Old Domestic Pig

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Following a routine MRI, a 4-month-old, approximately 85 kg, male domestic pig was reported for lethargy and hyporexia. The pig had undergone a series of surgeries to occlude the renal arteries and create an arteriovenous fistula, with the most recent procedure occurring 15 days prior to onset of clinical signs. The physical exam was unremarkable, and the pig’s demeanor improved with food rewards and socialization with caretakers. Over the next ten days, the pig remained intermittently lethargic and hyporexic. Carprofen (4 mg/kg PO) was administered to rule out occult pain or inflammation. The following day, the pig was reported for polyuria and polydipsia. The pig was anesthetized the next day for a previously scheduled MRI, and blood and urine were collected for point-of-care diagnostics. CBC revealed a marked leukocytosis characterized by a lymphocytosis, as well as a mild anemia. A limited serum chemistry panel revealed hyperbilirubinemia and hypoalbuminemia. Urine specific gravity was 1.040. Based on the presence of marked inflammation, the primary differential diagnosis was infection, either a primary bacterial etiology or viral with secondary bacterial infection. Plans were made to begin antibiotic therapy upon return from MRI. However, approximately four hours after induction of anesthesia, the pig went into cardiac arrest during MRI and could not be resuscitated. Gross necropsy revealed generalized mild icterus and a severely enlarged, friable, fibrotic liver. Tissues were examined by histopathology which revealed liver lobules that were largely effaced and replaced by sheets of degenerate and largely lytic leukocytes composed primarily of lymphocytes. A diagnosis of hepatic lymphosarcoma with severe parenchymal replacement was made. From 2003 to 2023, and out of approximately 200,000 case submissions, the examining diagnostic laboratory diagnosed lymphosarcoma in 121 porcine submissions, mostly in animals younger than 6 months of age (range 2 weeks to 5 years). Although uncommon, lymphoid neoplasia should be considered as a differential diagnosis for nonspecific clinical signs in young swine.

PS39 Ocular Swelling in Two African Cichlids (Neolamprologus pulcher)

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Two approximately 5-year-old female African cichlids (Neolamprologus pulcher) in a research breeding colony presented for unilateral ocular swelling of 1 week duration. They were housed with 1-2 other cichlids, and both were the dominant female in their respective tanks. The laboratory had attempted 30% water changes, replacement of the carbon filter, and a metronidazole-praziquantel water treatment with no improvement. On physical examination, both fish had severe exophthalmia of the right eye but were otherwise grossly normal with no lesions or buoyancy issues, normal swimming patterns, and appetite. Differential diagnoses included infection, trauma, or a mass. Given the severity of exophthalmia in cichlid #1, she was euthanized. A gross necropsy that included Gill and fin clips, as well as a skin scrape, was performed and tissues submitted for histopathology. The remaining cichlid was treated with a continuous 0.1% salt bath which was increased to 0.2% 2 weeks later after a mild decrease in exophthalmia was noted. No appreciable improvement was noted after 3 weeks so treatment with a 3-day course of meloxicam (1 mg/kg, IM) and a 2-week course of enrofloxacin (5 mg/kg, IM, every other day) was initiated. Due to lack of response to treatment, the second cichlid was euthanized 7 weeks after presentation and submitted for gross necropsy and histopathology. Gross necropsy of cichlid #1 revealed an approximately 1 cm soft brown-green mass in the coelom that was determined to be chronic lipogranulomatosis oophoritis on histopathology. Exophthalmia in both fish was found to be the result of an intracoelomic primitive neuroectodermal tumor (retinoblastoma), a relatively rare neoplasm in any species. While ocular swellings in fish are more commonly infectious in nature, tumors should be considered and ruled out. There are many possible treatments for infection, however prolonged salt baths or other treatments require considerable planning and coordination with animal caretakers.

PS40 Multiple Subcutaneous Masses in an Aged Long Evans Rat

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A 2.5-year-old female Long Evans rat presented with an ulcerated perineal mass. Upon a physical exam, the rat was mildly ataxic, but otherwise bright, alert, and responsive, and in good body condition. Additional subcutaneous masses were identified along her ventrum. The masses ranged in size from 1.5 to 5 cm and were lobulated, firm, or soft, and either fixed or freely moveable. This animal has a history of two previous subcutaneous masses presenting in the left inguinal region that were surgically resected 12 and 4 months prior. The initial masses were not submitted for histopathology and were presumed mammary fibroadenomas.
Differentials for the masses and ataxia include mammary fibroadenoma, abscess, cyst, pituitary adenoma, vestibular disease, radiculoneuropathy, and renal disease. Given the rat’s age, as well as the ulcerated and multifocal masses, euthanasia was elected. On necropsy, a large soft multi-lobulated subcutaneous mass was found in the right axillary region containing copious tan-white fluid. Cytologic examination of the fluid displayed proteinaceous fluid with aggregated of squamous epithelial cells. Two additional firm, fixed, and tan subcutaneous masses were present in the perineal space. A dark red - 1.5 cm mass was identified in the region of the pituitary gland. The remainder of the necropsy was unremarkable. The primary histopathology findings included a focal pituitary adenoma, multifocal fibroadenomas, a focal adenocarcinoma, and other age-related organ changes. While mammary tumors are common in aged rats (incidence of 30-90% in aged females), the majority are benign with ~10% being malignant. Pituitary tumors are benign tumors of aged rats with ~20-30% incidence. Though often subclinical and an incidental finding, pituitary adenomas can lead to neurological deficits and commonly produce prolactin, a hormone involved in mammary development and milk production. Together, these pathologic findings present an often-overlooked link between pituitary and mammary masses and remind us that pituitary adenomas can increase the incidence of mammary tumors via increased prolactin production. The initial masses were not submitted for histopathology and were presumed to be mammary fibroadenomas.

PS41 Bilateral Hind Limb Paresis in an Outbred Swiss Sentinel Mouse
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A 10-month-old female Tac:SW mouse presented with a 2-week history of ruffled fur coat and a 1-day history of unilateral periorcular swelling. The next day, the mouse presented with acute bilateral hindlimb paresis and possible ataxia. This animal was housed with a conspecific in a cage receiving soiled bedding from 40 other cages weekly as part of a sentinel program. The cage mate was unaffected. Differential diagnoses for bilateral hind limb paresis and ataxia included degenerative arthritis or disc disease, autoimmune arthritis, traumatic injury, compressive nervous system neoplasia, infectious viral encephalomyelopathies, spontaneous brain infarction, and metabolic lysosomal storage disease. The mouse was euthanized and submitted for necropsy. It had a mildly ruffled fur coat and appropriate body condition (3/5). Gross findings were nonspecific and included mild thickening of the lower eyelid of the right eye with focal redness around the medial canthus and minimal clear ocular discharge, congested uterine serosal surface, and cystic enlargement of the left ovary with clear fluid. No other gross abnormalities were identified. Histologically, there was diffuse accumulation of foamy cells (within neurons in the central and peripheral nervous system, and macrophages in several other tissues), Central nervous system lesions consistent with neuroaxonal dystrophy, such as hyaline or granular axonal spheroids, neuronal chromatolysis, and gliosis, predominantly affecting the gracile, cuneate, and caudal part of the spinal trigeminal nuclei, as well as Purkinje cell loss within the cerebellum were also observed. The widespread accumulation of foamy cells is consistent with a lysosomal storage disease. This disease encompasses an array of metabolic disorders of lysosomal dysfunction involving a steady buildup of substrates inside of the lysosomes, ultimately causing cell malfunction and death. These disorders are not widely reported in mice, making this a rare cause of neurological disease in mice. In this presentation, we will discuss the pathogenesis of several forms of spontaneous and induced lysosomal storage diseases in mice.

PS42 Tail Mass in a Sugar Glider (Petaurus breviceps)
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An approximately 7-year-old breeder female sugar glider was anesthetized for a routine semi-annual physical exam. During the exam, an 8 mm x 11 mm firm mass was palpated about halfway down the tail. The mass was lanced, and thick opaque material was expressed. The mass decreased in size and had a sandy gritty texture. Other than mild calculus of the incisors, the rest of the physical exam had no significant findings. Radiographs of the tail showed no evidence of vertebral pathology. There were pinpoint multifocal areas of increased opacity within the mass. A whole-body radiograph revealed no other significant findings. Impression smears of the lesion were submitted for cytologic analysis. The specimens were moderately to highly cellular and comprised a uniform population of polygonal to cuboidal cells. The cells had faint basophilic cytoplasm, mild anisokaryosis, and some rare binucleated or multinucleated cells. The differentials for the histopathologic diagnosis were possible chondroma or chordoma. Given both differentials have the potential to be locally invasive, a preemptive tail amputation was performed. At the time of amputation, an approximately 5 mm in diameter firm mass was palpated about 5 mm proximal to the original mass. The tail was amputated approximately 100 mm from the tail tip and proximal to the newly palpated mass. The tail was submitted for microscopic examination and two chordomas separated by approximately 2 mm were observed. There was no observation of local invasion. To the authors’ knowledge, this is the first report of a chordoma in a sugar glider. While common in ferrets, chordomas are rare in most other species and only a handful of reports have been published about this neoplasm in veterinary literature. Metastasis is not commonly observed in ferrets and surgical excision can be curative, but in humans, mink, and cats, chordomas are malignant, and considered highly malignant in rats. It’s uncertain how chordomas would behave in sugar gliders and so the prognosis is unknown.

PS45 Menometrorrhagia in a Cynomolgus Macaque (Macaca fascicularis)
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A 7-year-old female cynomolgus macaque (Macaca fascicularis) with a history of oligomenorrhea presented with a microcytic, normochromic, nonregenerative anemia and weight loss. Physical examination revealed a caudal oval-shaped abdominal mass roughly 15 cm long and 5 cm wide. Computed tomography and abdominal ultrasound showed a circumferentially and uniformly thickened uterine wall and hypoechoic nodules in the cervix and the right ovary measuring 1.2 and 0.6 cm in diameter, respectively. Differentials included endometriosis, adenomyosis, uterine polyps,
PS44 Vestibular Deficits in a Southern Giant Pouched Rat (Cricetomys ansorgei).
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Giant pouched rats, native to sub-Saharan Africa, are a murid species with an exceptionally well-developed olfactory system. This feature, in addition to their small size and trainability, makes them a valuable species for applications in humanitarian work such as for odor detection of land mines, buried survivors of natural catastrophes, and disease. The lack of literature on basic biology demands research on this valuable species to improve husbandry and clinical care. At our institution, a breeding colony of giant pouched rats is maintained to study their physiology and utility as scent-detectors. This report describes an aged (approximately 3.5-year-old) wild-caught female southern giant pouched rat (Cricetomys ansorgei) that presented acutely with vestibular deficits, including left-sided head tilt, ataxia, disorientation, and circling. Additional signs included poor body condition, dehydration, ocular discharge, and scaly dermatitis over the dorsum. Blood count, chemistry, thyroid panel, and urine analysis revealed elevated AST, cholesterol, phosphate, and T3. Prophylactic enrofloxacin was administered to address a potential bacterial otitis as the cause of vestibular disease. Initial treatment resolved the ocular discharge, and the animal stabilized in current condition. Despite treatment and supportive therapy, vestibular signs persisted. An intracranial hemorrhage was suspected, and an anesthetized MRI revealed a large, focal, heterogeneous mass arising from the pituitary fossa and extending into the suprasellar space causing foraminal herniation, ventriculomegaly, and severe dorsal displacement and compression of the adjacent neuroparenchyma. Due to poor prognosis, humane euthanasia was elected. Necropsy revealed a pituitary prolactin expressing tumor, whose invasive behavior within the basisphenoid bone prompted a diagnosis of pituitary carcinoma. Pituitary tumors have previously been reported in various laboratory rats. Unlike reports of pituitary neoplasms in Rnorvegicus, the pituitary mass in this pouched rat presented with uncommon malignancy. This case provides information important to our expanding clinical knowledge of a unique rodent species.

PS45 Weight Loss and Unexpected Deaths in a Wild-Caught Meadow Vole (Microtus pennsylvanicus) Colony
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A wild-caught meadow vole (Microtus pennsylvanicus) colony was established at our university to investigate tck burden differences between voles and white-footed mice (Peromyscus leucopus). Voles are housed in gang style ventilated cages, with CareFresh bedding, nestmaterial, a wood block, and a tunnel. Commercial rodent feed is provided on the cage floor and food enrichment items are provided by research staff weekly. Cage changes are performed weekly in a Rubbermaid bin using a tunnel. Several months after the colony was established, a series of unexpected vole deaths occurred. One of the animals necropsied displayed bilaterally symmetrical firm protrusions on the ventral aspect of the mandible associated with hair loss and dermal erythema. Around the same time, another vole in the colony presented with periorbital alopecia of the left eye, 10% weight loss, and similar bilateral protrusions of the. Despite supportive care, the vole continued to lose weight and was euthanized. Histological examination of the jaws indicated molar apical elongation. Open-rooted, hypsodont incisor teeth are a defining feature of rodents. However, unlike many rodent species, voles of the Microtus genus have continuously growing molar teeth as well. Diagnostic imaging of the euthanized vole confirmed apical molar elongation of the mandibular teeth and of the maxillary teeth which resulted in intrusion of the tooth roots into the orbit, nasal cavity, and the vault of the skull. To address the welfare of these animals, the frequency of weight monitoring for this colony has been increased to every 2 weeks with a 10% body weight loss initiating veterinary assessment. Animals are anesthetized and ventral mandibles palpated for mandibular protrusions. Additionally, a handful of timothy hay or alfalfa pellets is provided weekly to encourage use and normal wear of the molar teeth. Hay and pellets are usually consumed within two days when voles are provided with other food enrichment. Careful attention and weight monitoring allows for the euthanasia of voles with this unique disease process before it becomes a severe animal welfare concern. It is too early to determine if this husbandry change is preventing the formation of apical molar elongation in this colony.

