

THE Enrichment RECORD

Volume 2, JANUARY 2010

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WE'D LOVE TO HEAR FROM YOU!

We welcome your comments, observations and contributions to *The Enrichment Record*. Contributors include lab animal veterinarians, principal investigators, animal care staff, animal behaviorists, animal technologists and other members of the bioscience community who promote the 4 Rs: reduction, replacement, refinement and respect.

Share your story ideas with Rhoda Weiner, Editor at rmbw1@verizon.net. Guidelines for authors can be accessed at www.gr8tt.com/enrichrecord.html.

Please give credit where credit is due.

Outstanding animal care is truly a team effort, and we ask you to credit colleagues, published reports, articles, and other reference materials that have contributed to your enrichment article. Great ideas don't happen in a vacuum, and we encourage you to list all sources of inspiration.

The Enrichment Record is not a peer-reviewed journal. However, the Editorial Board of this E-Zine is composed of dedicated volunteers who have extensive experience and expertise in the care of laboratory animals. Members of the Board are involved with all aspects of this publication.

The Enrichment Record is published in October, January, April and July. If you are interested in advertising in *The Enrichment Record*, please visit: <http://www.gr8tt.com/docs/adrates.pdf>

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Jayne Mackta, President & CEO

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WHAT'S IN YOUR HEAD?



Animal photos courtesy of Bio-Serv

To facilitate informed discussion about environmental enrichment, we have joined the LinkedIn Group called Laboratory Animal Sciences.

This group allows members of the laboratory animal science community and our readers to interact over a web-based platform to compare ideas and methods. To participate, you will need to create a LinkedIn account and then join the Laboratory Animal Science Group.

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In Other Words



**A QUARTERLY E-ZINE/FORUM FOR:
Discussing environmental enrichment
in the optimal care of laboratory
animals**

**Documenting best practices and
approaches for addressing challenges
of implementation & assessment at
every level**

**Sharing data on the impact of
environmental enrichment on the
science**

**Building the case for integrating
enrichment into research design**

Welcome back to the second issue of "The Enrichment Record."

Over the holiday break, we spent considerable time reflecting on the mission of this E-Zine, which is to serve as a forum where the animal research community can engage in informed discussion regarding the value of environmental enrichment.

Our not-secret agenda is to promote consideration of environment enrichment by scientists as a fundamental component of their research design. As with all so-called "alternatives," enrichment should be given serious consideration early in the experimental design process. In other words, such consideration should not be an after-thought made necessary when submitting a protocol for approval.

However, the inclusion of a question about EE on the protocol form can be viewed as a strategy for advancing this important aspect of animal welfare. Daniel Harvey, Training Team Leader at UBC's Centre for Disease Modeling, featured in "Enriching Profiles" (p. 18), shared the language used on his institution's form:

*"Please provide details on environmental enrichment for the animals. If enrichment is not being provided, provide justification. If enrichment is not applicable for your study (e.g., field studies), please type Not Applicable as **this is a required field**."*

This example from Canada prompted us to begin searching the Net for others, and before we succumbed to Search Overload, we found the following on Duke's protocol form under **Special Concerns for Animal Use**:

D1. EXEMPTION FROM ENVIRONMENTAL ENRICHMENT

*Are there experimental or scientific reasons why any animal on this protocol should be exempted from routine environmental enrichment procedures (e.g., social housing and/or novel cage objects)?
NOTE: An approved environmental enrichment exemption must be requested and reapproved by the IACUC on an annual basis.*

- No. Routine environmental enrichment should be provided.
- Yes. The exemption request is detailed and justified Section U.

Although the wording differs, both forms assume the investigator will provide environmental enrichment. UBC's IACUC requires a detailed description. While there is no university policy to back up the enrichment question on the protocol, investigators are expected to conduct research that complies with Canadian Council on Animal Care Guidelines and Policies and with the Russell-Burch Three Rs' tenet of "reduction, replacement and refinement."

Duke assumes that species-appropriate EE procedures are known and will be followed as a matter of routine. Further searching of the Duke site uncovered an 18-page policy for non-human primates and a six-page policy for enrichment for other species.

On paper, such attention to enrichment is promising. One must ask what's actually being done in the lab? How is the implementation of EE guidelines and policies monitored? How much attention is paid to the effect of EE on the animals' welfare?

We don't have the answers, but we believe these interesting questions merit consideration. So, to stimulate discussion, we have developed a simple survey to facilitate data collection. Please take a few minutes to complete the survey below and help us to collect protocol questions on enrichment as well as copies of EE policies.

[CLICK HERE TO PARTICIPATE IN THE SURVEY.](#)

And if we have sparked your interest, let us know. Your thoughts are most welcome. Make your comments on the survey form or join the discussion as a member of the Laboratory Animal Sciences Group. [CLICK HERE](#)



Jayne Mackta, Publisher
President & CEO, Global Research Education & Training, LLC (GR8)



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An Interview With **Alla Katsnelson**

By Karen Froberg-Fejko, VMD

How to Jumpstart The Discussion about Environmental Enrichment

"While most facilities nowadays are embracing enrichment practices for rodents, the consensus for what constitutes good practice, or even what constitutes enrichment at all, has remained elusive."

Alla Katsnelson, "Lab Toys"

We recommend that readers pay attention to the article entitled "Lab Toys: How does cage enrichment affect rodents?" that appeared in the October 2009 issue of *The Scientist*. From the use of the word "toys" in the title to the call for a "major database that combines both published data and anecdotal observations, and tracks all the factors in one place," this well-written and balanced piece provides a great deal of food for thought. In fact, two of our writers, Karen Froberg-Fejko and Scott Lett, use the article as a basis for their own contributions to this issue of *The Enrichment Record*.

So if you want to go to the primary source and then join the discussion we hope will result, click here and find out what people are talking about.

<http://www.the-scientist.com/2009/10/1/30/1/>

I had the great pleasure to briefly interview Alla Katsnelson, the author of the article "Lab Toys—How does cage enrichment affect rodents?" which was published in *The Scientist* in the October 2009 issue. The article was a pragmatic, multifaceted review of environmental enrichment practices for rodents and a discussion of the issues in employing enrichment practices to this species.

I was curious how she became interested in the topic and she told me her editor sent her to the Environmental Enrichment Symposium in Boston sponsored by Merck last April. That experience prompted her to write the article.

I asked Alla if she was familiar with the term "environmental enrichment" prior to attending the meeting. She told me that she had utilized enrichment methods for purposes very different from those of laboratory animal professionals. Alla was trained as a neuroscientist at the Blakemore Lab at Oxford University. Dr. Blakemore is a well-noted British neurobiologist specializing in vision and the development of the brain. Neuroscientists employ the use of enrichment devices or "toys" in experimental paradigms as a tool to observe or create an effect. Alternatively, lab animal caregivers utilize environmental enrichment to create a "normal," less monotonous environment with the ultimate goal of reducing stress. Their use of environmental enrichment is more random.

As Alla reviewed, the effects of environmental enrichment upon rodents has historically been empirical, but now the lab-animal community is actively discussing this topic and more studies are being conducted. Though the data is not coming fast enough, there are many research institutions embracing environmental enrichment for rodents because it is a step in the right direction. As Alla eloquently quoted Dr. Joe Garner, regarding the argument that enrichment could impose research variables, "Variability exists (referring to monthly fire alarms, noise levels, changes in animal-care-staff), so let's embrace it."

Alla's article provides an overview of what research has been conducted and what can be validated in the future. It will be our responsibility to stay close to ongoing research and support more studies. Environmental enrichment is good animal welfare, and we must always strive for the curious balance of good data collection conducted in the least stressful environment. <http://www.the-scientist.com/2009/10/1/30/1/>

WHAT DO YOU THINK?

