Volume 16, JULY 2013

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THE Enrichment RECORD

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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 members of the bioscience community who promote the 4 Rs: reduction, replacement, refinement and respect.

Share your story ideas with Rhoda Weiner, Editor at
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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.***

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Jayne Mackta, *President & CEO*

IN THIS ISSUE | SUMMER 2013

The Enrichment Record
is 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 enrichmenton the science
- Building the case for integrating enrichment into research design

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is an 8.5" x 11" format.
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In Other Words

These are interesting times.

In the wake of crippling economic and environmental disasters, the biomedical research community is challenged to keep focused on lab animal welfare. It is only natural for people whose livelihood is threatened to make themselves and their personal welfare the primary priority. Forced to cut budgets and reduce staff, managers are being forced to put profits first without regard for individual needs of people. So we are forced to ask where the species-specific needs of research animals fit in the over-all scheme of things?

Happily, there are a few enlightened companies like Novo Nordisk that care about bioethics, sustainability and the provision of enriched environments for all species—including humans. Check out their website to read well-articulated position statements on issues of relevance to their business and role as a global corporate citizen. *http://www.novonordisk.com/sustainability/sustainability-approach/animal_experiments.asp*

These forward-thinking folks are so transparent and secure in the knowledge that they are doing the right thing in the right way for the right reason that they even list names and contact information to further public engagement. Among their many statements about the use of animals in research, the following reflect the need for integrating EE standards into every aspect of the R&D process.

- Novo Nordisk supports the principles of the Three Rs (Reduce, Refine and Replace) and is integrating these principles in all our processes and procedures.
- Novo Nordisk supports high animal welfare standards in relation to the housing, care and use of experimental animals and will house the animals according to their needs, provide appropriate training and socialisation of the animals.

Be sure to read the feature article by Jan Lund Ottesen, DVM, PhD, DipECLAM, Vice President and Head of Laboratory Animal Science at Novo Nordisk, in this issue. He clearly illustrates how environmental enrichment is good for the animals, the staff, science and the all-important bottom line. Very interesting, isn't it?

Jayne Mackta

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

EPAA 3R Laboratory Technician Prize 2013

Deadline: September 16, 2013

For the first time, EPAA will grant a €3000 prize to a laboratory technician involved in implementing and raising awareness of Replacement, Reduction and Refinement of animal testing.

While most of the current Three Rs prizes and awards target scientists, many of the processes using animals for safety science are actually performed by laboratory technicians and animal care-takers. The purpose of this prize is to recognize those implementing alternative approaches to animal testing, raise awareness of their role in the day-to-day implementation of Three Rs and, in particular, for seizing opportunities for further Refinement.

Starting in 2013, EPAA industry partners will sponsor a 3000€ prize every other year. Winners will be invited to the EPAA annual conference to receive the prize and briefly explain their contribution to the 3Rs. The Prize can be given to an individual or shared by a team. The money awarded is a prize, not a grant.

TIMELINES

16 September 2013:
Deadline for submissions of applications.

25 October 2013:
Winner to be contacted and invited to participate in the EPAA Annual Conference.

13 November 2013:
Winner to be invited to speak at the EPAA annual conference.

APPLICATION PROCESS

Application is restricted to those who:

1) Work in a laboratory animal facility as a laboratory technician or an animal caretaker
2) Contribute significantly to the development of a 3R method or implementation of a 3Rs approach
3) Work in European laboratory (EU 28 Member states and neighboring countries).

To apply, send the following documents by email to EPAA before the deadline of September 16th, 2013. *entr-epaa@ec.europa.eu*

- Detailed CV listing laboratory work experience
- Cover letter (max. 500 words) explaining why the jury should consider the applicant's dossier
- Case study (max. 5 pages) clearly putting in evidence how the applicant meets the above criteria.

The final decision will be made by the EPAA Steering Committee.

www.epaa.eu.com

AAALAC Council on Accreditation Clarifies Zebrafish Enrichment Reference

At their May 2013 meeting, AAALAC International's Council on Accreditation adopted new ***Reference Resources,*** including ***Guidance on the housing and care of Zebrafish*** (Danio rerio), Reed B. and Jennings M. (2010), Research Animal Department, Science Group, Royal Society for the Prevention of Cruelty to Animals (RSPCA).