PS46 Creating a GLP Framework in an Academic Research Setting
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Biomedical researchers wishing to translate basic science results to human clinical trials have a need to conduct pre-clinical studies under federal regulation CFR Title 21 Part 58 Good Laboratory Practice (GLP) for Nonclinical Laboratory Studies. These studies present many cultural and procedural challenges to an academic research laboratory and thus are often conducted at a commercial facility set up specifically for GLP work. However, an institutional animal research facility can leverage existing personnel exper-
ABSTRACTS OF PLATFORM SESSIONS

PS47 Ballin' On a Budget: From Stockroom to Vivarium
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Small laboratory animal programs starting out with spatial and budgetary constraints should strategically utilize resources already available at the institution to meet regulatory and programmatic needs. In 2020, a university began converting a central receiving stockroom into a vivarium for ABSL-2 mouse studies. In early 2022, a Laboratory Animal Care Facility Manager (LACFM) was hired to develop and implement the program with an operational start date of September 2022. In addition, a veterinarian board certified in laboratory animal medicine was contracted as the attending veterinarian to assist in program development. To complete such a large task in a relatively short amount of time, the LACFM formed a Vivarium Working Group committee which consisted of senior leadership within the Office of Research, Facilities Planning and Design, Environmental Health and Safety, Office of Laboratory Safety, and the Institutional Animal Care and Use Committee (IACUC). This working group collaborated to develop standard operating procedures and IACUC policies pertaining to pest control, occupational injuries and medical surveillance, animal emergency and disaster response, training and education requirements for vivarium personnel, vivarium security, post-approval monitoring, whistleblower policy, animal welfare concern reporting, vivarium staff, and more. The full group meets monthly to discuss overarching components and progress. Smaller breakout groups met bivewely to discuss specific needs and tasks relating to their departments. Within six months, driven by the leadership of the LACFM, the working group had developed 35 IACUC and facility SOPs addressing items for a fully functional laboratory animal program. Programs that were already in place were adapted to fit the needs of the vivarium, reducing the groundwork for startup. Work study programs for student assistants and pre-existing hazardous waste disposal procedures laid the groundwork for staffing and waste management within the vivarium, respectively. By collaborating with stakeholders and adapting existing resources to vivarium needs, implementation time and budgetary constraints can be reduced when starting a new laboratory animal program within a small university.

PS48 New Method to Evaluate the Quality of Life of Laboratory Swine
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There is a lack of quantitative research on the quality of life of animal models used in research studies. We evaluated if activity monitors can be used to measure the quality of life in swine cardiac models of atrial fibrillation and chronic heart failure. Yucatan mini swine were outfitted with activity monitors attached to nylon collars that were worn continuously throughout their time in the research lab (N=25). Multiple data downloads were conducted each week to evaluate the swine activity levels. The data was processed using pivot tables to calculate an average hourly activity and generate area under the curve graphs. During one of our studies, we saw a significant change in the activity levels as the swine progressed through the disease model. To keep confidentiality, these phases will be referred to as phases 1 and 2, and the animal progressed in the specific disease model according to the study they were placed in. Sudden increases or decreases in activity were identified as potential indicators of changes in the animals' health and quality of life. A notable finding from our research is the correlation between decreased activity levels and lower health and quality of life in laboratory animals. For chronic heart failure swine, the average activity was significantly higher (p<0.05) in phase 1 (236.49 ± 8.9) compared to phase 2 (210.14 ± 7.7). By tracking hourly activity averages and analyzing 24-hour activity graphs, we were able to gain insights into the animals' activity patterns throughout the day. Furthermore, employing a trapezoidal area under the curve analysis enabled us to assess changes in activity levels across different study phases in terms of total activity and specific hours. This data show a novel and critical approach, as it contributes to ensuring the safety and well-being of laboratory animals. By utilizing activity monitors and employing quantitative analysis techniques, we can better understand and evaluate the quality of life experienced by animal models in research studies.

PS49 Cooperative Care Techniques for Large Swine in a GLP Laboratory Setting
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Working with large breed swine presents multiple challenges in any environment. When large breed swine are participating in a GLP study at a contract research organization, finding a positive and safe method of interaction with those animals is not only a challenge but a necessity due to the frequent handling needed for study functions that are common on these studies. Voluntary cooperation with study staff on the part of the animals is required for data collection to be successful due to the exponential growth rate they experience and the safety concerns that creates. The research study discussed in this presentation included cage rotations, weekly body weights, ophthalmologic exams, multiple sedation events, and various veterinary procedures. For the safety of the technicians and the well-being of the animals, positive reinforcement training (PRT) was implemented to facilitate an environment of cooperative care on study. All animals were trained to follow a target via clicker bridge with food reinforcers. This basic
targeting behavior was then applied to multiple required instructions including mounting a body weight scale, moving between cages, moving onto transport carts, and stationing for various exams and procedures. Targeting was also utilized as enrichment and to encourage exercise for the animals. Study and husbandry technicians reported that training activities and resulting cooperative care opportunities created a low stress environment for the animals and the technical staff, an increase in animal welfare through enrichment, exercise, and positive interactions with handlers, and overall, a significant improvement in the human-animal bond. In conclusion, target training via PRT is an effective tool for implementing cooperative care for large swine. With planning, communication, commitment of resources, and coordination, PRT can be accomplished in a GLP environment, facilitating safe and accurate data collection. Inclusion of the study and husbandry team in training activities creates a low stress environment for both technicians and animals, allowing for successful data collection with a challenging species and significantly improved animal and technician welfare.

PS50 LED Light: An Extrinsic Environmental Factor that Enhances Laboratory Animal Health and Wellbeing

glas

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Light is an extrinsic environmental factor that profoundly influences circadian, neuroendocrine, and neurobehavioral regulation in laboratory animals. Responses to light are mediated via the retinal photoreceptors, including the classical rods and cones involved in vision, as well as the recently discovered melanopsin-expressing intrinsically photosensitive retinal ganglion cells (ipRGCs) of the non-visual system. Previous studies from our laboratory demonstrated that exposure of pigmented and non-pigmented rats to blue-enriched (465–485 nm) light-emitting diode (LED) light at daytime (bLAD), compared to broad-spectrum (500–700 nm) cool white fluorescent (CWF) light, amplifies nighttime circadian pineal melatonin production and positively influences metabolism and physiology. Here, in our GLAS-supported investigation, we tested the hypothesis in mice that exposure to BLAD, compared with CWF, positively enhances integrated visual and non-visual system photic responses, shown to promote the circadian regulation of neuroendocrine and neurobehavioral parameters that are associated with optimizing animal health and wellbeing. Three mouse strains commonly used in biomedical research (C57/BL/6, and BALB/c; n = 120/group; male and female) were maintained under an AAALAC-approved protocol in an AAALAC-accredited facility for 12 weeks on a common lighting regimens 12L (68.8 ± 5.2 lux, within cage): lights on 0600 h; 12D (0 lux) on either CWF (control) or bLAD (experimental) lighting, and were assessed for retinal photon flux (cm²/s), radiometric (µW/cm²), photometric (lux), and photopigment illuminances (µ-optic lux). Results (mean ± 1 SD) revealed in the 3 strains of mice that, although photon flux was similar between bLAD and CWF light exposure, stimulation of the non-visual melanopsin-containing ipRGCs and the visual S cones, rods, and M cones was 43.4 ± 0.8%, 45 ± 1.2%, 28 ± 0.7%, and 21 ± 0.1% higher (P < 0.001), respectively, in mice maintained under bLAD. These data show that daytime exposure of mice to bLAD, compared to CWF light, has marked positive effect on mouse retinal photic responses regulating the circadian, neuroendocrine, and neuro-behavioral parameters associated with the promotion of animal health and wellbeing.

PS51 Current Prevalence of Nonhuman Primate Pathogens

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Nonhuman primates (NHPs) remain a critical research model for clinical trials on new therapeutics. Understanding the prevalence of pathogens in NHP colonies is essential to ensuring reliable and reproducible research results. To this end, we have summarized the results generated by our commercial laboratory since 2006 for the most monitored pathogens from over 1.2 million NHP samples across numerous colonies around the world. Efficient analysis of this large dataset was made possible by employing Excel Power Pivot. The most recent pathogen prevalence levels comprise results from 2020 through 2022. During this period, the viruses most often monitored by serology were Herpesvirus simiae (B virus), simian T-cell leukemia virus (STLV), simian retrovirus (SRV), simian immunodeficiency virus (SIV), filovirus (FV), and measles virus (MV).

Excluding MV, B virus was the most prevalent with just over 1% of samples testing seropositive, followed by STLV and SRV at 0.27% and 0.13%, respectively. It is noteworthy that since 2006, the sero-prevalence of these three agents has trended downward. SIV and FV remain among the most tested agents but are not detected at any meaningful level. MV hovers between 50% and 70% of samples testing positive year over year, which is consistent with the push for vaccination of colonies to prevent infection. Of the bacteria for which NHPs have been screened most often since 2020, Campylobacter spp. was the most prevalent followed by Shigella spp., Salmonella spp., and Yersinia pseudotuberculosis, with prevalence levels by cultural isolation of 11.95%, 2.05%, 1.46%, and 0.98%, respectively. Prevalence for these agents by PCR was also summarized. Based on serosurveillance, the prevalence of Mycobacterium tuberculosis has experienced an uptick from just 0.12% in 2019 to 0.45% in 2022. Finally, recent parasite prevalence for both Trypanosoma cruzi and Plasmodium spp. was just over 5%. Prevalent agents should be included in surveillance of imported animals in quarantine and in routine monitoring of breeding and research colonies to avoid the confounding effects of adventitious infections and loss of valuable research resources.

PS52 Corynebacterial Species Interaction in an Atypical Corynebacterium bovis Outbreak

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Corynebacterium bovis, the cause of Corynebacterium-associated hyperkeratosis (CAH) in nude mice, is highly transmissible, persistent in the environment, can involve asymptomatic carriers, and currently has no effective treatment. In 2021, a C. bovis outbreak occurred in a sentinel colony of athymic nude mice that failed to manifest expected C. bovis growth kinetics and clinical disease, contributing to a 3-month diagnostic delay despite bimonthly testing. The purpose of this study was to identify factors associated with attenuated CAH, including in vitro competitive growth dynamics of C. bovis and C. amycolatum, corynebacterial host origin, and virulence genes. We hypothesized that attenuated pathogenicity of C. bovis in this outbreak was due to competitive suppression by endemic microflora (C. amycolatum) and that corynebacterial host origin and differences in virulence genes are
contributing factors. Routine health surveillance was performed via serology, PCR, culture, gross and histopathology and direct parasitologic examination for select agents. C. bovis was confirmed by culture. PCR, 16s rDNA sequencing, and Matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectrometry. Proximity and competition assays were performed via co-culture on blood agar inoculated from liquid monocolonies. Whole genome sequencing (WGS) and a genome-wide association study (GWAS) were performed on isolates from the outbreak as well. Preliminary results demonstrate no definitive evidence of competitive suppression and that C. bovis and C. amycolatum isolates from the outbreak were genomically identical and genomically heterogeneous respectively, which suggests that the attenuated C. bovis pathogenicity observed was more likely due to microbial factors. Identification of contributing factors in this C. bovis outbreak and in attenuated CAH as well as determination of in vitro growth dynamics will facilitate a better understanding of bacterial skin colonization dynamics of C. bovis in mice, potentially informing new strategies to decrease C. bovis morbidity or even prevent infection altogether.

PS54 Particulate Collected from Shoes Contains Non-Infectious Nucleic Acid for Numerous Rodent Adventitious Agents
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Urban rodent populations and associated zoonotic diseases increased during the height of the pandemic. The soles of staff shoes accessing vivaria may become contaminated while traversing urban streets and serve as a source of fomite-mediated transmission of adventitious agents to laboratory rodents. While shoe covers may be employed to reduce this risk, their donning may lead to hand contamination. Shoe cleaners, i.e., motor-driven brushes that remove and collect particulates via vacuum from the top, sole, and sides of shoes, are utilized in our vivaria to reduce the potential of introducing excluded agents. Shoe cleaner debris and contact media (CM) mixed with the debris from shoe cleaners serving 3 distinct vivaria (A-E) utilized hundreds of times daily were analyzed by PCR for the presence of nucleic acid from 85 adventitious agents. To determine if the shoe debris was infectious, 3 NSG and 2 Swiss outbred female mice were exposed oronasally to a liquid suspension of debris and cohoused on debris-contaminated bedding for 7 days from each of the 5 vivaria. A control group was similarly exposed to autoclaved debris (A-E pooled). Shoe debris and contaminated CM from each vivaria were positive for up to 51 agents. Of those agents, 47% were zoonotic and 25.5% were frequently monitored for in rodent colonies. Noteworthy agents included: Orthopoxvirus (8%), Rodenticide heylii (8%), Mouse Hepatitis virus (8%), Sarbecovirus (53%), Ornithomyxus bacoti (33%), Spiraculeus murs (50%), Mouse Norovirus (38%), Entamoeba (58%), Mouse Parvovirus (67%), Chlamydia muridarum (100%), Helicobacter spp (100%), and Intrichromonas spp (100%). There was a substantial difference in the odds of direct debris examination detecting more pathogens than CM in the control and 1 vivarium group, whereas there was no difference in all others. All NSG and Swiss mice remained clinically healthy, and PCR (fecal, buccal & skin samples) and serum were negative (SW) for all agents in the test panels. Preliminary histological evaluation did not reveal pathologic abnormalities. These results provide insight into the adventitious pathogens present on shoes in NYC and suggest that the debris is not infectious to laboratory mice.