"Variability exists so let's embrace it."—Joe Garner
Join the discussion as a member of the
Laboratory Animal Sciences Group.

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Type of Enrichment	Finding	Strain	Reference
Several cardboard, paper, or plastic objects, changed every 2 days	In a Huntington's Disease transgenic mouse model, enriched mice showed delayed onset of motor disorders and no loss of cerebral volume.	Transgenic HD mice on a CBA backgr	Nature 404: 721-22, 2000
Larger cage, running wheel, shelter, 4-5 toys changed weekly	Mice addicted to cocaine ceased to display addiction-related behaviors and showed decreased activity in brain areas associated with addiction after 30 days in an enriched environment.	C57/BL6 ound strain	PNAS 105: 16829-30, 2008
Double cage size, nesting material, shelter, cardboard tubes, chew blocks, running wheel	Mice in enriched environments with free access to anxiolytics took less meds than those in standard cages.	C57BL/6J	Lab Anim 40: 392-99, 2006
Larger cages, ladders, tunnels, running wheels, changed weekly	Experimental immunotherapy for B-cell lymphoma decreased tumor size and spurred higher antibody counts in mice housed in enriched cages.	C3H/eB	J Immunother 30: 517-22, 2007
Nesting material, PVC tube, exercise wheel, two nylon rings	Male mouse pups born into enriched cages had higher anxiety, but weighed more and survived better than those in standard cages	C57BL/6 Tac	Lab Anim 38: 24-34, 2009
Shelter, two tissues and paper strips for nesting material, PVC tube, chew sticks	Enriched mice showed increased acute stress response (upon handling), but lower response to chronic stress (measured via long-term cortisol levels).	C57BL/6J	Lab Anim 41: 161-73, 2007
Different types of nesting materials and shelters	In an aggressive mouse strain, nesting material boosted fighting; adding shelters to the cage prevented fighting.	NIH/s	Comp Med 56: 202-8, 2006
Interconnected cages containing either cardboard shelter or plastic shelter	Mice spent more time in the cage with the cardboard shelter.	BALB/cANCrIBr, C3H/HeNHsd, C57BL/6Jlc	Lab Anim 39: 58-67, 2005
Running wheels placed into cages containing 4-5 mice	The wheel increased aggression in group-housed male mice, but decreased the frequency of abnormal stereotypic behaviors.	CD-1	Applied Anim Behav Sci 115: 90-103, 2008
Cages smaller and larger than normal (which in the US is 96.8 cm ² of floor space per 25-g mouse), varying types of enrichment	Female mice of three strains showed less aggression and fewer stereotypic behaviors in enriched environments, but not in larger cages, suggesting cage complexity is more important than size.	C57BL/6NCrl, BALB/cAnNCrl and Crl:CD1	JALAS 46:93, 2007 (Abstract PS40)
Communal nest (in which three female mice jointly care for their litters)	Communally reared mice showed more social interaction and higher levels of growth factors in the brain in adulthood.	CD-1	Biol Psychiatry 60:690-96, 2006

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Measuring the Impact of Animal Enrichment on Research Results

In my previous article, I indicated my interest in measurement and data in my work, helping researchers get better results, as well as my personal interest in animal enrichment. The natural way to put these two passions together is to write about how people are measuring the impact of animal enrichment on research results. Fortunately, a recent article, "Lab Toys: How does cage enrichment affect rodents?" by Alla Katsnelson (*The Scientist*, Volume 23, Issue 10), gives an excellent review of the state of the art and introduced me to the work of Joseph Garner.

Katsnelson points out that there are two big challenges to overcome if one wishes to enrich the environments of animals used in research projects. The first challenge concerns the animal; it is not clearly known what constitutes a better environment for each species. The second challenge concerns the researcher; it is not widely known how enrichment will affect research results. Some researchers, she reports, fear that added variability of results due to changing animal environments will adversely affect their research.

Joseph Garner, professor of animal behavior and well-being at Purdue University, has published research addressing both questions, but we'll first look at the question from the animal's point of view. In an article published last year (*Applied Animal Behaviour Science*, Volume 116, Issues 2-4, 31 January 2009, Pages 279-285) Garner and collaborators studied the temperature preference of mice. They provided an environment in

which the mice could choose to occupy cages of different temperature, 20°C, 25°C and 30°C. They periodically noted where the mice were located and statistically analyzed the results. They concluded that the mice prefer temperatures higher than the standard laboratory conditions (20-24°C), but that no single temperature is ideal for all mice.

In other work (*Journal of the American Association for Laboratory Animal Science*, Vol 47, No 6, November 2008, Pages 25-31), Dr. Garner and collaborators studied whether nest-building helps mice control their own environmental temperature. They concluded that mice alter the construction of nests in response to temperature changes, allowing them some control over their environmental temperature. Apparently, providing the mice with means to control their environment can be more effective than over-controlling the environment externally.

The second challenge is just as important as the first. Assuming we can enrich the environments of laboratory animals in a verifiably beneficial way, what impact will it have on research results? In a review article, "Environmental enrichment of laboratory animals used in regulatory toxicology studies," S. W. Dean, looking at the question of animal enrichment in the context of toxicology studies, points out that the validity of the scientific conclusions cannot be jeopardized by the enrichment practice (*Laboratory Animals* (1999) 33, 309-327). This is especially interesting in light of



Garner's results; if animals are allowed to control aspects of their environment, then the environments are inherently more complex and heterogeneous than the standard barren mouse cage. Will this heterogeneity add intolerable variability to the research results? Because there was little data to support any such conclusions, Hanno Würbel and collaborators studied this question (*Nature* 432, 821-822, 2004). Looking at the effect of conditions, enriched and non-enriched, on 20 different behavioral endpoints, they found that environmental enrichment contributed to neither increased variability of results nor conflicting data in replicate studies. Würbel and Garner (NC3Rs #9, Jan 2007), reporting on this and other results, suggest the reverse, that over-standardizing the environment may generate endpoints that have poor external validity because they may be more a function of the abnormal conditions than the experimental treatments. They suggest that it is better to introduce variability in the conditions to find signals that persist over a range of conditions, arriving at more robust conclusions.

As a lay-person, my take-away message is that the world is heterogeneous and we are all 'wild-type'. As a mathematically-oriented scientist, my experience tells me that controlling the environment makes the result more reproducible and easier to analyze, but the better, more relevant results can come from greater variability and better analytical methods that help us understand the variability and see the underlying results more clearly.

The final message is again from Katsnelson's article; as empirical evidence is gathered, the support in the research community for animal enrichment is increasing, but as she puts it, "The data, it seems, are not coming fast enough." My take on this message is that the research community is gathering enough data from laboratory animals under a variety of environmental conditions, but we are not recording and/or sharing enough information about the animal treatment part of the experimental protocols to use this data to help us learn what constitutes optimal conditions for animals and the research they support.

WHAT DO YOU THINK?

Readers are encouraged to comment on the author's take-away message.

[CLICK HERE](#)

There's an old saying that "You can't dance at two weddings at once."

You also can't attend all the meetings and conferences taking place that offer the latest information in the field of laboratory animal science. **Meeting Up** will provide summaries of panels, workshops and symposia covering topics relevant to Environmental Enrichment. If you want more information about any of the presentations described or want to contact the presenters, let us know and we will be happy to connect you: info@TheEnrichmentRecord.com

"SOCIAL HOUSING AND ENVIRONMENTAL ENRICHMENT IN PRECLINICAL TOXICOLOGY STUDIES: WHAT CAN YOU DO WITHIN THE GLPs AND WHAT REALLY WORKS?"