Among four points the Council identified as requiring clarification with this Reference Resource, one is relevant to Environmental Enrichment:

> The document states on p. 37, "Providing artificial plants or structures that imitate the zebrafish habitat allow animals a choice within their environment. It should be strongly considered—especially for breeding tanks or where fish are kept at low density."

While AAALAC International acknowledges the use of environmental enrichment may be beneficial to the zebrafish, its implementation should take into consideration the scientific goals of the study for which the animals are used. Performance standards should be applied taking into consideration the health, welfare and species-typical behavior.

Jan Lund Ottesen, DVM, PhD, DipECLAM

Vice President, Laboratory Animal Science, Novo Nordisk A/S, Denmark

Provision of Environmental Enrichment—Scientifically Proven or Use of Common Sense?

Introduction

To this day, the use of animals in research is essential for all pharmaceutical companies in the processes of discovery, development and production of new pharmaceutical products. Companies are required to provide appropriate data regarding efficacy, safety and toxicology from testing in both animals and people before the authorities will approve a new product. So, while we recognise that we cannot eliminate the use of animals completely, we are committed to doing everything we can to minimise the number of animals used and to ensure that the animals we do use are treated well.

The new EU Directive 2010/63/EU, which must be transposed into the member states national law effective January 1, 2013, sets out minimum standards for housing and care, including requirements for incorporation of enrichment initiatives[1].

Annex III of the Directive sets out requirements for animal housing and husbandry and the environment of the animals; their behavioural needs and enrichment are explicitly mentioned. It will depend largely on the people responsible for the animals at the user, supplier and breeding establishments how effectively this is implemented and it is our joint responsibility to read the Directive with an open mind and a will to apply the spirit, as well as the letter, of the law[2].

The new EU Directive 2010/63/EU, which must be transposed into the member states national law effective January 1, 2013, sets out minimum standards for housing and care, including requirements for incorporation of enrichment initiatives[1].

In the beginning of year 2000, Novo Nordisk, in a unique partnership with the Danish Animal Welfare Society, established new standards for housing animals, with the aim of improving animal welfare and minimising stress. The housing conditions of mice, rats, guinea pigs, rabbits and dogs were initially reviewed based on the needs of the animals, disregarding the existing housing systems, and financial and technical considerations. The identified basic needs of the animals were then prioritised, resulting in a description of how these needs ideally could be met in captivity; subsequently, new housing systems were developed and introduced[3].

Enriched housing conditions for rats does not impact scientific outcomes

A number of studies have expressed concerns that environmental enrichment may increase uncontrollable variation in the animals, thereby creating the need for greater numbers of animals. Within neurobiology, there may be a scientific basis for such concern[4]. However, even though there could be a negative impact within neurobiological research,

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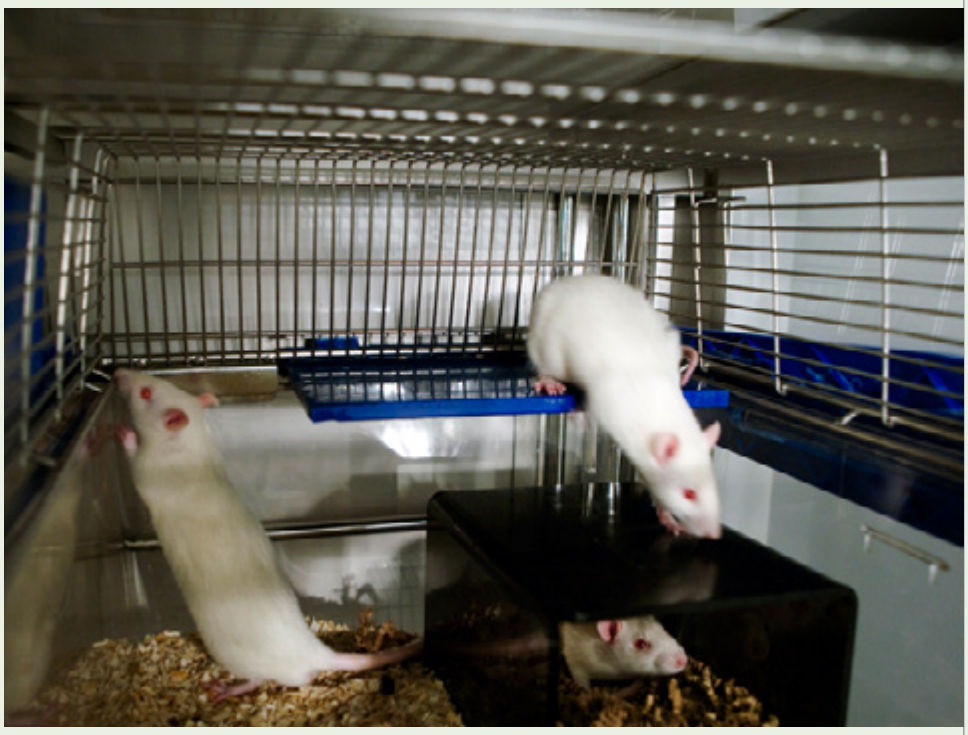