PS55 Seroprevalence of Adeno Associated Viruses (AAVs) in Nonhuman Primates (NHPs)
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Adeno-associated virus (AAV) has become the preferred vector for gene therapy studies but can be limited by the presence of neutralizing antibodies (NAAb), from prior exposure to the virus, in patients or research animals. Therefore, cell based AAV NAAb prescreening of subjects prior to enrollment in studies has become commonplace. Researchers routinely screen 8X-10X the number of NHPs enrolled in studies to find enough animals that are AAV seronegative for the AAV vector serotype utilized. However, given today’s NHP shortages, it’s difficult to find enough animals to accommodate testing these large numbers leading to increased
costs and delays in studies. Using data collected by our lab over the past 2 years, we sought to identify variables that better predict the likelihood of AAV seropositivity in NHPs to minimize the number of animals required for prescreening to achieve the desired total of seronegative NHPs. To this end, data for four AAV serotypes including AAV2, AAV8, AAV9 and AAVrh74 from nearly 2500 cynomolgus macaque sera was collated and analyzed. Results showed that seroprevalence ranged between 50% and 80% for all serotypes with AAV2 being the most prevalent and AAV9 the least. Interestingly, the seroprevalence dropped substantially to between 30% and 60% at a serum dilution of 1/40. Sex did not influence the percentage of AAV NAb positive NHPs for any of the tested serotypes. Similarly, no correlation was observed between the age of animals (2-3 years old) and the seroprevalence of AAV NAbs, despite suggestions that older animals are more likely to be positive for AAV NAbs. Small variations in seroprevalence were found in NHPs from different countries of origin and even different colonies from the same country. For example, between two Asian countries, one showed ~15% higher prevalence of AAV9 NAbs but ~10% lower prevalence of AAV2 NAbs. Additionally, in some cases, seroconversion was observed between prescreening and the study start date, so it is advisable to screen NHPs as close to the start of a study as possible. In summary, when screening NHPs to select candidates for study, it’s important to consult the NHP supplier for suggestions about optimal screening timing and numbers based on specific seroprevalence observed in their colonies.

PS56 Prevalence of Mouse Kidney Parvovirus in Sentinel Swiss Webster Mice

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Mouse kidney parvovirus (MKPV), also known as murine chappar-virus (MuCPV), induces inclusion body nephropathy (IBN) and kidney fibrosis in aged immunodeficient mice and, to lesser extent, in immunocompetent mice. The presence of MKPV in academic and biomedical animal facilities can be an important confounding factor complicating interpretation of in vivo experimental findings. We surveyed prevalence of MKPV using feces, kidneys and livers collected from 212 sentinel Swiss Webster (SW) mice [Crl:CD1(ICR)] from 8/2019 to 12/2020. SW mice were cohoused, as sentinel mice using a dirty bedding protocol, on racks with colony mice used in research located in MIT and Whitehead vivaria. The MKPV genome copies in tissues and feces were determined via qPCR, and selected kidney and livers were evaluated for histopathology and MKPV RNA expression via RNA scope. Rates of MKPV positivity were 16.6%, 14.7% and 10.2% for feces, kidney, and liver respectively; in aggregate, prevalence of MKPV was 23.6% (50 out of 212 mice). Thirty-three out of 103 rooms (32%) were MKPV positive; were 16.1%, 14.7% and 10.2% for feces, kidney, and liver respectively. In MKPV-positive mice, 32.5% (16/50) were MKPV positive; however, MKPV infection did not induce overt IBN or liver lesions in infected sentinel SW mice. MKPV RNA was sporadically detected in MKPV-positive kidneys but not in MKPV-positive livers. Our data indicate that sentinel SW mice can be infected with MKPV, and this viral pathogen was modestly distributed in sentinel mice housed in our animal facilities. In addition, MKPV infection can cause sporadic inclusion bodies, but given the age (6mos) IBN was not observed. Furthermore, fecal DNA qPCR for monitoring MKPV status in animal facilities is less invasive and more sensitive compared to targeted murine tissues. Our results emphasize the importance of monitoring MKPV distribution using qPCR in sentinel mice housed in vivaria.

PS57 Evaluation of Sentinel-Free Soiled Bedding PCR Sampling as a Quarantine Method

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Soiled bedding sentinels (SBS) have historically been relied on to screen rodents in quarantine for excluded infectious agents prior to their release into a research vivarium. However, due to growing reports that many infectious agents are not effectively detected by SBS, direct animal sampling (DAS) for PCR-based quarantine has become a common alternative. Sentinel-free soiled bedding (SFSB) PCR sampling, which relies on dust collected from pooled soiled bedding, has been reported as a successful method for routine screening of research colonies. As an alternative to DAS, we investigated the efficacy of SFSB as a quarantine method. Pet shop quality mice supplied soiled bedding: one cage of (n=5) 6-7 month-old, one cage of (n=5) 6-10 week-old, and two cages each housing a dam and litter. DAS were collected from mice on arrival (D0); fecal pellets were collected from the dams and pups, while feces, body swabs, and oral swabs were collected from all older mice and pooled by cage. Soiled bedding from the shipping crate for each age group was divided into three equal quantities and used to expose contact media via manual agitation (D1). Shipping crate bedding was then placed with the mice of the appropriate age group in cages in a cube isolator for one week. At D1, DAS for PCR and traditional diagnostic methods were used to screen mice for infectious agents. As described for D0 soiled bedding for each age group at the end of study (D7) was divided into three replicates to expose new contact media via manual agitation. Both SFSB and DAS had more positive replicates at D1 vs. D0 for bacteria, parasites, and protozoa. Positive replicates for some viruses diminished by D7 likely due to normal clearance by the immune system. Overall, 12 different bacteria, 10 parasite/protozoa, and 17 viruses were detected in the mice by DAS. SFSB detected all infectious agents present in the survival samples. In general, estimated PCR copy numbers were equivalent or higher for all samples and agents at the D1 timepoint. This data supports that SFSB has equivalent sensitivity to direct animal sampling and may serve as a viable option for a sentinel-free, PCR-based quarantine program.

PS58 Mouse Coronavirus MHV-1 Disease in A/J and NOD Mice is Accompanied by a Hyperinflammatory State and Fewer Tissue Repair Macrophages.

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Mouse hepatitis virus (MHV) is a betacoronavirus of mice. To understand the similarities of MHV disease with COVID-19, the immune response caused by MHV-1 was characterized in four mouse strains. NZO/HILtJ, NOD/ShLtJ, C57BL/6J, A/J male and female mice (18 per strain) were infected with 1.5 x 10⁶ pfu of MHV-1 (or media) and euthanized at 3- and 8-days post infection (DPI). Blood (plasma) was collected for cytokine analysis or flow cytometry of peripheral blood mononuclear cells (PBMC). The cytokine results for MHV-1 at 8 DPI showed no significant differences in PBMCs, recognizing the severe clinical phenotype in A/J mice precluded assessments beyond 3 DPI. Significant differences (p <0.05) were detected at 3 DPI in PBMCs including: 1) B6 mice had significant increases in interferon gamma and tumor necrosis factor alpha (IFN-γ and TNF-α); 2) A/J mice had significant increases in IFN-α and TNF-α; 3) NOD mice has significant increases in IL-4, IFN-γ and TNF-α; and 4) NZO had significant increases in IL-6, IL-18, IFN-γ, and TNF-α. The most striking feature of the cytokine...
Investigation.

May induce at least a local immune response, warranting further mucosal epithelial cells in the large intestine suggest that Cm associated lymphoid tissue (GALT). Importantly, these findings indicate was only detected in surface intestinal epithelial cells, primarily in. No significant histologic lesions were appreciated in the lung, gastrointestinal, and a C5 deficiency. The combination of a pre-existing inflammatory state and defects in innate and adaptive immunity set the stage for more severe MHV disease.

**PS59 Chlamydia muridarum Causes Persistent Infection in C57BL/6, BALB/c and Swiss Mice Following the Presumptive Route of Natural Infection**

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Recently, we described the moderate prevalence of *Chlamydia muridarum* (Cm) infection in global academic mouse colonies. To better understand the natural biology and significance of Cm infection in commonly used inbred strains and an outbred stock, 2.7 x 10^2 IFU of a Cm field isolate was administered to a cohort (n=27) of 8-week-old female BALB/c/j (C) mice via orogastric gavage. After confirmation of Cm shedding via fecal PCR through 95 days post-inoculation (DPI), these mice were utilized to investigate the transmissibility, shedding kinetics, and tissue tropism of Cm following cohousing with C57BL/6 (B6) and C mice (1th and 1h2 skewed, respectively), and Swiss (J:ARC(S)) mice (n=30 each strain). A Cm infected C mouse was cohoused with naive mice (n=12 each B6/C Swiss) for 30 days. On days 14 and 63 after cohousing, infected and uninfected control mice (n=6 each/strain/timepoint) were necropsied, and their tissues assessed for immunophenotyping via flow cytometry. On day 14, infected (compared to uninfected control) mice demonstrated significant differences (p<0.05, Wilcoxon rank sum). In B6, CD4+ T cells preferentially differentiated into effector memory cells and CD8+ T cells were activated. In C, the frequencies of macrophages decreased and CD4+ T cells were reduced among the 1 cell population. In Swiss, effector CD8+ T cells were reduced among the total CD8+ T cell population. On day 63 in B6 mice, Cm infection led to a reduction in B cells, an increase in monocytes, and preferential differentiation of both CD4+ and CD8+ T cells into effector cells. In C mice, CD8+ T cells preferentially differentiated into memory T cells. In Swiss mice, CD4+ T cells preferentially differentiated into central memory and CD8+ T cells into effector memory cells. Additionally, the gastrointestinal tract was removed from the B6 cohort on the same days and the intestinal immune response was assessed. Sustained increases in the total number of CD45+ cells, including neutrophils, Th1, and Th17 CD4+ T cells, were observed indicating a prolonged inflammatory response. There was also sustained elevated cytokine expression from type 3 innate lymphoid (ILC3) and effector T cells in the large intestinal lamina propria in Cm-infected B6 mice compared to the controls. Collectively, these results demonstrate that while no clinical disease or histopathology were appreciated, there is potential for induction of monocytes and activation of T-cell subsets at different stages of Cm infection. Considering the widespread use of mice to study GI disease, an assessment needs to be made as to whether Cm-infected mice should be used as models.

**PS60 Chlamydia muridarum Modulates Splenic Monocyte and T-cell Response and Induces Sustained Intestinal T-cell and ILC3 Responses in Inbred and Outbred Mice**

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*Chlamydia muridarum* (Cm) was recently shown to be prevalent in academic mouse colonies. As Cm causes persistent infection in immunocompetent strains, we assessed the immunologic impact of Cm infection on commonly utilized C57BL/6J (B6), BALB/c (C), and J:ARC(S) (Swiss) female mice to determine its potential to confound research. A cohort of Cm infected C mice was cohoused with naive mice (n=12 each B6/C Swiss) for 30 days. On days 14 and 63 after cohousing, infected and uninfected control mice (n=6 each/strain/timepoint) were necropsied, and then assessed processed for immunophenotyping via flow cytometry. On day 14, infected (compared to uninfected control) mice demonstrated significant differences (p<0.05, Wilcoxon rank sum). In B6, CD4+ T cells preferentially differentiated into effector memory cells and CD8+ T cells were activated. In C, the frequencies of macrophages decreased and CD4+ T cells were reduced among the 1 cell population. In Swiss, effector CD8+ T cells were reduced among the total CD8+ T cell population. On day 63 in B6 mice, Cm infection led to a reduction in B cells, an increase in monocytes, and preferential differentiation of both CD4+ and CD8+ T cells into effector cells. In C mice, CD8+ T cells preferentially differentiated into memory T cells. In Swiss mice, CD4+ T cells preferentially differentiated into central memory and CD8+ T cells into effector memory cells. Additionally, the gastrointestinal tract was removed from the B6 cohort on the same days and the intestinal immune response was assessed. Sustained increases in the total number of CD45+ cells, including neutrophils, Th1, and Th17 CD4+ T cells, were observed indicating a prolonged inflammatory response. There was also sustained elevated cytokine expression from type 3 innate lymphoid (ILC3) and effector T cells in the large intestinal lamina propria in Cm-infected B6 mice compared to the controls. Collectively, these results demonstrate that while no clinical disease or histopathology were appreciated, there is potential for induction of monocytes and activation of T-cell subsets at different stages of Cm infection. Considering the widespread use of mice to study GI disease, an assessment needs to be made as to whether Cm-infected mice should be used as models.

**PS61 Improving the Design of Cranial Implants for Sensory Neuroscience in Ferrets**

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Ferrets are an important model species in sensory neuroscience due to their well-developed visual and auditory systems and trainability on behavioral tasks. For these studies, cranial implants are often necessary for restraint during awake behavioral tasks.
or for stability during imaging and electrophysiology. As in other species, it can be difficult to maintain these implants for long-term use. Here we describe improvements in implant design and surgical implantation methods for chronic use in ferrets. Implants described are metal posts for head-fixation with enhanced stability from specially designed t-bolts and low profiles allowing skin to be tightly opposed to the posts. We observe that these implants are well-tolerated both by implanted individuals and their cage-mates and can last for over 4 years. Further these implants require minimal maintenance with no instances of infections or need to revise margins. The stability of the implants also makes them useful as a base for expanded implants for imaging chambers and electrodes in chronic recording experiments. We conclude that our modifications to previous methods offer refinements by increasing survival time of the implants and decreasing maintenance requirements without reducing functionality for ferret studies. The lab is currently adapting this implant style for chronic recording devices. Refinements to implant methods mean reduced animals lost to complications and fewer sedations or surgeries for invasive maintenance procedures for each animal, thus improving animal welfare based on the 3Rs.