AALAS GLP Seminar Update

November 10, 2009—Denver, CO

Kathleen L. Smiler, DVM, DACLAM, Seminar Organizer

The highly-regulated nature of GLP studies often leaves sponsors, study directors, and their management hesitant to adopt new methods and procedures. Concerns about influencing study variability, exposure to contaminants from enrichment items, and perceived inability to compare results to historical data have caused some toxicology facilities to hesitate to adopt social housing and enrichment techniques. The annual seminar addressing issues relevant to toxicology presented at the national AALAS meeting this year focused on social housing in GLP studies for dogs, nonhuman primates, and rats. Presenters reviewed options for social housing and enrichment that are appropriate to GLP-regulated environments and can improve animal welfare without negatively impacting study design. They also discussed various aspects that must be addressed when initiating and requiring social housing and enrichment as a default in all facility protocols.

Dr. Todd Jackson (Bristol-Myers Squibb) discussed housing requirements specified by the Guide, and how these practices are adopted in GLP facilities for studies utilizing dogs and nonhuman primates. He provided examples of how programmatic "musts" can be used successfully in GLP studies, including 2 or more animals

per cage, frequent use of kennel runs instead of cages for dogs, frequent opportunities for exercise and play with caretakers, use of fresh fruits, vegetables and certified treats for enrichment, and the importance of toys and activities for nonhuman primates. He offered several scenarios illustrating how activities can be scheduled to accommodate almost continuous group housing of study animals and roadblocks to introduction of these procedures in regulated studies can be overcome.

Dr. Donna Clemons (Covance Laboratories) focused on "Resolving Data Collection Concerns with Social Housing" and considered the clinical observations, food consumption, and body weight parameters that may be specifically impacted by social housing. She reviewed situations influencing the number of data points, including whether observations are for a single entity (group) or individual animal. She concluded that despite widespread fear, there have been few actual issues concerning the validity of data/studies with social housing, which supports a growing opinion that benefits in animal health and normal physiology offset the possible loss of some individual data.

Dr. Christina Winnicker (Charles River) discussed the benefits of using acclimatization and operant conditioning as important refinements utilized during training of study animals. She discussed the cost-benefit advantages that include improved animal welfare, animal safety, and efficiencies gained in speed, accuracy, and reliability of dosing and handling procedures. She presented preliminary survey results that indicated treats are frequently used to establish a trust relationship by the animal with

caretakers and to reward cooperative behavior by the animals to accept study procedures. She stressed that careful observation of behavior can frequently be the most sensitive and early indicator of adverse effects occurring in study animals. She concluded that planning ahead, patience and positive reinforcement training are significant elements in an animal welfare program.

Dr. Alex Wakefield (Covance Laboratories) presented a case study in which a contract research organization required pair or group housing on all rat studies conducted at the facility. He discussed the issues and challenges raised first by the pharmaceutical company sponsor and then the CRO management when it became known that the CRO's IACUC had initiated this animal enrichment requirement. Given less understanding of the social needs of lower order species and other concerns with rodent studies such as how data on food consumption is analyzed, the change raised many questions. Concerns included GLP compliance issues such as randomization, outcomes when animals lose cage mates, and the influence on hormonal data that may be impacted by dominance hierarchies. Benefits included improved CNS development and survival of socially housed animals. Many scientific questions may remain, but future studies will utilize social housing and solid bottom caging.

Dr. Mack Holt, representing the FDA, spoke on the impact of animal welfare refinements on the validity of GLP studies. He reviewed the importance of GLP regulation of nonclinical laboratory studies to determine the safety of prospective test articles, emphasizing meticulous attention to quality and review of all influences on data points. Dr. Holt also discussed the FDA Turbo EIR Data Base of noncompliant citations and reviewed items related to enrichment and/or social housing. He reminded the audience that FDA has a role to play in dispelling misperceptions concerning safety data generated from socially housed and enriched test systems.

Program Topics Welcome

Dr. Kathleen Smiler, the seminar organizer, invites *Enrichment Record* readers to suggest topics for future GLP seminars at AALAS. She also encourages you to promote programs at toxicology meetings that include animal welfare trends. Quality presentations and thoughtful discussions like those described in this publication can help to allay fears and accelerate acceptance of enrichment practices that can advance science and animal welfare.

Survey for Industry Veterinarians

Dr. Smiler has also announced that a survey developed by the seminar speakers and Dr. Kathleen Murray of Charles River will be resent to veterinarians working in industry

early in 2010. The survey focuses on the current use of social housing and enrichment items in studies subsequently submitted to FDA in support of pharmaceutical drug safety. Questions cover a wide range of husbandry and management practices that enhance animal welfare but may introduce variables into data reported by the study. We encourage industry veterinarians to participate in this important effort. It's all about the data!

SWIMMING WITH THE TIDE **Joint International Educational Symposium** **on Animal Welfare**

November 2009—Michigan State University
American Veterinary Medical Association (AVMA), American Association for Veterinary Medical Colleges (AAVMC), Co-Sponsors By Sarah Hoekwater BS, RLATG Research Associate II, Large Animal Toxicology—Primates, MPI Research

In mid-November, I had the privilege of attending the Joint International Educational Symposium on Animal Welfare, organized by the American Veterinary Medical Association (AVMA) and the American Association for Veterinary Medical Colleges (AAVMC). It took place on the campus of Michigan State University. The theme of the entire conference was "Swimming with the Tide." Maybe the organizers were trying for irony with that title, as it seemed that every lecturer encouraged attendees to push boundaries and break new ground in the science of animal welfare.

There were participants from all around the world including the United States, Chile, Australia, New Zealand, France, the United Kingdom and Canada. Many participants took time to speak on the state of animal welfare education and legislation in each of their prospective countries. It would be difficult to list every topic that was discussed. I will touch on only a couple that seemed particularly relevant to those in laboratory animal science and enrichment.

Typically when learning about animal welfare, we are all introduced to "The Five Freedoms."¹ Indeed they were discussed at this symposium as well. However, another paradigm of measuring animal welfare status in terms of three spheres, the Mind, the Body and the Natural, was presented as well. In this paradigm, "Mind" referred to the mental state of an animal; "Body" referred to biological aspects that are measured (e.g. corticosteroid levels, body condition scoring). "Nature" or natural referred to the ability of animals to exhibit movements and behaviors one would normally observe in a natural setting.²

Although I had always been aware of these different aspects of animal welfare implicitly, it seemed helpful to divide and define each of them explicitly. Using this way of thinking, one can assess which of these spheres is most predominant in his or her facility's animal care programs, decide the balance that is most desirable for the animal and the institution, and design programs based upon these figures.

Another underlying theme was that animal welfare is a field with a tremendous amount of room for growth. There are increasing numbers of educational courses and programs focusing on animal welfare being offered at the collegiate and graduate levels worldwide.^{3, 4} Animal welfare is an active and changing science. This makes me think of those of us in Laboratory Animal Science. As technicians, when room for improvement is seen in one of our laboratories, we are often afforded the unique opportunity of being able to take an idea from conception to implementation. Knowing how to think critically about and accurately assess animal welfare is the crucial key to making decisions that are good for technicians, animals and the scientific data.

For more information about the Joint International Educational Symposium on Animal Welfare please visit:
http://www.avma.org/press/releases/091110_complex_animal_welfare.asp
<http://www.fawc.org.uk/freedoms.htm>

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2. Siegfard JM, Bernardo TM, Malinowski RP, Laughlin K, Zanella AJ. 2005. Integrating animal welfare into veterinary education using an online, interactive course. *J Vet Med Educ* 32(4):497-504.
3. Siegfard JM, Zanella AJ, Bernardo T, Wickens CL, Laughlin K, Malinowski R. 2007. Leveraging expertise in animal welfare to create educational equity. *Animal Welfare* 16(2):241-244.
- 4 Siegfard JM, Zanella AJ, Bernardo T, Wickens CL, Laughlin K, Malinowski R. 2007. Leveraging expertise in animal welfare to create educational equity. *Animal Welfare* 16(2):241-244.

3RD ANNUAL INNOVATIVE ENVIRONMENTAL ENRICHMENT SYMPOSIUM

November 8, 2009, Denver, CO

Massachusetts General Hospital Center for Comparative Medicine,
Symposium Organizer

Jennifer N. Camacho, LVT, RLATg

Enrichment Program Manager, Center for Comparative Medicine,
Massachusetts General Hospital

The 3rd Annual Innovative Environmental Enrichment Symposium proved to be an energetic and intellectually rich event with dynamic speakers, exhibits featuring novel enrichment modalities and engaging discussion forums on specific topics. The event grows larger each year continuing to attract individuals interested in environmental enrichment, welfare, and behavior of laboratory animals—each of whom can walk away with a fresh perspective and a working plan for animal care refinements.

The symposium, offered without registration fees, is scheduled immediately before the National AALAS meeting to offset costs of travel and lodging and to encourage parallel attendance. The 4th annual symposium is already in the planning stages and will be held on Sunday, October 10, 2010 in Atlanta, GA. For more details, visit www.virtualvivarium.com and check upcoming events in the "About Us" tab.

Symposium Speakers

Marc Bekoff, a professor of ecology and evolutionary biology and an author of over 24 books and publications, presented his provocative views of animal rights and unique perspective of animal welfare combined with an appreciation for laboratory science.

Lisa Leon, a research physiologist, presented some of her research in thermoregulation and how she used this knowledge of physiology to determine an animal's preferred environment and to shape the environmental enrichment program. Dr. Leon's approach was a profound message to the audience: researchers can perform quality science while using simple measures in support of animal well-being.

Brenda McCowan, a professor and director of the behavioral management program for non-human primates, presented methods and recommendations of applying objective analysis of enrichment, housing and care practices to determine animal welfare. Dr. McCowan

shared amazing tools and information to guide quantitative analysis to ensure animal welfare.

Margaret Whittaker, a behavioral consultant with Active Environments, brought an interactive training approach with video tutorials and guidelines for incorporating conscious training techniques for animal handling and care.

Sylvie Cloutier, a research assistant professor and teacher of the human-animal bond, presented her research of the recently discovered "laughing" behavior of rats and "tickling" them. The audience was able to walk away with an exciting and novel approach towards care and enrichment of this species.

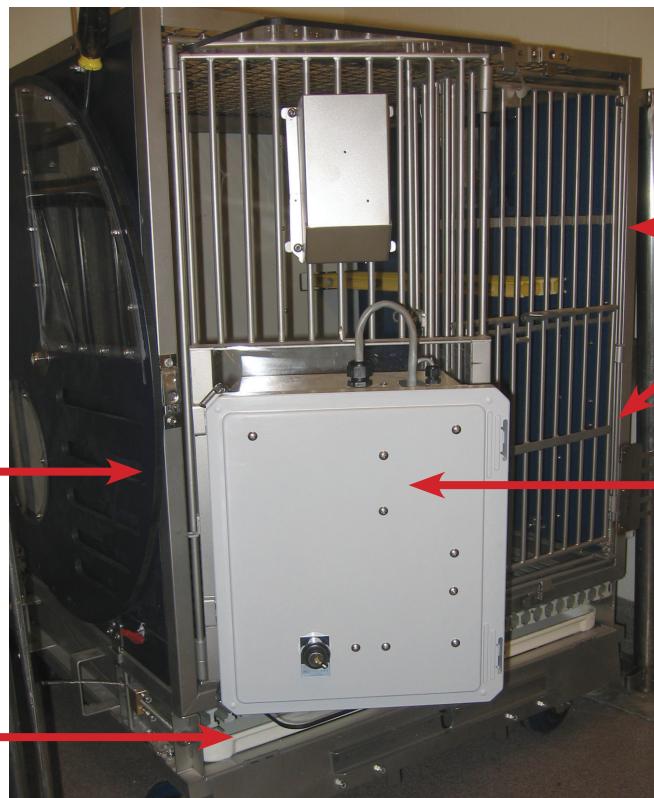
The symposium featured an exhibit area that offered handouts, book sales and highlights from innovative enrichment programs including:

- Animal Training, Enrichment and Behavioral Management Resources presented by Jaine Perlman, Yerkes National Primate Research Center
- Interactive NHP Enrichment Cage Display (Britz & Company), a collaborative effort by UCSF, MGH, Yerkes NRPC and Britz & Company presented by Autumn Sorrells, UCSF

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Collaborators:

Jennifer Camacho, Massachusetts General Hospital,
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Jaine Perlman, Yerkes National Primate Research Center
Autumn Sorrells, University of California, San Francisco
William Britz, Britz & Company

Symposium faculty led open session discussion forums on the following topics: *Innovation-Beyond the Basics, Non-Human Primates and Behavior Management, Rodent Enrichment and Breeding*. These forums allowed problem-solving and question & answer scenarios with professionals.

ACTIVATION OF ARYL HYDROCARBON RECEPTOR SIGNALING BY COTTON BALLS USED FOR ENVIRONMENTAL ENRICHMENT

Tischkau, Shelley A.1; Mukai, Motoko2
Journal of the American Association for Laboratory Animal Science, Volume 48, Number 4, July 2009, pp. 357-362(6)

Dioxins are nearly ubiquitous environmental contaminants that are produced as byproducts during industrial processes, including the bleaching of paper and textiles. Contamination of animal bedding material with dioxins has been a concern for both laboratory and farm animals. The objective of this study was to determine whether the presence of cotton balls, provided to mice for enrichment, caused induction of the cytochrome P450 1A1 gene (*Cyp1A1*), which typically is stimulated through activation of the aryl hydrocarbon receptor (AhR) by dioxins and dioxin-like compounds. *Cyp1A1* transcripts and protein in the liver were increased significantly by either exposure to cotton balls or treatment with a single dose of 2,3,7,8-tetrachlorodibenzo-para-dioxin. Unexposed controls displayed low levels of *Cyp1A1* transcript and undetectable levels of CYP1A1 protein. These results suggest that cotton balls are potentially contaminated with dioxins and/or dioxin-like compounds that act as potent inducers of *Cyp1a1* in laboratory animals if used as nesting material. This study underscores the necessity of considering dioxin content in products used for enrichment in animal facilities.

HOME IMPROVEMENT: C57BL/6J MICE GIVEN MORE NATURALISTIC NESTING MATERIALS BUILD BETTER NESTS

Sarah E Hess,* Stephanie Rohr, Brett D Dufour, Brianna N Gaskill, Edmond A Pajor, and Joseph P Garner
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Corresponding Author. Email: hesss@purdue.edu

Environmental enrichment of laboratory mice can improve the quality of research, but debate arises over the means of enrichment and its ability to be used in a



sterile environment. One important form of enrichment is nesting material. Mice in the wild build dome-shaped, complex, multilayered nests, but this behavior is not seen in the laboratory, perhaps due to inappropriate nesting material rather than the nest-building ability of the mice. Here we focus on the use of naturalistic nesting materials to test whether they improve nest quality through the use of a 'naturalistic nest score'

system; we also focus on materials that can be sterilized and easily used in existing housing systems. We first determined whether C57BL/6J mice build naturalistic nests when given shredded paper strips. We then compared these shredded paper strips with other commonly used nesting enrichments (facial tissues and compressed cotton squares). Nests were scored for 6 d. We found that the shredded paper strips allowed the mice to build higher quality nests than those built with any of the other materials. Nests built with tissues were of intermediate quality, and nests built with compressed cotton squares were of poor quality, similar to those built by the control group. These results suggest that C57BL/6J mice given appropriate nesting materials can build nests similar to those built by their wild counterparts.