**PS62 Evaluation of Enrichment Preference of Tree Shrew (Tupaia belangeri)**

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Although the tree shrew (Tupaia belangeri) is an increasingly popular animal model used in ophthalmology and infectious disease research, the environmental enrichment preferences of this species are largely unexplored. We sought to determine the preference of 2 male and 6 female (N = 8) naïve adult tree shrews aged 1–3 years (mean 2 years) by offering them 5 novel forms of enrichment. A single novel object was placed, and criteria evaluated included species-specific behaviors such as stereotypic circling time until first interaction with novel object, and time spent engaging with each form of enrichment. Subjects in the home enclosure were observed by video recording for up to 8 hours. All events were evaluated and included a baseline video without novel enrichment present. Novel objects were removed at the end of each recording with a 24–48-hour washout period before a new item was placed. Mirrors, external forage feeders, artificial plant spheres, suet feeders containing crinkle paper, and plastic pan containing aspen bedding (dig pan) were evaluated. Among the 5 enrichment items tested, tree shrews showed the strongest preference for the dig pans and least preference for the suet feeders with crinkle paper. The shortest time to first interaction was with the forage feeders at 2 minutes (m) 24 seconds (s) after initial introduction. However, tree shrews spent more time total interacting with dig pans (meaning 29 m 15 s). More importantly, 6 of 8 tree shrews displayed decreased stereotypic behaviors in cages enriched with dig pans. Overall, mirrors, dig pans, and artificial plant spheres decreased stereotypic behavior and increased natural behavior such as scent marking. To account for neophobia, subjects were evaluated for time to first interaction with novel items. Surprisingly, most subjects showed an immediate interest in novel items. In this study, we observed increased natural behaviors and decreased anxiety like behaviors highlighting the benefit of novel enrichment items for tree shrew. Items such as dig pans that elicit natural behaviors should be strongly considered as part of a behavioral management plan for tree shrews.

**PS63 Marseille Declaration: Together We Prioritize Animal Welfare**

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When animals are needed for research, high standards of animal welfare and quality of work are imperative for two reasons. First, because of the ethical imperative to minimize pain and distress. And second, because psychologically and physiologically healthy animals are necessary to provide meaningful and reliable data. To ensure these goals are met, husbandry conditions must meet species-specific needs for a complex environment that provides adequate space for movement, social contact, nutrition, stimulation, and freedom from stress and illness. Local legislation pertaining to animal care and use varies widely across the globe and cannot be solely relied upon to ensure consistent high standards are met. In addition, local regulations may or may not support a Culture of Care program, robust ethical review, post approval monitoring, and incident reporting for animal studies, continuous education and training for all staff working with animals, and a program of risk management. For this reason, and to enable coordinated action with our global partners in industry and academia, the signatories of the Marseille Declaration agreed to define their objectives and priorities for the welfare and husbandry conditions of laboratory animals. The declaration is named because this framework was initially drafted at the 2022 FELASA Conference in Marseille. The declaration does not claim to be a concrete guideline or audit standard, nor does it claim to be complete. Rather, it outlines the signatories’ shared expectations, that sometimes go beyond local legislation, for external partners working with animals on their behalf worldwide, including a commitment to applying and promoting the care and accommodation standards for dogs, pigs, and nonhuman primates consistent with those required by the European Union and United Kingdom. The signatories invite others to join our declaration and coalition. This presentation will share the principles of the Marseille Declaration, along with the goals for aligned and global support for high standards of animal welfare and quality of research results.

**PS64 Pebble to the Metal: A Boulder Approach to Enrichment for Danio rerio**

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Zebrafish are a widely used animal model, yet there is limited understanding of their welfare needs. Despite an increasing number of studies on zebrafish enrichment, it remains unpopular among researchers to use in-tank environmental enrichment. Although supportive evidence is sparse, there is hesitancy to include in-tank enrichment due to perceived concerns of health/hygiene of the fish. To accommodate these concerns, we tested the potential benefits of enrichments presented outside the tank on 40 adult...
mixed-sex zebrafish. We hypothesized that zebrafish would show a preference for enriched environments and have lower cortisol levels than zebrafish housed in barren environments. We used two experiments to test our hypothesis. In our first experiment, we either group housed (8 tanks of 4 fish) or singly housed (8 tanks of 1 fish) the fish. Over 2 weeks, using a repeated-measures factorial crossover design, we quantified if their preference for a pebble picture located under half of their tank was as strong as zebrafish's well-established preference for social contact. We used two positive controls: group housing, and visual access to conspecifics. Singly housed zebrafish displayed a significant preference for the enriched half of the tank (quantified as spending <50% of their time over the pebble picture); this preference was equivalent to the positive control of visual access to conspecifics. In our second experiment, using the same cohort of 40 zebrafish, alternating tanks received pebble enrichment or standard housing (barren) underneath the entirety of the tank floor, equally distributed between singly and group housed. After one week, to quantify stress levels, we collected tank water to measure cortisol levels. Overall, being group housed decreased tank water cortisol levels by 25% and being enriched decreased tank water cortisol levels by 22%. These effects were independent and additive such that singly housed enriched fish did not differ in cortisol levels from group housed barren fish.

**PS65 Skin Swabbing of Zebrafish (Danio rerio) as a Refinement for Genotyping: How to Make it Work**

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Current practice when obtaining a tissue sample for genotyping zebrafish (Danio rerio) is to remove a small part of the caudal fin in a procedure known as fin clipping. During this procedure, zebrafish in the United Kingdom need to be anesthetized ahead of sample removal, and the use of analgesia is being phased in as a legal requirement. This procedure is invasive as tissue is removed and zebrafish have previously shown an aversion reaction to MS-222. In partnership with an outsourcing genotyping service, we trialed a refined DNA collection technique, skin swabbing. This project has been developed with the intention of validating this as a reliable method for collection of sufficient DNA to return accurate genotyping results via an external service provider. Over six separate skin swabbing sessions, we experienced a success rate of 84.6% while testing for 10 different genotyping assays. Common errors were failed internal control and signal between positive and negative results. The housekeeping Ct data indicated that the amount of DNA varies from a swabbed sample, with a lower Ct means there are higher amounts of DNA. There was no pattern of error detected when comparing the specific technicians who performed the sampling, the size of the animal, or the selected genotyping assay. We further refined our methodology to reduce error rates by letting the swabs dry on the plate for 60 minutes after the final sample was collected. From a 3Rs perspective, skin swabbing offers refinement benefits in improving welfare of the fish using a less invasive technique with a shorter procedure time when compared to fin clipping. Trial and error may be required depending on the genotyping assay used and external suppliers should be able to support this process.

**PS66 Incorporating Lidocaine as Analgesic During Fin Clipping using a Recirculating Housing System**

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Analgesia is one way to embrace the 3Rs when working with laboratory animal models. While it is standard in mammalian care, only recently has it been put into practice with aquatics species in research, even though it is well established that fish can feel pain. Working with the veterinary team, scientists, equipment manufacturer, and the Aquatics team, the Francis Crick Institute has developed a way to provide analgesia pre- and post-procedure on zebrafish (Danio rerio) undergoing fin clipping for genotyping individuals. The developed methodology does not impact user workflow as there are no additional steps required to administer analgesia. The newly developed process maintains the ability for high-throughput sampling while maintaining excellent animal welfare. Analgesia is provided to zebrafish at the correct dosage and exposure time off the recirculating housing system, first in their home tank on the benchtop and then post-clip in a shallow tray where they will remain until the genotyping results are received. A wash step is performed before the fish is returned to the main system. This, in addition to a carbon filter, ensures that lidocaine is not detectable in the system water as verified by HPLC testing. The wash step and carbon filter prevent fish experiencing repeated exposure to lidocaine while housed on a recirculating system. This talk will outline the necessary steps to provide analgesia for fin clipping without impacting procedural session length, both with a recirculating system or in small static tanks, which can further be adapted to suit different facility set ups as required. Providing analgesia to zebrafish can now be standard practice by following these steps.

**PS67 Persistent Abdominal Distension in a Laboratory Guinea Pig**

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A 2-year-old, 3.5 kg, intact, singly housed female guinea pig was presented for growing abdominal distension. The animal was housed in the university's training core and was utilized for purposes such as handling, restraint, and injections. No treatments or experimental manipulations were performed on this animal. On presentation, the guinea pig exhibited normal behavior and had an unremarkable examination other than a symmetrical, distended abdomen. On palpation, her abdomen was soft and nonpainful, with no evidence of organomegaly. Differentials included bloat, neoplasia, intestinal dysbiosis, and obstruction. Serial radiographs of the abdomen and thorax revealed increased gas within the stomach and throughout the gastrointestinal tract. This clinical presentation waxed and waned over several months and was resistant to medical therapy, which included pro-kinetics, anti-gas medicine, and analgesics. Her mentation and food and water intake remained consistent and there were no abnormalities in her eliminations. After nearly 6 months from the initial presentation, a few days prior to euthanasia, the animal developed diffuse alopecia centered over the abdominal distension and displayed signs of pain including increased sensitivity to handling and picking at the abdomen. Necropsy findings included adrenal hypertrophy and hyperplasia, steroid hepatopathy, and sparse and inactive hair follicles. The clinical signs and histologic lesions were consistent with Cushing's disease. Differential diagnoses should include...
Cushing’s disease in cases with nonspecific abdominal distension in the absence of other clinical signs. Furthermore, a full workup including blood profiles and hormonal assays should be considered in a guinea pig with a persistent distended abdomen that is otherwise asymptomatic.

**PS68 Unexpected Mortality in a Captive Wild Caught Crested Anole Colony**

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Crested anole (Anolis cristatellus) breeding colony was established with wild-caught individuals from Puerto Rico. Approximately 2.5 months after transport, investigators reported decreased reproductive performance, and two animals were found dead on same day. Two days after initial mortalities, two anoles were identified as sick, one with poor righting and the other moribund. A necropsy performed after euthanizing the moribund animal showed body condition 1.5/5 with no fat pads, and empty stomach/intestines. Differential diagnoses included metabolic bone disease, parasites, stress, unknown species-specific needs, or infection. Five days after initial mortalities, 5 anoles were found dead/euthanized, and multiple new sick cases identified. An animal with poor righting reflex was approved for diagnostics and histopathology. The blood glucose was 147 mg/dL, and a blood smear revealed normal red blood cells and platelets with severe leukopenia. This individual also had no fat stores, but laces were present in the distal intestine for fecal float, no parasites seen. With histopathology pending, housing conditions were optimized to decrease potential stressors by adding dividers between cages to decrease aggression, eliminating daily temperature fluctuations, increasing misting, and adding standing water for increased humidity and hydration, increasing UVB light, and changing enrichment to promote arboreal behavior. Feeding and weight logs were established to monitor response to treatments. Radiographs were performed to exclude metabolic bone disease but were inconclusive due to machine resolution. Histopathology revealed renal tubular mineralization and urate stasis, and metabolic derangements. Diet was modified to include calcium with D3, reptile vitamins, and mealworms for higher fat content. More severe cases were gavaged daily with critical care diet for several weeks and then gradually weaned. The number of insects fed gradually increased individually based on the feeding logs. Visible response to treatments was seen after 2 weeks with increased activity and more vibrant color patterns. Return to reproductive function visualized by eggs laid occurred seven weeks after changes initiated. Metabolic disease was the primary diagnosis. However, the cause was likely multifactorial.

**PS69 Intermittent Lethargy and Epistaxis in a Rhesus Macaque**

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A 14-year-old male rhesus macaque (Macaca mulatta) enrolled in a behavioral neuroscience study presented with a history of episodic and intermittent episodes of laying down in his cage. Physical examination revealed tachycardia and grade 3/6 left systolic gallop murmur, with normal respiratory auscultation and no abdominal distention. Survey radiographs revealed right sided cardiomegaly with a mild unstructured broncho-interstitial pulmonary pattern. Cardiac troponin was elevated (0.07 ng/ml). Differential diagnoses included valvular insufficiency, hypertrophic cardiomyopathy, septal defects, and dilated cardiomyopathy. At this time, the animal was removed from study due to concerns regarding fluid regulation in an animal with abnormal cardiac function. A follow-up echocardiogram and EKG one month later revealed dilated ventricles and decreased ejection fraction, consistent with a diagnosis of dilated cardiomyopathy (DCM). The EKG showed intermittent ventricular premature contractions (VPCs) and a gallop murmur that had worsened from grade 3/6 to 5/6. While off study, the animal started on Carvedilol (3.125 mg/dag), which lowered the awake resting heart rate to within normal limits for one month without any dosage adjustments. Serial EKG and cardiac auscultation were performed in an awake chair-trained animal, a procedural refinement that enabled close monitoring of disease progression. Elective euthanasia was performed two months after treatment initiation when the Carvedilol therapy failed to control the tachycardia and VPCs. Histological findings were consistent with dilated cardiomyopathy, characterized by extensive cardiac myocyte hypertrophy with loss and replacement by mature fibrous connective tissue and fatty infiltration. This case presents a refinement to the management of cardiomyopathies in laboratory housed primates and highlights the importance of considering spontaneous DCM as a differential diagnosis for cardiac disease in adult rhesus macaques.

**PS70 Suspiciously Swollen and Scaly Skin in a Recently Transported T-cell Receptor (TCR) Transgenic Mouse**

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An experimentally naïve 2.5-month-old, male, homozygous C57BL/6-tcrIcralcbl100M/J (T1-4) mouse presented with swollen digits on all paws and mild scaling along the pinnal margin. Seventeen days prior, this mouse along with four other male mice were transferred from another animal facility and housed in breeding trays with C3H/BL/6 female mice. On exam, all digits were swollen and mildly erythemic with mild scaling. Mild to moderate swelling was primarily over the metacarpals and metatarsals while swelling was not noted elsewhere. The pinnal margins were non-erythemic though mildly thickened bilaterally with scaling. The four other male mice transported with this mouse were not similarly affected. Differential diagnoses included immune mediated disease, vascular disease, infection, or neoplasia. Despite a 7-day course of meloxicam in the water (1mg/kg/day PO), no improvement was noted, and euthanasia was elected. On necropsy, there was moderate diffuse erythema and dermatitis of the paws and multifocal missing nails on various digits. Internally, there was moderate enlargement of the mesenteric lymph nodes, mild splenomegaly, and moderate diffuse pallor of the lungs. Ectromelia virus serology and Pneumocystis spp. PCR evaluation of lung tissue was negative. Aerobic and anaerobic bacterial culture of the spleen and mesenteric lymph node were negative as well. A complete blood count showed lymphocytosis (8270/ul). On histology, diffuse enlargement with small to medium-sized round cells was noted in numerous lymphoid organs (thymus, mediastinal and mesenteric lymph nodes, and spleen) that were CD3+, CD4+ on IHC and diagnosed as T cell lymphoma. Skin lesions of the paws consisted of mild to moderate multifocal epidermal hyperkeratosis with orthokeratotic and parakeratotic hyperkeratosis, interface dermatitis, and other histologic features typical of exfoliative dermatitis, and is presumably paraneoplastic in origin based on overall case findings and similarity to paraneoplastic exfoliative dermatitis described in cats and rabbits with thymomas and lymphomas. Spontaneous development of T cell lymphomas in TCR transgenic mice has been...
PS71 Subcutaneous Swelling in a Laboratory Ferret
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A 10 month old, 1.28kg, group-housed, experimentally naive, neutered, male ferret was examined for a non-painful right axillary subcutaneous mass approximately 2.0x1.2x1.0 cm in diameter. As the ferret was afebrile and displayed no regional lymphadenomegaly, he was placed on monitoring for suspected local inflammation secondary to rough housing. On reassessment 7 days later, the mass had grown and become lobulated, now measuring 4.3x1.6x1.3 cm in diameter. An I&Na of the mass found mild to moderate mixed inflammation. The ferret’s clinical signs had also progressed; he was quite dehydrated, and febrile. Support in the form of fluids, critical care, meloxicam, and amoxi-clav was initiated.