Abbreviation: GLM, generalized linear model



ASSESSMENT OF THE USE OF TWO COMMERCIALLY AVAILABLE ENVIRONMENTAL ENRICHMENTS BY LABORATORY MICE BY PREFERENCE TESTING

Laboratory Animals (UK) 2005;39:58-67

Pascalle L.P. Van Loo, Harry J.M. Blom, Margot K. Meijer and Vera Baumans

Department of Laboratory Animal Science, Utrecht University, The Netherlands; Department of Laboratory Animal Science, Utrecht University, The Netherlands; Department of Laboratory Animal Science, Utrecht University, The Netherlands; Department of Laboratory Animal Science, Utrecht University, The Netherlands and Karolinska Institute, 17177 Stockholm, Sweden

In the field of biomedical research, the demand for standardization of environmental enrichment for laboratory animals is growing. For laboratory mice, a wide variety of environmental enrichment items are commercially available. Most of these comply with the demands for standardization, hygiene and ergonomics. Whether these items also comply with their actual purpose, to enhance the well-being of the mice, is often not assessed scientifically. In this study, we tested the preference of mice for two commercially available nest boxes differing in shape and material: the Shepherd Shack/DesRes (SS/DR) and the Tecniplast Mouse House (TMH), in a simple preference test. To indicate strength of preference, both nest boxes were also tested against a highly preferred nesting material. Preference for the most preferred nest box was investigated further. Our results indicated a strong preference by mice for the SS/DR, but not for the TMH. Furthermore, nesting material was almost always combined with the SS/DR, but not with the TMH. More elaborate testing of the SS/DR in an automated preference test system confirmed that mice spent significantly more time in a cage in which an SS/DR is provided. Differences between both nest boxes are discussed with regard to their attractiveness to mice. It is also argued that enrichment should primarily be developed in concordance with the animals' needs prior to the marketing of enrichment tools.

Key Words:

Mice
Preference
Welfare
Environmental Enrichment
Nest Box
Nesting Material

INFLUENCE OF ENVIRONMENTAL ENRICHMENT AND HANDLING ON THE ACUTE STRESS RESPONSE IN INDIVIDUALLY HOUSED MICE

M K Meijer, R Sommer, B M Spruijt, L F M van Zutphen and V Baumans

Laboratory Animals 41(2): 161-173;
doi:10.1258/002367707780378168

In this study we investigated the effect of environmental enrichment and handling on the acute physiological stress response caused by short periods of restraint in individually housed female mice. Heart rate (HR) and body temperature (BT) were measured by radiotelemetry and compared with plasma corticosterone (pCORT) levels. Also, postmortem thymus weight and tyrosine hydroxylase (TH) activity were assessed. The acute stress response was seen in both HR and BT. Enrichment and handling were found to increase rather than decrease this stress response, but pCORT values, measured 90 min after restraint, suggested a lower stress response in the enriched groups. No effect was found with thymus weight or TH as parameters.

Key Words:

Mice
Acute Stress
Individual Housing
Environmental Enrichment
Radiotelemetry



STEREOTYPES AND OTHER ABNORMAL REPETITIVE BEHAVIORS: POTENTIAL IMPACT ON VALIDITY, RELIABILITY, AND REPLICABILITY OF SCIENTIFIC OUTCOMES

Joseph P. Garner
ILAR J, 46:106-17, 2005

Normal behavior plays a key role in facilitating homeostasis, especially by allowing the animal to control and modify its environment. Captive environments may interfere with these behavioral responses, and the resulting stress may alter many physiological parameters. Abnormal behaviors indicate that an animal is unable to adjust behaviorally to the captive environment and, hence, may be expressing abnormal physiology. Therefore, captive environments may affect the following aspects of an experiment: validity, by introducing abnormal animals into experiments; reliability, by

increasing interindividual variation through the introduction of such individuals; and replicability, by altering the number and type of such individuals between laboratories. Thus, far from increasing variability, enrichment may actually improve validity, reliability, and replicability by reducing the number of abnormal animals introduced into experiments. In this article, the specific example of abnormal repetitive behaviors (ARBs) is explored. ARBs in captive animals appear to involve the same mechanisms as ARBs in human psychiatry, which reflect underlying abnormalities of brain function. ARBs are also correlated with a wide range of behavioral changes that affect experimental outcomes. Thus, ARBs in laboratory animals may compromise validity, reliability, and replicability, especially in behavioral experiments; and enrichments that prevent ARB may enhance validity, reliability, and replicability. Although many links in this argument have been tested experimentally, key issues still remain in the interpretation of these data. In particular, it is currently unclear (1) whether or not the differences in brain function seen in animals performing ARB are abnormal, (2) which common behavioral paradigms are affected by ARB, and (3) whether enrichment does indeed improve the quality of behavioral data. Ongoing and future work addressing these issues is outlined.

Key Words:

abnormal behavior
animal welfare
executive system
obsessive compulsive
perseveration
stereotypy

**SOME LIKE IT HOT: MOUSE TEMPERATURE PREFERENCES IN LABORATORY HOUSING**

Brianna N. Gaskilla, Stephanie A. Rohra, Edmond A. Pajora,

Jeffrey R. Lucasb and Joseph P. Garner,

Applied Anim Behav Sci , 116:279–85, 2009.

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In standard laboratory environments mice are housed at 20–24°C. However, their thermoneutral zone ranges between 26°C and 34°C. This challenge to homeostasis is by definition stressful, and could therefore affect many aspects of physiology and behavior. We tested the hypothesis that mice under standard laboratory conditions are not housed at a preferred temperature, and predicted that this would be evident in thermotaxis and other behavioral responses to ambient cage temperature. We assessed the temperature preferences of C57BL/6J mice in standard laboratory housing from 4 to 11 weeks of age. Forty-eight mice (24 male and 24 female in groups of three) all born on the same day were randomly assigned to one of

eight age treatments. One cage of males and one cage of females were tested each consecutive week. Mice were tested in a set of three connected cages with each cage's temperature set using a water bath. On days 1–3 each group of mice was acclimated to each of the three temperatures (20°C, 25°C, or 30°C) in a random order. Then each group was given free access to all temperatures on days 4–6, and video taped continuously. The location of each mouse and the occurrence of three behavioral categories (Active, Inactive, and Maintenance) were recorded by instantaneous scan samples every 10 min over the 3 days, and time budgets

calculated. While both sexes chose warmer temperatures overall ($P < 0.001$), they preferred warmer temperatures only for maintenance and inactive behavior ($P < 0.001$). This effect was most pronounced in females ($P = 0.017$). As temperature selection varied with time of day ($P < 0.001$), these behavioral differences cannot be due to ambient temperature dictating behavior. We conclude that C57BL/6J mice at 20–24°C are not housed at their preferred temperature for all behaviors or genders, and that it may not be possible to select a single preferred temperature for all mice.

Keywords:

Animal welfare
Thermoregulation
Stress
Temperature preference
Mice
Home cage

ENVIRONMENTAL MODIFICATION AND AGONISTIC BEHAVIOR IN NIH/S MALE MICE: NESTING MATERIAL ENHANCES FIGHTING BUT SHELTERS PREVENT IT

Kaliste, Eila K.; Mering, Satu M.; Huuskonen, Hannele K. Comparative Medicine, Volume 56, Number 3, June 2006 , pp. 202-208(7)

Outbred NIH/S male mice were housed from weaning in groups of 4 without enrichment (control) or with nesting material (nest), nesting material and a box (nest-and-box), or nesting material and a tube (nest-and-tube) as environmental modification. The aim of the study was to investigate effects of widely recommended nesting material and additional shelters on male mice. The aggressiveness of the mice in their home cages clearly increased in the nest group, as assessed by the number of wounds. In the nest group, fighting was a stressful situation for the mice, leading to changes in weight gain and in the weights of the thymus, adrenals, spleen, and epididymal



adipose tissue. Moreover, the agonistic behavior of these mice toward an intruder was increased both in individual tests (an intruder with the individual mouse) and group tests (an intruder with a group of mice). The provision of a box or tube as a shelter, in addition to nesting material, prevented intracage fighting and did not lead to alterations in the weight gain or organ weights of the mice. However, the agonistic behavior of mice with shelters was slightly increased in behavioral tests. Anxiety in the elevated plus-maze was not affected by any of the housing systems. In conclusion,

the agonistic behavior of NIH/S mice, an aggressive strain, seemed to be easily enhanced by these environmental modifications. The suitability of any enrichment should be carefully evaluated, especially when highly aggressive mice are used.

ENVIRONMENTAL ENRICHMENT AUGMENTS THE EFFICACY OF IDIOTYPE VACCINATION FOR B-CELL LYMPHOMA.

Benaroya-Milshtein N, Apter A, Yaniv I, Kukulansky T, Raz N, Haberman Y, Halpert H, Pick CG, Hollander N. *J Immunother.* 2007 Jul-Aug;30(5):517-22.
Department of Anatomy, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv 69978, Israel.

Environmental enrichment is known to positively influence the organism's psychologic and physiologic well-being. However, the effects of environmental enrichment on immune responses and cancer prognosis have not been clearly established and its impact on cancer therapy is unknown. Here, we report that environmental enrichment mediated a statistically significant improvement of the outcome of immunotherapy in an experimental model of B-cell lymphoma. When mice were immunized with an idiotype-vaccine, those maintained under enriched environmental conditions produced statistically significant higher levels of anti-idiotype antibodies and revealed more attenuated tumor growth than those housed in standard environments. Most strikingly,

enriched tumor-bearing mice had statistically significant prolonged survival, with 44% of them disease-free compared with 0% in the standard rearing tumor-bearing mice. The possible mechanisms for the enhancement of immunotherapy by environmental enrichment are cognitive, physical activity, and psychologic. The demonstration of synergistic effect of cancer therapy and environmental enrichment on tumor rejection has important implication for cancer treatment.

EFFECTS OF ENVIRONMENTAL ENRICHMENT ON MALES OF A DOCILE INBRED STRAIN OF MICE.

Marashi V, Barnekow A, Sachser N.

Physiol Behav, 82:765-76, 2004.

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Environmental enrichment is intended to improve the welfare of laboratory animals. However, regarding male mice, numerous studies indicate an increase in aggressive behavior due to cage structuring. On the one hand, this might be a problem concerning animal welfare. On the other hand, enrichment is thought to hamper environmental standardization and to increase variability of data. Furthermore, increasing fights, arousal, and/or injury in enriched housed animals might superimpose other (positive) environmental effects on behavior and physiology. Therefore, the present study investigated effects of environmental enrichment on behavioral, endocrinological, and immunological parameters in male mice of the docile inbred strain ABG. From weaning until day 77+/-3 of life, animals were kept in stable sibling groups of four under three different housing conditions:

(A) nonstructured Makrolon type III laboratory cages ("standard housing"=S); (B) equivalent laboratory cages that were enriched with a box and scaffolding ("enriched housing"=E); and (C) spacious terrariums that were structured richly ("super-enriched housing"=SE). No differences in agonistic behavior, levels of plasma corticosterone (CORT), and activities of adrenal tyrosine hydroxylase (TH) existed among S-, E-, and SE-housed ABG males. Play behavior and general activity increased



significantly with increasing enrichment. Concerning immunological parameters, males of both forms of enriched housing showed significantly lower percentages of CD4 and CD8 cells compared to S-housed mice. However, regarding the ratio of CD4/CD8 cells, IL-2, IL-4, IL-10, IFN-gamma, IgG1, and IgG2a, no significant housing-dependent differences were found. Enrichment did neither hamper standardization nor negatively influence the variability of physiological parameters. In summary, using a docile strain of mice revealed the positive effects of environmental enrichment also on male mice. The lack of adverse effects on behavior, physiology, standardization, and variability of data defuses these arguments against providing docile male mice with enrichment.

THE MOUSE COMMUNAL NEST: INVESTIGATING THE EPIGENETIC INFLUENCES OF THE EARLY SOCIAL ENVIRONMENT ON BRAIN AND BEHAVIOR DEVELOPMENT.

Branchi I.

Neurosci Biobehav Rev. 2009 Apr;33(4):551-9.

Epub 2008 Apr 4. Section of Behavioural Neurosciences,
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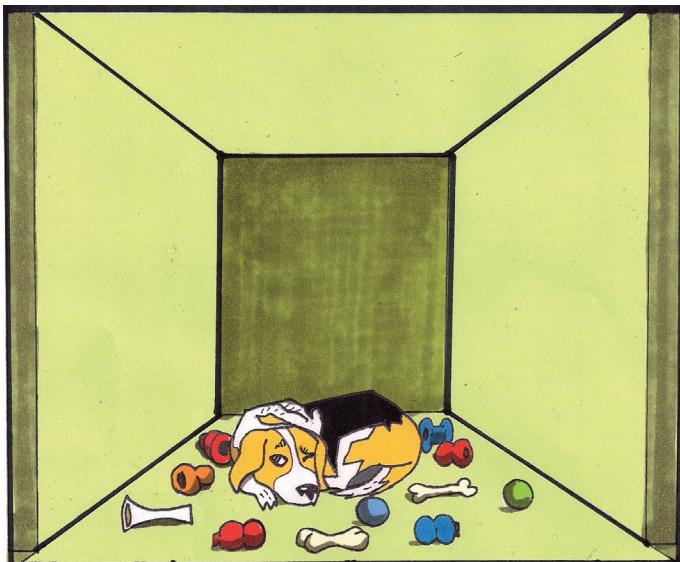
Among the epigenetic factors shaping brain and behavior during early postnatal life, social experiences have a major impact. Early social experiences are mainly of two kinds: mother-offspring and peer interaction. In rodents, the latter has so far been rarely studied. The communal nest (CN) is an innovative experimental strategy that favors an exhaustive investigation of the long-term effects not only of mother-offspring but also of peer interaction. CN is a rearing condition employed by up to 90% of mouse females in naturalistic settings and consists of a single nest where two or more mothers keep their pups together and share care-giving. Mice reared in a communal nest display relevant changes in brain function and behavior, including high levels of neural plasticity markers, such as brain-derived neurotrophic factor (BDNF), and elaborate adult social competencies. Overall, CN appears as an experimental strategy different and complementary to the ones currently used for studying how the early environment determines developmental trajectories.