Bloodwork revealed mild neutrophilia (9.828-K/ul), monocytosis (0.546-K/ul), and basophilia (0.273-K/ul), and marked eosinophilia (13.65-K/ul). Differential diagnoses included an allergic reaction, parasitism, hypereosinophilic syndrome, eosinophilic gastroenteritis, autoimmune disease, or neoplasia. During this time, the right prescapular lymph node slightly enlarged, the right axillary mass megaly, he was placed on monitoring for suspected local inflammation secondary to rough housing. On reassessment 7 days later, the mass had grown and become lobulated, now measuring 4.3x1.6x1.3 cm in diameter. An I&Na of the mass found mild to moderate mixed inflammation. The ferret’s clinical signs had also progressed; he was quite dehydrated, and febrile. Support in the form of fluids, critical care, meloxicam, and amoxi-clav was initiated.

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Repeat blood work revealed marked leukocytosis (47.8-K/ul), with more extreme neutrophilia (17.208-K/ul), lymphocytosis (13.384-K/ul), monocytosis (1.434-K/ul), basophilia (0.956-K/ul), and eosinophilia (14.818-K/ul). Differential diagnoses included an allergic reaction, parasitism, hypereosinophilic syndrome, eosinophilic gastroenteritis, autoimmune disease, or neoplasia. At this time, including a diagnosis of eosinophilic gastroenteritis, the ferret’s presentation of severe idiopathic pyogranulomatous myofasciitis, and eosinophilia with severe eosinophilic gastroenteritis. This ferret’s presentation of severe idiopathic pyogranulomatous myofasciitis associated with the masses and other tissues and concurrent eosinophilic gastroenteritis – two rare conditions – represents an unusual clinical case scenario.

PS72 High Mortality in Juvenile Rainbow Trout
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500 juvenile rainbow trout fish were ordered from a reputable source slowly began to experience a mortality of ~3% within the first 2 hours after their arrival to our aquatics facility. This was presumed to be a typical occurrence due to shipping stress and acclimating to a new tank system. Modifications were made to the tanks to decrease the speed of the water flow rate to prevent the fry from fatiguing while swimming and could ultimately lead to their mortality. Routine water tests were performed to ensure that the water temperature, nitrate, and nitrite levels were appropriate. As the week progressed, the mortality increased over the next few days from 10% to 40% to eventually 80%. Fish were noted to have a corkscrew swim pattern, some of the fish had increased pigmentation, and fecal casts extending from their vent. Due to the likelihood that this was an infectious disease outbreak and some individuals remained asymptomatic, we elected to euthanize the remainder of the fry in the tank and the tank was disinfected using the lab’s standard chlorination protocol. Our differential diagnoses for this rapid rate of mortality in fry included infectious pancreatic necrosis virus and infectious hematopoietic virus. Any potential survivors from this cohort could potentially serve as asymptomatic carriers if they were to reach adulthood posing a threat to any future fry brought into the colony that would be naive. Fry were submitted for viral culture, PCR, and histopathology. The results of our diagnostic testing were conclusive for an infectious pancreatic necrosis outbreak. We moved forward with contacting the vendor to warn them of the potentiality of disease in their colony.

PS73 Facial Swelling in an Adult Sprague-Dawley Rat
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A one-year-old intact male Sprague-Dawley rat was reported to have acute facial swelling on the right cheek and blood in the ear canal. Initial differentials included: trauma, neoplasia or abscessation of the Zymbal’s gland, parotid salivary gland, or extraorbital lacrimal gland, or a deep inner ear infection. The mass was 2.5x1.5x1.5 cm (about 0.59 in), firm but slightly fluctuant, and warm to the touch. Under general anesthesia (2% isoflurane), the mass was lanced using a 20g needle. Approximately 1 ml (about 0.05 oz) of purulent exudate was drained from the mass. The abscess was not flushed with iodine for fear of spreading infectious material to deeper tissues or the ear canal. The rat was given a single dose of enrofloxacin and meloxicam and the husbandry staff was instructed to monitor daily. Six days later the abscess recurred, and the rat was euthanized. Necropsy revealed a solid mass immediately caudal ventral to the ear canal, with purulent material filling the interior of the mass. On histopathology, the mass was identified as a Zymbal’s gland adenocarcinoma, likely leading to a secondary abscess formation. Aerobic culture revealed a mixed population of bacteria, including Proteus mirabilis, Escherichia coli, Staphylococcus aureus, and Streptococcus mironis. Zymbal’s gland pathology is common in rats used in research. Though abscessation was the most prominent feature in the initial presentation, it is often secondary to another underlying pathology, in this case neoplasia. The bacteria cultured in this case are opportunistic infections. Interestingly, Streptococcus mironis is most often associated with gerbils and other jirds; it has previously been cultured from the oropharyngeal region of gerbils and other small burrowing rodents. Though thought to be a commensal bacterium, not much is known about its pathogenic potential. With respect to the present case, there have been no gerbils ever housed in this building. Therefore, the origin of the S. mironis could not be determined.

PS74 Mysterious Mass in a Mangabey
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A 25 yr-old, 6.47 kg, intact, socially run-housed female sooty mangabey (Cercopithecus atys) was admitted to the hospital for oral trauma, Physical exam findings included; a missing incisor #101, a complete crown fracture of incisor #102 with a retained root due to trauma, a necrotic incisor #401, and a crown fracture of incisor #402. In addition to oral trauma, the uterus was moderately enlarged and firm on abdominal palpation. Abdominal radiographs revealed a soft tissue mass in the caudal abdomen. The geriatric mangabey also had a history of lumbar kyphosis and decreased...
range of motion in both stifles due to chronic arthritis. Incisor #102 was addressed on the exam table via manual extraction of the retained root, and a dental exam was scheduled for further treatment of the remaining incisor traumas. The animal was started on antibiotics and NSAIDs for trauma and arthrosis. Complete blood count revealed neutropenia with monocytosis, indicative of chronic inflammation. Chemistry did not reveal any significant findings. At this point, a list of differential diagnoses included uterine leiomyoma, leiomyosarcoma, adenomyosis, adenocarcinoma, and endometriosis. Due to chronic arthritis and suspected endometriomysis or neoplasia associated with advanced age, the mangabey was euthanized. On gross exam, the uterus was enlarged, and the uterine wall was uniformly thickened with tan motting. Histopathology showed that the myometrium was thickened by smooth muscle with multifocal islands of endometrial glands and stroma, consistent with adenomyosis. The oviduct was surrounded by endometrial glands and stroma with hemosiderin laden macrophages, which is pathognomonic for endometriosis. Immunohistochemistry (IHC) staining with CD10 stain was performed to confirm presence of endometrial stroma in both tissues. While endometriosis is the most commonly diagnosed nonneoplastic uterine lesion in the sooty mangabey, other conditions such as adenomyosis can occur concurrently and must be considered.

**PS75 Subtle, Unilateral Hindlimb Lameness in a Lesser Egyptian Jerboa**

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A 2-year-old female lesser Egyptian jerboa (*Jaculus jaculus*) presented with a discrete swelling on the right hindlimb. There was no known history of trauma and the animal had been singly housed since its arrival at our institution approximately 1 month earlier. The physical exam was normal except for a 2mm fluctuant swelling on the medial aspect of the right tarsus. When standing at rest, a subtle favoring of the right hindlimb was observed; however, lameness was difficult to appreciate during normal ambulation in the cage and behavior was otherwise normal. Fine needle aspiration of the tarsal mass produced a small amount of clear, viscous, acellular material consistent with synovial fluid. Differential diagnoses included acute soft tissue injury, a synovial cyst, and chronic degenerative joint disease. Conservative therapy was initiated with 0.5 mg/kg meloxicam administered subcutaneously once daily. Despite treatment, the lameness worsened, and the jerboa was sedated for imaging. Radiographs revealed soft tissue swelling around the right hock and a small, radio dense lesion associated with the tarsal joint space. Humane euthanasia was elected due to the poor prognosis for improvement. On necropsy, there were several gross changes of the right tarsal joint, including generalized soft tissue swelling and a small, spherical outpouching from the joint space. Histologic findings included a chronic, non-healing fracture of one of the tarsal bones with exuberant cartilage formation. While this case illustrates that fractures must be considered as a differential in instances of joint swelling and mild gait abnormality in this species, the fracture of single tarsal bones is relatively rare in humans and domestic animal species. It is unclear what the inciting cause was in this animal, though this species’ unique hindlimb biomechanics must be considered, as jerboas are desert-adapted rodents that demonstrate bipedal locomotion and explosive hopping as a mechanism for predator avoidance.

**PS76 High-mortality Epidemic Mycobacterium ulcerans ecovar Lillafuredii in a Colony of Zaire Dwarf Clawed Frogs (Hymenochirus boettgeri)**

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*Mycobacterium ulcerans* ecovar Lillafuredii (MuLill) was identified as the causative agent of systemic mycobacteriosis in a research colony of approximately 300 Zaire dwarf clawed frogs (*Hymenochirus boettgeri*). Approximately four frogs per month over a five-month period presented with acute morbidity and mortality, including lethargy, coelomic effusion, multifocal cutaneous hemorrhages, and rarely cutaneous granulomas. Differential diagnosis included *Chytridium dendrobatidis*, Ranavirus infection, ovarian hyperstimulation syndrome, and bacterial septicemia. Coelomic samples tested negative for *C. dendrobatidis* and Ranavirus, documented water quality appeared sufficient, and there was no history of gonadotropin administration. Histologically, clinically affected animals showed multifocal necrotic and inflammatory lesions in multiple organs, which contained myriad acid-fast bacteria consistent with *Mycobacteria spp.* Identification and speciation of mycobacteria was performed using nucleic acid amplification and sequencing, as well as special mycobacterial culture techniques with mass spectrometry. These findings suggest that MuLill is a primary pathogen in *H. boettgeri* and should be considered in the differential diagnosis of sepsis and coelomic effusion in amphibians. Mycobacterial speciation is important given the difficulty in diagnostic specificity, variability in pathogenesis within the family Mycobacteriaceae, and the implications for both animal and human health as a potential zoonotic disease. *H. boettgeri* is a species common in the pet trade and used increasingly in laboratory animal medicine, and these findings provide consideration for this pathogen as a potentially important public health concern. To the authors’ knowledge, this is the first report of MuLill infection in the genus *Hymenochirus* and illustrates the diagnostic challenges of differentiating among mycolactone-producing mycobacteria, as well as between these species and *Mycobacterium marinum*. Furthermore, we demonstrate the utility of environmental sampling for this pathogen reliably within the tank system, suggesting this mode of sampling could be used as a reliable method for direct frog surveillance.

**PS77 Armenian Hamsters (Cricetulus migratorius): A New Host for Corynebacterium bovis Infection**

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*Corynebacterium bovis* (Cb), an opportunistic bacterial pathogen, causes skin disease in immunocompromised mice and possibly rats. Until now, Cb has not been reported to affect other rodents. In 2021, neonatal mortality, initially of unknown etiology, was observed in a small, newly established, Armenian hamster (*Cricetulus migratorius/Cnig*) breeding colony. With successive litter losses in which pups presented with flaky skin, Cb was detected by PCR from caging as well as the dam of an affected litter. Affected 10d old neonates had mild to moderate hyperkeratosis with abundant Gram-positive cocci/cocci within the excessively keratinized skin. These skin sections were PCR positive for Cb. Subsequently, a
PS78 Novel Demonstration of Corynebacterium bovis-associated Lesions and Interface Dermatitis in NIH-Foxn1rnu Rats (Rattus norvegicus)

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Corynebacterium bovis (Cb), a short, pleomorphic, gram-positive rod, is well recognized to cause clinical disease and histopathologic lesions in immunocompromised mice and has been isolated from Sprague-Dawley and athymic nude rats. While rats can be colonized with Cb, there is no peer-reviewed literature describing clinically and microscopic lesions consistent with Cb observed in pups of various ages as well as in post-weaning hamsters up to 2.5 months old, although the older hamsters had a lesser bacterial burden and lesion severity. Small numbers of Demodex were concomitantly detected in some pups at 14 days old. Demodex causes scaling in heavy infestations of adults and is enzootic in all Cmig derived from the single importation from Armenia in the 1960s. The role that Demodex, the skin flora, and perhaps other unknown contributing factors have on the clinical presentation and mortality observed in these colonies remains undefined, but evidence indicates that Cb can colonize and likely cause dermal pathology in Cmig.

PS79 Incidence of Dystrophin Mutations in Swine (Sus scrofa domestica): Novel Porcine Stress Syndrome Implications for Physiology during Anesthesia

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Swine are increasingly being used for biomedical research as appropriate animal models given similarities to humans including size, arterial capacity, and cutaneous structure. From November 17, 2021, through February 15, 2022, 11 out of 11 swine (Sus scrofa domestica) exposed to isoflurane inhalant anesthesia over two different research protocols were euthanized after exhibiting symptoms like malignant hyperthermia including hyperthermia, hypercapnia, skeletal muscle rigidity, dyspnea, tachycardia, and hypotension. This group of 2 males and 9 females was composed of intact Yorkshire/Landrace crosses females with weights between 68 to 91 kilograms and ages 3 to 5 months purchased from a research breeder. While malignant hyperthermia is caused by mutations in ryanodine receptor 1, another novel stress syndrome in pigs involves a mutation in the dystrophin gene. We analyzed the incidence of ryanodine receptor 1 and dystrophin mutations in 7 of the original 11 clinically effected pigs in 56 subsequent non-clinical research swine using a combination of blood and muscle samples. All animals tested negative for the ryanodine receptor 1 mutation, while the dystrophin variant was found in 2 out of 7 of clinical (28.6%) and 22 out of 46 (47.8%) subsequently tested female pigs. During procedures in female swine, creatinine kinase, an indicator of muscle damage, was measured while under isoflurane anesthesia. Creatinine kinase was elevated in dystrophin mutation positive carriers (625.0 ± 81.8U/L) compared to those negative (543.8 ± 109.5U/L), but this did not reach statistical significance (P=0.088). Body temperature was slightly decreased in dystrophin mutation positive carriers (37.7 ± 0.4°C) compared to those negative (37.8 ± 0.3°C), but this also did not reach statistical significance (P=0.368). After unsuccessfully trying to prevent the clinical signs utilizing intravenous administration of dantrolene, one research group switched anesthesia protocols from primarily total intravenous anesthesia, and one research group switched anesthesia protocols from primarily inhalant anesthesia to primarily total intravenous anesthesia, and the clinical signs did not return. Taken together, choice of anesthesia should be carefully considered when performing longitudinal porcine studies.
PS81 Don’t Stand So Close to Me: Do Aging Adult Male Rats Prefer to be Alone or in Pairs?

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This study was designed to look at the space requirements for aging male Sprague Dawley rats. These rats quickly outgrow Guide floor space requirements, leading institutions to have to decide if it is better to house animals in pairs, but crowded, or separated, but alone. This study therefore seeks to assess the behavioral and physiologic responses of rats in varying conditions of caging floor space and group vs. individual housing. We obtained 276 male Sprague Dawley rats which were assigned to one of three types of caging: standard sized Lab Products rat IVC (Alt Design), Allentown NexGen 1800 rat IVC (Allentown), or Tecniplast GR1800 rat IVC (Double Decker) and initially pair housed. Once both rats in a cage reached 600g, they were assigned to either the paired housing condition, and remained in their initial caging, or assigned to the single housed condition and separated. Three days after this assignment, rats were assessed for acute effects of their experimental condition with one individual undergoing behavioral testing such as the Elevated Plus Maze (EPM) or Forced Swim (FS). One month later, rats were assessed for chronic effects of their experimental conditions with the opposite assay from their acute assessment (i.e., if a rat completed EPM for acute assessment, they would undergo FS for their chronic assessment). After the chronic assessment, blood samples were taken for CBC and Corticosterone analysis, and rats were euthanized. We found that rats made more open-arm entries on the EPM if they were from a Double Decker cage compared to either the Allentown or Alt Design and that caging type did not affect blood markers of stress. We also found that paired vs single housing made no difference to behavioral or blood results.

PS82 Effect of In-house Permethrin-soaked Enrichment Bedding on Mouse Nesting Scores, Body Weights, and Body Condition Scores

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Fur mites are an excluded agent in most contemporary laboratory mouse colonies but remain a persistent issue with infestations complicating animal health and research outcomes. Wild rodents are a likely source, and infestations may be clinically silent or result in pruritis, dermatitis, weight loss, and decreased fertility. To address potential mite contamination, our institutional rodent quarantine practice was to provide animals with permethrin-treated nesting material manufactured by outside vendor. However, this product is no longer commercially available. Methods to create in-house permethrin-soaked enrichment bedding have been published. Before implementing this technique, we wished to assess for impacts on mouse health and nest building. Female C57BL/6 mice (n=10/group, 3-7 mo, pair-housed) were provided permethrin-soaked or untreated enrichment bedding and body weights, body condition scores, and nest scores were measured over 5 weeks. Treated enrichment consisted of a 4 g bedding “puck” saturated with 5 mL of 0.5% permethrin and left to air dry for 24 hours before use. Control cages received one untreated bedding “puck.” Both treated and control cages were also provided with an untreated cotton nesting square as additional enrichment. Initial body weights and body condition scores were collected before the experiment began and then twice weekly for the duration of the experiment. Nest scoring was performed twice weekly. There were no significant differences in body weight at any time point between the mice receiving permethrin-soaked or untreated enrichment bedding. At one time point, mice receiving treated bedding had significantly higher body condition scores than control mice (p<0.05). At three of ten nest score assessments, cages with treated bedding had significantly lower scores than control cages (p<0.03, p<0.02, p<0.03). Despite this, all cages demonstrated interaction with the enrichment material and built nests consistently throughout the study. Permethrin-soaked enrichment bedding did not negatively impact the health or well-being of mice as measured by body condition, body weight, or nesting scores. Our institution plans to implement permethrin-soaked enrichment bedding made in-house for fur mite treatment of rodents in quarantine.

PS83 Mice Make Moisture: Comparing Relative Humidity in the Housing Room and Home Cage

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Relative humidity (RH) is commonly measured in mouse housing rooms. It is typically assumed that measurements in the room reflect what the mice experience in the cage. However, there is limited data comparing RH measurements at the room level and inside of ventilated cages. The purpose of this study was to compare how RH levels taken at the room level compare to those inside of ventilated cages containing breeding trios and same sex groups of laboratory mice. We also assessed how RH is impacted by the age of a single mouse litter, the time since cage change, and the group size of same sex cages. RH was measured using a temperature/humidity sensor attached to a solid top caging lid. The
PS84 Efficiencies of Different Genetic Modification Techniques in Rat Embryos

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CRISPR-Cas9 has revolutionized the creation of genetically modified animals. Preconstructed DNA templates along with CRISPR-Cas9 reagents can be inserted into embryos by pronuclear injection (PNI), electroporation (EP), and delivery via adenovirus-associated virus with electroporation (AAV+EP). Currently, no published literature compares the efficiency of these techniques as it relates to embryo development and knock-in (KI) rate in rats. We used a 401 base pair (bp) short artificial intron targeting exon 2 of the Crb gene as the DNA construct. Superovulated Sprague-Dawley (SD) female rats mated to SD male mice were used to generate zygotes. Ten SD females were superovulated per collection, five collections were performed for a total of 50 female rats. Ten SD stud males were used for mating. Zygotes were randomly assigned into four groups: culture only control, PNI+EP, and AAV+EP. Manipulated embryos were cultured to blastocysts in 500 µL of KSOM-R media. Embryos were collected individually and submitted for genome sequencing to detect evidence of genome editing. Embryo survival after one day in culture was 98% (109/111) for culture only control, 58% (101/175) for PNI, 100% (106/106) for EP, and 95% (124/130) for AAV+EP. Cleavage rate after one day in culture of surviving embryos was 99% (108/109) for culture only control, 88% (89/101) for PNI, 99% (105/106) for EP, and 94% (116/124) for AAV+EP. Development of embryos to 4-cell stage after three days of culture were 90% (98/109) for culture only control, 62% (65/101) for PNI, 77% (78/103) for EP, and 52% (65/124) for AAV+EP. Knock-in rates for manipulated embryos were 67% (12/18) for PNI, 3% (1/35) for EP, and 63% (22/35) for AAV+EP. From our results, we conclude that PNI decreases embryo survivability. All three gene editing techniques have similar embryonic development to a 2-cell and 4-cell stage for rat embryos that survive 24 hours in culture. With a 401 bp DNA template, we found PNI and AAV have similar KI rates while EP had a much lower KI rate. We speculate that this lower KI rate is related to the size of the DNA repair template. Our work is important since optimizing gene editing techniques greatly reduces total animal numbers and saves both the time and money associated with rat model generation.

PS85 Facilitating Mouse Studies of Post-Acute Sequelae of COVID-19

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The chronic form of COVID-19, Post-Acute Sequelae of COVID-19 (PASC), remains a significant public health concern. The B6.Cg-Iq(K18-ACE2)2Prm1/J (hACE2) mouse has been widely used to study acute COVID-19 studies, but its suitability as a model for PASC remains uncertain. The long-term goal of this research is to establish whether the hACE2 mouse is an effective model for PASC research. Previous work by our lab has shown experimental inoculation of the hACE2 mouse with SARS-CoV-2 results in persistent infection up to 16 weeks, but their infective potential was unclear. The primary objective of this study was to assess viral infectivity in persistently infected mice with the aim of transitioning them from animal biosafety level 3 (ABSL-3) containment to ABSL-2. To this end, a sub-genomic E RNA (sgE-RNA) RT-PCR assay, which detects replicating virus, and sentinel mice were employed to determine SARS-CoV-2 viral infectivity. It was hypothesized that infected mice would be free of replicating virus by 16 weeks post-infection (WPI) and that sentinel mice would only become infected when exposed to recently inoculated mice. Six- to 18-week-old, hACE2 mice (N=78 females + 75 males) were intranasally inoculated with the USA-WAI/2020 strain of SARS-CoV-2 in ABSL-3 containment. Acutely ill mice were euthanized, and their tissues collected, while cohorts of surviving mice were necropsied at weekly intervals up to 16 WPI. Normal, female, homologous hACE2 sentinel mice (N=5) were exposed to previously inoculated mice at 0 DPI (N=3) and 8 WPI (N=2), and euthanized 2 weeks post-exposure, when lungs were harvested. Viral RNA and sgE-RNA were present in lungs up to 16 WPI and viral RNA was also present in the lungs of all sentinel mice. Together, these results suggest that intranasal inoculation of hACE2 mice results in persistent infection with replicating virus present up to 16 WPI, hindering removal from ABSL-3. However, the presence of viral RNA throughout the study suggests that this experimental model may be valuable for assessment of PASC pathology associated with viral persistence.

PS86 Chlamydia muridarum: Insights into the Effectiveness of Automated Cage Washing and Infectiousness as Assessed by Intercage Transmission During Cage Change

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Chlamydia muridarum (Cm) has reemerged as a prevalent contaminant in academic laboratory mouse colonies causing persistent infection and immune activation, potentially confounding research. The susceptibility of Cm to inactivation and/or removal (IAR) from cages via heated, pressurized water and its transmissibility as it relates to modern husbandry practices are unknown. To evaluate IAR, we assessed the ability of Cm to survive autoclaving and/or cage wash and subsequently infect naïve animals. Cages which had housed Cm-shedding mice were assigned to 1 of 3 groups: sanitization in a tunnel washer (82.2°C [180°F] final rinse for an average of 17 seconds per run, n=10), sanitization in a tunnel washer followed by autoclaving (121°C for 20 minutes; n=10), or...
control (bedding change only; n=10). The interior of each empty soiled cage was swabbed pre- and post-treatment and assayed for Cm by PCR. All pre-treatment swabs were PCR positive, while post-treatment swabs in all cages (excluding controls) tested negative. To determine if any residual elementary bodies in cages were infectious, a Swiss outbred (SW) and an NSG mouse was co-housed for 7 days in each cage type (n=10 pairs/mice/group). This process was repeated weekly for 4 weeks after which the mice were housed in sterile cage units for 4 weeks. At the end of the 4-week observation period, feces was tested and determined to be negative by PCR. To assess transmissibility, 6 IVC cages (1 cage per rack side) each housing a SW and an NSG mouse were randomly placed amidst cages housing CM shedding mice (as confirmed by PCR from pooled soiled bedding from each cage per rack) for 35 days. These cages were only manipulated by animal care staff during weekly cage change in an animal transfer station using microisolator cage technique. All mice remained fecal PCR negative when tested for Cm 14- and 35-days post placement. Collectively, these results indicate that Cm does not remain in cages after mechanical washing and even when present (empty soiled cages), cages do not transmit Cm. Further, modern husbandry practices appear to be sufficient to prevent cage to cage transmission.

PS87 Group 2 Innate Lymphoid Cells Are Required for Protective Immunity in Helminth Infected Mice

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Experimental studies employing the murine hookworm Necator americanus are widely used to elucidate the pathogenesis and immunology of helminth infection, which is a major cause of morbidity in human and animal health. Hookworms parasitize the host through skin penetration by third stage infectious larvae (IL3). Migration through lung tissue and entry into the gastrointestinal (GI) tract for egg production by adult stage worms. Type 2 immune responses, characterized by Interleukins (IL) 4, 5, 9, 13, 25, and 33, drive host protection through worm clearance and tissue repair, while Interferon gamma (INF-γ) and IL-17A responses can drive susceptibility and disease exacerbation. The relative contributions of CD4+ 1 helper (Th2) cells versus group 2 innate lymphoid cells (ILC2s) to host immunity and tissue repair remain unclear, largely due to the lack of genetic systems that selectively eliminate one of these populations. The recent generation of mice deficient in Locus Control Region 1 (LCR1−/−), which allows a selective loss of ILC2 with an intact Th2 compartment, provides a critical tool for addressing this long-standing controversy. In this study, LCR1−/− mice or wild-type controls (C57BL/6, n = 15/group) were subcutaneously infected with N. brasiliensis IL3 and evaluated for parasitological impact and extent of lung injury. Data show 144- and 49-fold higher fecal egg loads and intestinal worm numbers and significantly more red blood cells in the lungs of LCR1−/− mice vs. controls, indicating greater host susceptibility and lung damage in mice lacking ILC2s. LCR1−/− mice produced higher IL-17A levels than WT controls. As expected, LCR1−/− mice had significantly fewer GATA3+ST2+ILC2s, as well as fewer eosinophils, but Th2 cells were equivalent between groups. This study sheds new light on the mechanisms of resistance against hookworms and supports the idea that ILC2s are essential for both host protection and tissue repair independently of Th2 cells.

PS88 Linoleic Acid: An Omega-6 Fatty Acid Essential for Liver Regeneration in Rats.