Funny Stuff | Caption Reports

Cartoonist: Danny Kelly

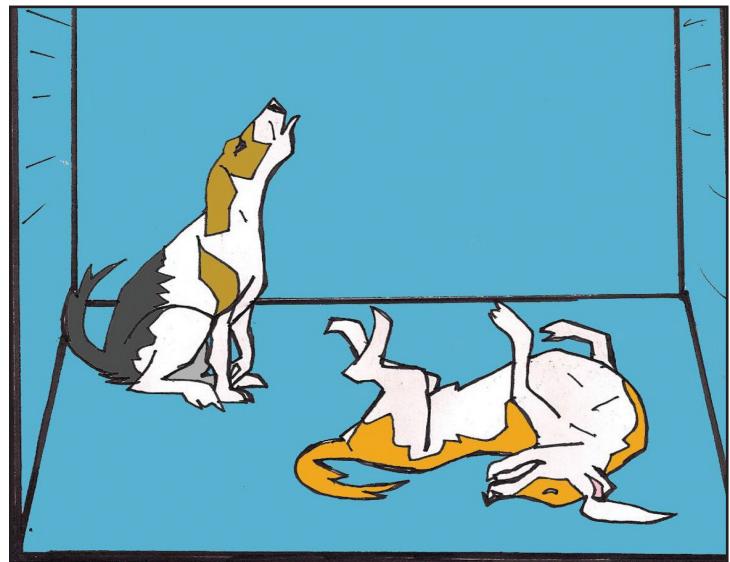
We all agree that animal research is serious business. But there is still a place for laughter in our lives... even in the lab. So, in the spirit of good fun, we invited our readers to explore their lighter side and to share their worldview from the perspective of our mascot beagle. Happily, clever captions came in by the crateful.

THE WINNING CAPTION



This government stuff is okay, but I could really use an old shoe.

THIS ISSUE'S CONTEST



Please submit your captions to rmbw1@verizon.net. We will list the finalists in the next issue.

Dr. Thomas Hartung Receives 2009 Russell & Burch Award

This past September, The Humane Society of the United States (HSUS) presented the society's 2009 Russell & Burch Award—a \$5,000 prize and trophy—to Dr. Thomas Hartung for advancing the development and implementation of non-animal methods in toxicity. This Award recognizes scientists who have made outstanding contributions toward the advancement of alternative methods in the areas of biomedical research, testing or higher education. The 2009 Award comes on the 50th anniversary of the publication of William Russell and Rex Burch's pioneering book, *The Principles of Humane Experimental Technique*, detailing the Three Rs: Replacing or Reducing animal use in experiments and Refining methods so that animals experience less pain and distress.



<http://altweb.jhsph.edu/news/current/hartungrussellandburch.html>

Daniel Harvey, RLAT, AHT

Team Leader—Training, Centre for Disease Modeling
The University of British Columbia (UBC), Vancouver, BC Canada

The Centre for Disease Modeling at The University of British Columbia's Life Science Center is a new 100,000 sq. ft. rodent research facility dedicated to providing excellence in research and animal care. The Centre will house 50 of UBC's 311 Principal Investigators, whose work is covered by 200 of the university's 850 animal protocols.

The training program led by Dr. Beverly Chua, in collaboration with Daniel Harvey AHT, RLAT, RN and Gayle Paquette BSc., RAHT, RLAT, is mandatory for all rodent users, including staff, technicians, Ph.D.s, MDs and Principal Investigators. Each year, the UBC Laboratory Animal Training Program serves about 200-300 participants coming from all over the world to either study, conduct their research or work at UBC.

Certification is awarded following the completion of an on-line introductory course on Ethics, presented by the University through Research Services and following the Canadian Council on Animal Care, and three courses in rodent training that fulfill CCAC mandates for training and the requirements of UBC Animal Care Committee's Institutional Animal Users Training (IAUT).

There are two components to each course: an on-line didactic portion



and a hands-on laboratory session. Participant backgrounds and experiences are diverse but the courses are designed and implemented to standardize knowledge and skills for acceptable and "best practice" rodent procedures and techniques, and to comply with UBC's animal care policies that set the bar for rodent work.

Obligations, Privileges and Rights

From Daniel's perspective, Environmental Enrichment is essential to animal research. "The use of animals in research is sometimes unavoidable," Daniel says, "and they deserve to be understood and respected. Respect means looking after their needs as if they were in the wild, providing food, water, shelter and appropriate environmental conditions.

Great strides have been made in providing enrichment for mammals; for fish and exotics there is still much work to do."

According to Daniel, "the use of research animals is a privilege, not a right." Inspired by the 3 Rs of Russell and Burch (Replacement, Reduction, Refinement) and the Five Freedoms of the Farm Animal Welfare Council (FAWC), he has proposed the *Eight Freedoms of Lab Animals*—mammals, exotics, birds, fishes, wild or commercially supplied. They include:

- Freedom from exploitation, cruelty, neglect, and abuse
- Freedom to receive care from trained and skilled personnel
- Freedom to not be used in unnecessary experiments
- Freedom to live in a constant controlled environment that satisfies their basic physical and psychological needs
- Freedom to receive environmental enrichment
- Freedom to receive a species and strain appropriate healthy diet and water
- Freedom to have an Emergency Response Team available 24/7/365 and ready to be deployed to provide care in case of emergency or disaster
- Freedom to live in a secure environment 24/7/365

Upcoming Events

Moving Forward!

Hoping to change the culture, and encourage researchers to think about the welfare of laboratory animals, Daniel asked the IACUC to promote consideration of enrichment before Principal Investigators design their experiments. As a result, the protocol form now contains the following:

"Please provide details on environmental enrichment for the animals. If enrichment is not being provided, provide justification. If enrichment is not applicable for your study (e.g., field studies), please type Not Applicable as this is a required field."

The Challenge for the Future

For those interested in setting up an environmental enrichment program, there are many challenges. Daniel sees the biggest challenge as one of communication and available data—effectively showing that environmental enrichment does not affect the science negatively!

On line ethics course:

<http://www.acc.ubc.ca/WebBaseTraining/index.html>

Training program:

<http://www.animalcare.ubc.ca/education/education.htm>

Daniel Harvey has been associated with programs at The University of British Columbia since 2006. After earning Diplomas of Collegiate Studies in Animal Health Sciences and Nursing at Sherbrooke College, Quebec (1977-78), and receiving his RLAT designation from CALAS (Canadian Association of Laboratory Animal Science), Daniel served as an Animal Health Technician in both the research and clinical field. In 2005, he was a member of the New Orleans 2005—Canadian Animal Assistance Team—Hurricane Katrina and Rita Relief and in 2007, he traveled to Peru to serve as a Team Leader for the Canadian Animal Assistance Team—Earthquake Relief.

Third Annual Enrichment

Extravaganza, An Environmental Enrichment and Behavioral Management Symposium, will be held April 15, 2010 at the National Conference Center in East Windsor, NJ. This event is sponsored by the New Jersey Association for Biomedical Research and Merck & Co., Inc.

GUEST SPEAKERS:

Dr. Kathryn Bayne

"Enrichment and Behavioral Management Programs Around the World:
The AAALAC International Perspective"

Dr. Paul E. Knepley

"Acclimation of the Laboratory Primate, Dog, and Rabbit to the Research Environment"

Dr. Georgia Mason

"Animal Welfare: A Hard Sell of a Not-so-Soft Research Discipline"

Dr. Christina Winnicker

"Rabbit Enrichment and Behavioral Management"

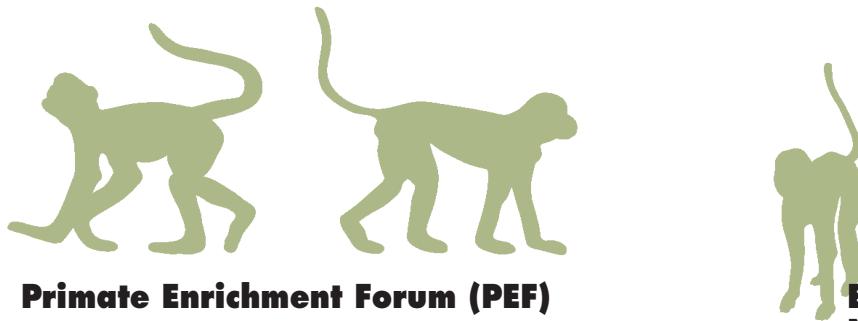
BREAKOUT SESSIONS:

Over 10 interactive workshops from which to customize your afternoon based on your interests

Vendors' Exhibits

For more information and registration, please contact Genevieve Andrews-Kelly at 732-594-1773 or Genevieve_andrews@merck.com

Please send upcoming event notices to Rhoda Weiner, Editor at rmbw1@verizon.net



Primate Enrichment Forum (PEF)

The Primate Enrichment Forum (PEF) is an email list designed to facilitate communication between professionals working at primate biomedical research facilities on the topic of environment enrichment for nonhuman primates. The list is open to animal caretakers, veterinary, research, and behavioral technicians, veterinarians, colony managers, research scientists, and behaviorists/enrichment coordinators, including staff at the NCRR Primate Centers and other research-based primate centers and laboratories worldwide.

PEF is hosted by the Wisconsin Primate Research Center at the University of Wisconsin-Madison and administered by David Seelig at the University of Pennsylvania School of Veterinary Medicine (dseelig@vet.upenn.edu).

Purpose

The purpose of this forum is to foster discussion amongst professionals involved in the care and use of nonhuman primates in biomedical research on the topic of environmental and social enrichment.

Scope

The following topics are among those covered by this forum:
Foraging and feeding enrichment • Cage enhancement and modification • Training techniques • Enrichment strategies for on-study animals • Physiological measurements of stress • Pair housing techniques • Socialization strategies • Toys and manipulanda • Rearing techniques • Colony management • Article and book reviews

How to Subscribe

You must have an electronic mail address, preferably from an institution, and be able to access the internet to participate in PEF. To apply, fill out the [Primate Enrichment Forum application](#).

Questions and Comments

If you have questions about electronic access to Primate Enrichment Forum, contact:
David Seelig, Primate Enrichment Forum administrator, University of Pennsylvania
E-mail: dseelig@vet.upenn.edu Telephone: (617) 504-1258
<http://pin.primate.wisc.edu/infoserv/forums/pef/>

Environmental Enrichment for Nonhuman Primates Resource Guide

This guide, a publication of The Animal Welfare Information Center (AWIC), a part of the U.S. Department of Agriculture (USDA) National Agricultural Library (NAL), updates AWIC's *Environmental Enrichment for Nonhuman Primates Resource Guide*, June 2006. It covers literature published from 1999-January 2009. This document includes links to the draft policy published in the Federal Register on July 15, 1999 by the United States Department of Agriculture, Animal and Plant Health Inspection Service, Animal Care and the *Final Report on Environment Enhancement to Promote the Psychological Well-being of Nonhuman Primates* that was drafted by a committee of experts from areas of research, teaching, regulation, and exhibition and led to the draft policy. Relevant sections of United States Animal Welfare Act and regulations are also included as well as parts of the Guide for the Care and Use of Laboratory Animals (NRC, 1996).

The bibliographic chapters are divided into subject areas that cover the concept of environmental enrichment, enrichment for nonhuman primates overall, abnormal behavior exhibited by nonhuman primates, great apes and gibbons, macaques, old world monkeys other than macaques, marmosets and tamarins, other new world monkeys, lemurs, lorises, and tarsiers, animal training as an enrichment strategy, and books and proceedings from conferences focused on environmental enrichment or nonhuman primate management.

Web Site Resources include:

Online resources on environmental enrichment, for all species and nonhuman primates, Organizations and Professional Societies, U.S. National Primate Centers, Additional Primate Centers and Animal Colonies, Products and Suppliers, and Discussion Groups.
<http://www.nal.usda.gov/awic/pubs/Primates2009/primates.shtml>

Human Enrichment

I am the enrichment coordinator for a mid-sized company. When I ask to attend professional meetings as a way to keep current in the field and to learn from others, the answer is always "No." How can I make the case that attending meetings has value? For me, for the company and, most importantly, for our animals?

Sincerely, Stuck on the Sidelines

Dear Stuck-on-the-Sidelines,

Think of it from the point of view of the person approving your travel funds and time off—they know that they need you in your job, so they need a good reason to let you get away! The best way to get to your meeting will depend on your exact situation, but here are some ideas.

Get permission to propose a talk or workshop to run for an upcoming meeting—preferably on a topic you have learned about while at the company (and in which the company's name is featured). That way, your expertise acts as promotion for the company and the invitation is more difficult to turn down. Invite input from your workmates, so that this becomes a joint activity for the company where you are acting as their ambassador.

Show how the meeting fits with mission or vision statements, strategic goals or other governing policies of the company—do not hesitate to quote these word-for-word in a written request. You should also highlight some specific practical training that the meeting will provide, perhaps relating to regulatory compliance, cost reduction or taking part in the kinds of collaborative projects that

are good for company PR. This might not be your main reason for wanting to go to the meeting, but it may be their main reason for wanting to send you!

Identify personal training or career development needs during your regular job appraisals—and make sure they just happen to match a meeting that will be held later in the year. If you are in a position partly or entirely dedicated to environmental enrichment, it is reasonable to expect professional support and development specific to this subject. If they compare meeting attendance to other comparable costs such online professional courses, academic journal subscriptions and association memberships—meetings might start to look like a cost-effective option.

Finally, remember that getting to one meeting is not the end of the story. While at the meeting, identify which company you are representing and be sure to seek out, speak to, and leave business cards with others in your industry—not just those you want to network with regularly, but those your supervisors and company executives might be in contact with. Be sure to make a good impression and have a positive attitude.

When you return to work, be sure to demonstrate the value of attendance to your peers and supervisors. Share meeting materials and a brief written report of the meeting with your supervisor/s. Don't forget to specifically mention the role of the meeting in inspiring refinements or improvements that benefit your work. Be sure to recommend other staff members be sent to this meeting in the future. Asking to return yourself shows that you enjoyed the meeting; requesting that your peers attend means you think it had value to the company as a whole.

And, even if you have had requests turned down in the past, don't give up! If none of these approaches works, honesty may be the best policy. Make time to speak to your supervisor one-on-one and ask what kinds of benefits would be needed to justify meeting attendance, and what the current budget constraints are. If you are willing to work with them, they might be able support a meeting every few years, or one that is in the local area. This gives you a chance to show them the benefits of an truly inspired workforce and make meeting attendance a regular part of your job!



LabTreat® Sucrose Reward Tablets



Monkey Morsels Blend



LabTreat® Purified Tablets



**Monkey Delight®
Enrichment Tablets**



Monkey Jumble® Blend



Primate Crunch®



**LabTreat® Primate
Enrichment Pellets**



LabTreat® Foraging Bits



LabDiet®

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Macro-Pack

Provides ideal method of delivering superior and constant nutrition along with animal enrichment.

200 X 75-gram packs per box • Four products available

Monkey Jumble®

A fusion of seeds, nuts, fruits and vegetables for enhanced palatability. The assortment of flavors and textures will keep primates interested over long periods of time.

Monkey Morsels

A tasty mixture of small fruits, seeds, and vegetables that are especially suited to encourage the natural foraging instincts of primates.

Health Products

Specialized products to enrich performance and well-being. Products include PriMade® Hydrating Electrolyte Replenisher, Vitamin Supplement Tablets, and PriLieve® Series medicated tablets for maintenance of health and prevention of disease.

LabTreat® Primate Enrichment Products

Primate enrichment products, perfect for reward, reinforcement, and psychological well-being. Products include Foraging Bits, Primate Crunch®, High Fat Primate Treats, Monkey Delight® Tablets, LabTreat® Enrichment Tablets, LabTreat® OmniTreat® Enrichment Tablets & Pellets, and LabTreat® Primate Enrichment Pellets.