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The laboratory rat is currently the most used experimental model in hepatic surgical resection studies to investigate liver regeneration, chronic liver disease, and hepatic cancer. Our previous studies showed that the dietary consumption of linoleic acid (LA), an omega-6 fatty acid, stimulates the growth of rodent and human liver tumors in vivo. We tested the hypothesis that increased LA intake in animals fed a 5% corn oil semipurified diet (control Diet I) or an essential fatty acid deficient (EFAD; deplete in LA) diet but supplemented with an equal amount of LA as in Diet I (experimental Diet II), compared to EFAD diet alone (Diet III), would elevate plasma levels of LA and stimulate regeneration of 70% partial hepatectomized (HPX) rat livers that show metabolic similarities to hepatomas. Three groups of randomized male (N=60/group) and female (N=60/group) Buffalo rats (BUF/CFCrCl) were fed either diet I, II, or III and water ad libitum under an IACUC-approved protocol. After 8 weeks on the respective diets, rats were subjected to HPX. At Day 4 post-HPX (maximum regenerative period) arteriovenous (A[carotid]-V[inferior vena cava]) samples (0.2ml) were collected across regenerated livers (Diet III HPX livers did not regenerate) and measured for LA-, glucose-, O2- uptake, and lactate- and CO2-output; harvested remnant livers were measured for liver LA, total protein, cAMP, DNA content, and [3H]thymidine incorporation into liver DNA (TH-DNA). Regenerated liver A-V consumption of LA, glucose and O2, and lactate and CO2 output, were significantly elevated by over 200% in dietary groups I and II, compared to III; and, LA-, protein-, cAMP-, DNA- and TH-DNA content were significantly elevated (P<0.0001) in I and II (male/female) by over 6000%, 400%, 250%, 80%, and 60% (I vs II). HPX livers regenerated to 60% original size in groups I and II, but not in III. Understanding the mechanism of LA-dependent liver regeneration in the laboratory rat will strengthen our current efforts to enhance successful surgical resection therapies in humans.

PS89 Dietary Approaches to Combatting Obesity: An Investigation of High Fiber and High Protein Diets in Spiny Mice (Acomys cahirinus)

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Spiny mice (Acomys cahirinus) are a unique species with a diverse research portfolio. Although they have been a laboratory model for over 20-years, little is known regarding nutritional requirements. Studies of dietary salinity, fats, and sucrose have been performed with the aim of inducing pathologies. This original research focuses on fiber and protein. We hypothesized that increased dietary protein or fiber will regulate weight gain and improve glycemic control, while a combination diet of increased protein and fiber will achieve an ideal body weight with appropriate glycemic control. Spiny mice were fed either a commercially available rodent diet, a high fiber diet, a high protein diet, or a combination of high fiber and high protein diet for 8 weeks. Physiologic data including body weight, body condition scores, and peripheral blood glucose were collected throughout. A complete blood count, select chemistry panel, organ weights, and histopathologic data were obtained at endpoint. There was no significant difference in the consumption
rate between diets. Data shows weight management was obtainable with added fiber. Weight gain was similar between animals on the high protein and the control diet. No diet modification proved best in controlling blood glucose, including during stress-induced hyperglycemic episodes. Ultimately, no diet proved best in managing both weight and blood glucose. While the high fiber diet was effective in controlling weight, it often resulted in a decrease in weight among a growing population. No diet was able to significantly impact blood glucose within 8 weeks. Surprisingly, though, the combination diet, while able to maintain weight with a slow increase in weight gain, showed a trend in elevated blood glucose, warranting a longer diet trial prior to recommending this specific combination.

**PS90 Welfare Wednesday: A Weekly Installment for Continuous Animal Welfare Training**

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Employee time is a highly valued resource, but direct training of staff either individually or in small groups exhausts the availability of both the trainers and trainees, who could otherwise be dedicated to animal care. When the veterinary group realized there was a gap due to the insufficient cadence of annual training, we developed a new method to disseminate information efficiently and rapidly in a way that was easy for staff to grasp the presented material quickly and asynchronously across multiple production sites of a large animal vendor. Welfare Wednesday was created to review the top clinical observations reported to the veterinary team through a visual aid, using one slide to outline the critical topic points. This slide is displayed on monitors throughout the vivariums and employee break rooms in conjunction with an email that includes a copy of that slide along with more detailed information. A new topic is covered weekly. The learning platform utilized to communicate with animal caretakers about these common clinical observations quickly evolved into a way to educate the entire company on issues noted with our models and created discussion between different teams at all levels. A virtual assessment performed companywide determined that Welfare Wednesday was a successful training mechanism, with many positive responses received. This tool might be useful at institutions with large staffs and/or multiple geographically separated vivariums.

**PS91 Reducing Errors and Increasing Operational Efficiency Using Modern Cloud Study Management Solutions**

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As pharmaceutical research becomes infinitely more advanced, preclinical data capture must catch up. Many researchers still rely on outdated paper and spreadsheet systems that slow down the entire research process, increasing the risk of data error and wasting already constrained time and resources—impacting both animal welfare and scientific integrity. A digital study and colony management system centralizes data and massively reduces the use of paper systems and the risk of mistakes. In order to improve study efficiency and reduce error, we introduced a study and colony management solution to a group that previously used spreadsheets and paper almost exclusively. Over time we tracked metrics around the reduction of errors made in data collection and the overall reduction in time and paper spent in study management. Users were trained to use the new system and then asked to compare how long similar tasks took using the new software solution compared to their previous workflow methods. Overall we saw a drastic reduction in errors made and almost eliminated the use of paper daily. Modernizing a vivarium’s workflow by switching to a digital study and colony manager increases efficiency and reduces error within research leading to both an improvement in animal welfare and a reduction in overall cost.

**PS92 The Clinical Evaluation and Management of a Nonhuman Primate Model of Multiple Sclerosis**

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The Common marmoset (Calithrix jacchus) is an increasingly popular translational model of neurologic disease. We utilize the marmoset model of experimental autoimmune encephalomyelitis (EAE) to further understand the pathogenesis of human multiple sclerosis (MS), a chronic inflammatory disease of the central nervous system. The marmoset EAE model presents unique husbandry and management challenges, including the support of animals with neurologic deficits ranging from blindness to paresis or paralysis. To refine experimental endpoints and clinical management, and to allow for consistency in collection of clinical data, we adopted a standardized neurologic examination based on a previously published EAE score system and the expanded disability scoring scale (EDSS), the primary scale used in MS in humans. The scale includes muscle tone of each limb and tail, grip strength, sensitivity to touch, eye movement, and pupil dilation. These examinations are performed in parallel with regularly scheduled MRI procedures, allowing for both clinical and imaging-based measurements of disease progression. In addition to monitoring disease progression, these scores also help inform and dictate clinical support needed for each individual animal, such as removal of hanging enrichment once vision is impaired and/or addition of food enrichment as mobility decreases. The creation and implementation of a standardized neurologic scoring system in marmoset EAE has allowed us to successfully maintain animals throughout their disease progression and complete numerous studies, providing valuable knowledge about human MS pathology.

**PS93 The “Aunting” System: Improving Survival in Immunocompromised Mouse Strains Post-Weaning**

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Immunocompromised mice can be challenging to breed even when housed using specific pathogen free (SPF) conditions. Breeders cannibalize pups, pups fail to thrive including post-weaning, and litter sizes are generally small for NSG and NOD.SCID strains. Important factors such as increased enrichment, temperature, and socialization can be utilized to increase production and optimize colony health. The “Aunting” system in post-weaning period provides warmth and socialization to runted pups that are often cannibalized by parents or fail to thrive when utilizing traditional delayed weaning. In addition, post-weaning aunting improves weaning health while allowing breeders to continue production without having to nurse multiple litters, increasing breeding production overall. Mice are housed on ventilated racks with room temperature of 74 degrees and provided acidified water and breeder chow. At seven weeks of age, one male and
two female mice are housed in breeding cages which includes bedding, nesting material and igloo enrichment items. If the first litter is unsuccessful, animals receive additional enrichment rotated to maintain novelty. On 10-14 days, pups are provided with chow on floor and a dietary gel supplement. Pups are weaned at ~20 days depending on health and appearance followed by housing with designated aunts. Enrichment items and dietary gel supplementation are maintained. Aunts, CB17SCID females, 8 weeks of age and older, are housed four mice per cage. Depending on how many mice are being weaned, anywhere from one to four aunts are used for the aunting period in single or multiple cages, without exceeding five mice per cage total. After pups are healthy enough to be removed from their aunts, the aunts are recombined into their original cage. The “Aunting” system is also effective when weaning singly housed mice and helping them adjust. After three to five days post-weaning aunting, pups have gained weight with improvements in health, potentially demonstrating the importance of additional warmth and socialization versus primary nursing in a delayed wean scenario. In conclusion, weaning survival improves when post-weaning care is provided by an “Aunt” between 18-21 days of age.

PS94 Thinking out of the Box to Get into the Dirt: Constructing A Visible Burrow System Habitat for Rats
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Researchers studying the sociality of rodents have long been confronted with the challenges of translating a rich array of natural behaviors into an ethologically relevant context that can be manipulated in a laboratory setting. Confining animals to standard cages and conducting artificial social experiments has often been the approach. To provide animals with a semi-naturalistic environment and researchers with an alternative model for sociality studies, a visible burrow system was constructed, featuring interconnected tunnels, home cages, and an open arena for rats. However, many challenges and creative solutions were needed for husbandry and health monitoring. For example, pathogen testing was conducted on two dirt-like substrates to confirm their safety for use. Extensive environmental parameters measuring temperature, humidity, ammonia, and adenosine triphosphate levels were recorded at regular intervals to gauge the effectiveness of cleaning methods, as well as to determine a threshold for cleaning that would minimally disturb the animals’ environment without posing health concerns. An iterative process was utilized to upgrade the system from a hand-wash-only design to a rack-washable system. Researchers, animal care staff, and the attending veterinarian collaborated to produce new guidelines for the acclimation of animals to the system, criteria for removal, and standards for health checks. By analyzing environmental parameter data and maintaining open lines of communication among all stakeholders, the system has housed different cohorts of animals with varying experimental needs. Cages and tunnels were changed on a tri-weekly interval, and valuable behavioral and husbandry knowledge was gained from the arena and its burrows. By providing the animals a naturalistic environment that promotes social interaction, researchers can study behaviors and the neural mechanisms underlying them from a new perspective, while the vivarium continues to gain knowledge that can be applied to the construction of other novel housing paradigms in the future.

PS95 Dealing with A Flood in an Aquatic Facility: How to Keep Your Head above the Water
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When a vivarium is hit by a natural disaster, animal research becomes vulnerable to loss. The disruption that follows may halt or disrupt research projects over months or even years, since unique, irreplaceable, long-term animal models could be at risk. Therefore, catastrophic events require a coordinated and fast response to face the destruction and minimize the negative consequences, both to animals and to research projects. In December 2022, because of heavy rain fall, part of the IGC vivarium was flooded and three satellite aquatic animal rooms were affected. Most of the facility equipment was destroyed and zebrafish life support systems failed. To save the experimental animals, a prompt coordinated response was required, where the researchers and the animal care staff had pivotal roles as first responders. The animal rescue strategy included animal evacuation and shelter in place, following a priority list elaborated in the first hours of the incident. Coordination, communication, teamwork, and solidarity were essential to deal with disaster, from which we are still recovering 6 months later. Nevertheless, we were able to draw important lessons to incorporate in emergency planning and training.

PS96 Musings on the Microbiome: Does Water Delivery Source Make a Difference?
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Nuances of the gut microbiome have led to investigations of environmental parameters and their influences. To date, the water delivery method largely is underreported in animal research and is hypothesized to have an impact on microbiome. Water is typically provided to laboratory mice by reusable autoclaved bottle (RAB), by autowater mechanism (AW) from the housing rack, or by use of a single-use disposable plastic pouch (DPP). This study hypothesized that controlling water delivery source would positively stabilize gut microbiomes of mice following arrival from approved vendor to our facilities, within either immunocompetent (n=36 B6; 18M:18F) or immunocompromised (n=36 NOG; 18M:18F) genetic backgrounds over an 8-week study period. Mice were housed on a single IVC rack in sex-specific groups and provided with autoclaved caging/bedding and irradiated feed, while receiving one of three routes of reverse-osmosis, chlorinated water (8 cages per water source). Fecal pellets (n=2) were collected from each animal biweekly and water samples were collected from each cage weekly or from the AW rack for analysis of potential bacterial load. Animal care was provided by dedicated staff (n=5) that performed daily checks and changed cages biweekly. The results indicated that over the course of the study, water from ~10% RAB cages (7 of 63 samples) had bacterial detection and ~4% of water samples from AW cages (1 of 25 samples) had bacterial detection. No DPP water samples had detectable bacteria during the study. Shotgun metagenomics highlighted obvious shifts in gut microbiome in all groups over the course of the study, regardless of water delivery source, except for NOGs on RAB. No clinical concerns were reported, except one cage of fighting male mice: histologic
ABSTRACTS OF PLATFORM SESSIONS

PS97 Neuroblastoma Cell Line Engraftment in 48 Hours Post-Fertilization IV Zebrafish Larvae
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Neuroblastoma is the most common solid extracranial tumor in children, accounting for ~8-10% of all childhood tumors and ~13% of childhood cancer-related deaths. Zebrafish are commonly used for xenotransplantation tumor studies to evaluate therapeutic interventions, but little information is available regarding which neuroblastoma cell lines can be successfully engrafted in zebrafish larvae and if injection location plays a role. To evaluate the ability of BE(2)-C neuroblastoma cells to engraft in zebrafish larvae, two groups of five 48 hours post-fertilization (HFP) zebrafish larvae were microinjected with approximately 35 red fluorescent protein-labeled BE(2)-C cells into either the yolk sac or hindbrain. Larvae were imaged at Days 1 and 3 post-injection via fluorescence microscopy to evaluate the presence of the cells at the site of injection, size of tumor, and spread from the initial injection site. Tumor cells were present at the site of injection on Days 1 and 3 in both groups, indicating the ability of BE(2)-C cells to engraft at either site. BE(2)-C cells injected into the yolk sac were static in number without evidence of metastasis at Day 3, while cells injected into the hindbrain were static to increase in number with evidence of metastatic spread in one fish. These preliminary results indicate that BE(2)-C cells can successfully engraft in 48 HFP larval zebrafish when injected into the yolk sac or hindbrain, with a potential advantage to tumor growth and metastatic potential when injected into the hindbrain.

PS98 Age at Intravenous Administration of AAV9 and an Engineered Variant, AAV.CAP-Mac, Influences Transduction Efficiency in the CNS of C57BL/6J Mice
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Efficiency in the CNS of C57BL/6J Mice
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PS99 Age at Intravenous Administration of AAV9 and an Engineered Variant, AAV.CAP-Mac, Influences Transduction Efficiency in the CNS of C57BL/6J Mice
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Adeno-associated virus (AAV) capsids are used for central nervous system (CNS) gene therapy. Direct administration of AAV into the brain is invasive and often associated with local transduction. However, some conditions require widespread diffusion throughout the CNS; intravenous (IV) administration of AAV represents an attractive alternative. Newborn and juvenile animals are believed to have more permeable blood-brain barriers (BBBs), and age-dependent variation in neuronal transduction has been described with AAV9, the neurotropic gold standard, and an engineered variant AAV.CAP-Mac. We aimed to better characterize this phenomenon following systemic dosing in rodents. We dosed C57BL/6J mice (n=106) with AAV9 or AAV.CAP-Mac (5E13 genome copies/kg) IV. Animals were dosed once at P1, P9, P16, or P25 and sacrificed after 14 days. We hypothesized that the amount of vector and efficiency of transduction in the CNS would be highest in animals dosed at P1 and would decrease as age-at-dosing increased. Immunohistochemistry showed the greatest transduction of neurons and astrocytes in the brain of mice dosed at P9, supported by vector genome quantification, with both capsids. Following this peak, transduction of the brain decreased with increasing age of administration. Conversely, transduction of the liver (a potential site of AAV toxicity) by both capsids was lowest when dosed at P9. Superior BBB-crossing properties for AAV.CAP-Mac compared to AAV9 were not observed at any age. AAV.CAP-Mac demonstrated less neuronal and more endothelial transduction compared to AAV9, particularly at P16 and P25 dosing. Transduction of thoracic dorsal root ganglia was also lower by AAV.CAP-Mac compared to AAV9. Overall, our results demonstrate that CNS transduction via IV dosing of AAV9 and AAV.CAP-Mac is highest in young B6 mice when performed at P9. Because P9 in mice better correlates to the brain development of a newborn human than does P1, groups studying neonatal gene therapy with AAV9 via the IV route in mice to target CNS should consider dosing at P9 rather than P0-1. This would also allow for baseline assays and genotyping to be performed prior to dosing, more efficient injection technique and anesthesia, and less disruption of neonatal mice immediately following birth.

PS99 Histocompatibility as a Function of Inbreeding in Miniature Swine
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Pigs are potential organ donors for humans. Our laboratory is developing highly inbred lines of miniature swine to obtain animals that can provide donor organs to recipients of preparative regimens in which cells or thymi from other, histocompatible animals with different genetic modifications may be used to induce transplantation tolerance. The aim of the present study was to test the survival of split thickness skin grafts (STSG), exchanged without immunosuppression, between pigs from a subline bred to a coefficient of inbreeding (COI) of 92%, acceptance of which would represent a very stringent test for histocompatibility. Two 5-month-old pigs (one male 28 kg, one female 27 kg), each received one STSG from self and one from the other animal. Grafts were inspected daily for evidence of rejection from day 3 until day 28. The day of rejection was defined as the post-operative day on which less than 10% of the skin appeared viable, as judged by color, texture, and warmth to touch. For both pigs, the self-graft showed a normal appearance (pink, warm and soft) throughout the study. For the male pig, the allograft demonstrated hyperemia on day 9 but remained warm and soft to touch. The hyperemia resolved spontaneously by day 15, and the graft showed normal appearance (pink, warm and soft) throughout the study. For the female pig, the allograft demonstrated more severe hyperemia starting on day 9 and continuing until day 21, at which point it darkened to purple, progressing to full rejection by day 25. Swine leukocyte antigen-matched swine from our herds that are not further inbred to a coefficient of inbreeding (COI) of 60% reject skin grafts in less than 10 days, indicating that the survivals of both allografts were markedly prolonged. Since skin grafts are among the most difficult tissues for which to prolong survival, it is likely that organ transplants between these animals would be accepted indefinitely, as we have previously demonstrated for another highly inbred subline of our swine. In addition, this study revealed a sex-dependent difference in
the histocompatibility of skin grafts, likely due to male-specific, Y-chromosome encoded antigens, analogous to the H-Y antigens, defined previously in mice and humans. This finding demonstrates the importance of including both sexes in animal research.

**PS100 Comparing Different Strategies to Reduce Hepatocellular Damage in Obese Common Marmosets**

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Obesity is a common problem in captive common marmoset colonies (*Callithrix jaccus*), with institutions reporting up to 40% prevalence. Obesity can lead to hepatocellular damage secondary to hepatic steatosis and hepatitis. Reducing caloric intake is a common treatment strategy; however, it is unknown whether weight loss also corrects hepatocellular damage. In other species, hepatic damage is often treated with a combination of S-Adeosylmethionine (SAMe) and milk thistle extract, which supports liver function and repair. No published studies investigate using SAMe and milk thistle extract in marmosets. We hypothesized that pharmaceutical therapy (SAMe + milk thistle extract, or SMT) and caloric restriction, both alone and combined, would reverse hepatocellular damage in obese marmosets, with combination therapy reducing enzyme levels more quickly. Fifteen animals (nine males, six females) were randomized into three groups: 1) 12.5% daily caloric restriction (reduction from 45g to 40g feed daily), 2) 10mg/kg SMT PO SID, or 3) 12.5% daily caloric restriction and SMT. Subjects were adults with body conditions greater than 5 out of 5 and with elevated serum levels of the hepatocellular leakage enzyme alanine transaminase (ALT). Monthly bloodwork and weights were collected for 3 months of treatment and for 3 months after removal of pharmaceutical treatment. Across all groups, there was a significant effect of treatment over time on ALT (p=0.036). Evaluating each treatment alone, ALT was significantly decreased at 6 months compared to baseline in the SMT group (p=0.045). Combination therapy did not result in a faster reduction in liver enzymes. Liver biopsies were also collected from one animal in each group at baseline, 3-, and 6-months. All liver biopsies revealed glycogen hepatopathy, which remained consistent throughout the study except for the combination treatment animal who showed a marked reduction in glycogen deposition after 3 months of treatment. The results of this study support the use of both caloric restriction and SMT therapy in obese marmosets for reducing hepatocellular damage. Although all treatments are effective at reducing enzyme levels, the combination of caloric restriction and SMT may be necessary to reverse glycogen deposition in the liver.

**PS101 Effects of LED Lighting on Fecundity in C57BL/6 Mice**

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Light emitting diode (LED) lighting is a new energy-efficient technology that is quickly replacing standard fluorescent lighting in animal research facilities as vivaria upgrade or are newly constructed. The impact of LED lighting on the health and welfare of research animals has not been thoroughly investigated. The goal of this study was to compare the effects of LED and fluorescent lighting on fecundity of C57BL/6 mice, paired at 6-8 weeks old, over a six-month period under four conditions: standard fluorescent (10 pairs), low intensity (~half normal intensity) LED with instantaneous light-dark phase transitions (8 pairs), normal intensity LED with instantaneous light-dark phase transitions (9 pairs), and LED with gradual light-dark phase transitions (9 pairs). We hypothesized that there would be no difference in fecundity between these lighting conditions. All breeding pairs under all lighting conditions successfully mated and became pregnant during the study period. The production of the breeding pairs was not significantly affected by type of lighting or intensity as there were no significant differences between treatments in litter numbers (average 4.6±1.4 litters per dam), or litter size at birth or weaning (average 7.3±1.7 pups per litter). While pup weights at parturition were nearly identical across treatments averaging 14.0±0.04 g/pup, there was a significant effect seen with lighting treatment on weaning weight with the fluorescent control group having the smallest weanlings averaging 9.5±0.6 g. A higher than anticipated frequency of dystocia occurred during the study with significantly greater frequency in the normal intensity instantaneous and gradual phase transition LED treatments. The increased frequency of dystocia correlated with an overall significantly decreased survival of pups to weaning in the gradual phase transition LED treatment. For all treatments, only 6% of dystocias occurred in primiparous females, while 83% of dystocias occurred in multiparous females where the interval between litters was less than or equal to 25 days. The significant differences in weaning weight, dystocia and pup survivability between lighting conditions warrant further investigation as vivaria change to almost exclusive LED lighting.

**PS102 A Comparison of Fluorescent Versus LED Lighting on Reproductive Success in Laboratory Zebra Finches (Taeniopygia guttata)**

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The zebra finch (*Taeniopygia guttata*) is an important animal model for biomedical research, especially in the field of neurobiology (e.g., auditory learning). However, limited evidence-based husbandry recommendations exist for laboratory zebra finches, including appropriate light sources. While fluorescent lighting is commonly used for captive avian species, it may negatively affect aspects of physiology and behavior. Light-emitting diode (LED) technology has been shown to be superior to fluorescent lighting for some laboratory animal species, such as mice and rats, but a study assessing the impact of LED lighting on zebra finches has not been published. We compared the effects of “daylight” spectrum fluorescent and LED lighting on the reproductive success of indoor-housed research zebra finches. We hypothesized that use of LED lighting would maintain or improve zebra finch fecundity compared to fluorescent lighting, demonstrated by improved hatching rates and hatching survival. Over 26 weeks, 54 male-female pairs housed in breeding cages under either fluorescent or LED lighting were monitored twice weekly for an average of 37 consecutive days. The number of days to produce the first egg of the clutch, maximum clutch size, percent hatching rate (eggs hatched per maximum clutch size), and percent hatching survival to 11-days-post-hatch (11-dph nestlings per maximum clutch size) were recorded. Five pairs were excluded due to aggression or infertility. Results (n = 23-26 pairs per light source) showed no statistically significant difference in the timing of the first egg produced, clutch size, or percent hatching rate, but percent hatching survival was higher in the LED group (mean 97.8% vs 88.5%; Mann-Whitney U test, p = 0.049). These results support our hypothesis, and additional studies are being performed with more breeding pairs.
to confirm our findings. Based on our results, we will provide evidence-based lighting recommendations, which will include specific photometric values, for zebra finches used in biomedical research.

PS103 Effect of Tunnel Handling to Reduce Fighting in Aggressive Male Mice
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Fighting in laboratory mice has long been a discouraging issue for animal research personnel. Separation of animals is often employed to resolve fighting, but increased cages and per diem rates can be frustrating for researchers. Tunnel handling has been shown to reduce anxiety when compared to tail handling in mice. Mice of a particular strain housed at our institution display aggressive behavior; we explored whether tunnel handling could reduce fighting incidence. Male APP+PS1 mice (n=81) were weaned at 4 weeks of age into 27 cages with 2 to 5 mice per cage. 14 cages contained a PVC tunnel, and 13 cages did not have a tunnel. All cages contained standard nesting enrichment including one shredded paper “puck” and one cotton square. Mice were monitored for 14 weeks and active fighting or fighting wounds observed by husbandry staff were reported to veterinary staff. Mice in cages without tunnels were handled by the tail base. Five of thirteen cages without tunnels were reported for fighting; two cages had one instance of fighting and three had multiple reports despite separation of aggressor animals. Seven of fourteen cages with tunnels were reported for fighting, three with one report and four with multiple reports. The proportion of cages in the tunnel and no tunnel groups with no fighting reports at days 30, 60, 90, and 95 (final study day) were compared with no significant differences between the groups (all p>0.3). Similarly, the proportions of cages with multiple reports of fighting at the same time points were compared between the groups with no significant differences found (all p>0.3). Tunnel handling did not have an apparent benefit for reducing aggression in APP+PS1 male mice.

PS104 Treatment of Ulcerative Dermatitis Restores Immune Cells to Homeostatic Levels in Mice
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Ulcerative dermatitis (UD) is characterized by epidermal pruritic lesions of the upper body, enlarged spleens, and an inflammatory immune response affecting the widely used C57BL/6 (B6) mouse strain and mice on a B6 background. The underlying cause of UD is still not fully understood, although it has been shown that a high fat western diet potentiates the disease. Several studies have investigated palliative, but not curative, treatment for UD, but it is not known if mice treated for UD are immunologically like mice without UD. To determine the immunological profiles of UD mice treated versus untreated, we fed 120 B6 males and 120 B6 females high fat western diet (HFD) to induce UD. Symptoms of UD started developing around 16-20 weeks after the start of HFD. None of the 120 males developed UD, 16 of the females did develop UD. Once diagnosed with UD they were assigned into 3 groups: no treatment (4 females), toenail trimming (4 females), or topical application of triple antibiotic ointment containing bacitracin zinc, neomycin sulfate, and polymyxin B sulfate (4 females). Toenail trimming was done once a week and mice completely healed between 8-12 weeks. Topical triple antibiotic ointment was applied to lesions once daily for 8-12 weeks, but they never fully healed. Once fully healed (toenail trimmed) they were euthanized along with a control and a mouse with UD, and blood, lymph nodes, and spleen were harvested for multicolor flow cytometry analysis of immune cell composition and their activation status. After analysis we found that B6 mice with UD have altered systemic frequencies of neutrophils, monocytes, B cells, CD4+ T and CD8 T cells in Blood, lymph nodes, and spleen compared to unaffected controls. For the treated mice, toenail trimmed mice fully recovered from UD and their immune cell profiles were like mice with no UD. Topical triple antibiotic ointment mice never fully recovered, and their immune cell profiles had altered systemic frequencies. In summary, we found that mice treated with toenail trimming once weekly is a method to control UD, whereas topical antibiotic ointment was not. Once mice are completely healed, they have no significant difference in immune cell composition and activation status to that of a control mouse.
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