Figure 1: Novo Nordisk RAT CAGE
Type IV cage measures 1800 cm²/279 in² and is 32 cm/12.6 inch high. There is a build-in shelf (400 cm² / 62 in²) and the floor is covered with aspen bedding. The cage contains paper-based nesting material, a gnawing stick and a hide. Finally, corn and maize are provided twice a week to encourage foraging behaviour. The number of rats per cage depends on the weight of the rats (e.g. max. 5 rats weighing up to 400 grams).

there is not necessarily any basis for concern within other research areas.

In the new housing systems we developed for rats (Fig. 1), we demonstrated in preference tests that the rats actually prefer to stay in an enriched environment compared to an un-enriched cage[5]. We then initiated studies to explore whether clinical pathology and cardiovascular parameters were influenced by housing rats under environmentally enriched conditions. Male Sprague-Dawley rats were housed under three different regimes: non-enriched, standard-enriched (according to Annex III of the Directive) and the extra-enriched Novo Nordisk cages. A total of 41 different parameters were monitored via daily observations, clinical pathology, telemetry and coagulation tests and virtually no differences were observed in relation to the manner in which the rats were housed[6]. Furthermore, six traditional behavioural tests were done to evaluate the impact of enrichment on group-housed animals. The basic activity level of the animals was assessed using the open-field test. This test was combined with an amphetamine challenge test. The level of anxiety was evaluated by use of the elevated plus maze test. Secondly, a Morris water maze study was done to assess spatial learning abilities. Thirdly, two more complex learning ability tests were performed, namely the water Y-maze and the conditioned avoidance task. The different housing conditions did not influence the level of activity, the level of anxiety or the response to amphetamine. Neither did the differences in housing conditions influence the learning abilities of the animals in the Morris water maze or the Y-maze. However, in the conditioned avoidance task, rats housed in the extra-enriched environment demonstrated significantly fewer avoidances than rats housed under non-enriched conditions[7].

Clearly, it is impossible to conclude that there will never be any variation in relation to these differences in housing conditions, but in terms of clinical pathology, haematological or cardiovascular pathology, there is no basis, thus far, for denying rats environmental enrichment due to fear of a changed parameter expression or increased uncontrollable variation.

Figure 2. Novo Nordisk DOG PEN
Pens each consisting of an indoor area of 2-3.8 m^2/ 21.5-40.9 ft^2 (and connected through a hatch to an outdoor pen of approximately 2m^2/21.5 ft^2). The individual pens can be connected in a flexible way, allowing dogs to be standard group housed, but still fed individually. All mature dogs are typically housed in harmonious groups consisting of 2–4 animals each.

All the indoor pens are enriched with platforms and ramps, which provide a choice of resting place and observation opportunities, offering the dogs visibility across the room. The dogs are given various other types of toys for playing and biting, as well.

Figure 3. Novo Nordisk DOG OUTDOOR ENCLOSURES
The outdoor grass enclosure includes: a) pig huts with flat roofs that provide resting and observation opportunities: b) huge banks with underground tunnels: c) small stone formations used for observation: and d) trees and big logs for playing and marking.

Scientifically proven or use of common sense?

In an ideal world, of course, it would be nice to have the time and resources to prove everything scientifically and in many cases this is also the right approach. However, sometimes the use of common sense might be a better way to get things moving.

We decided to change the housing of our dogs:
1) From single housing to group housing in pens (Fig. 2),
2) To give all dogs daily access, in harmonious groups, to large outdoor enclosures for a minimum of one hour (Fig. 3),
3) To take the dogs for walks on a leash either alone or in small groups in the surrounding farmland,
4) To introduce a three-step, age-divided socialisation program to fulfil the need of early socialisation and on-going training, as well as to fulfil the need for close social interaction with humans.

It was common sense to us that by doing so we actually "*provided an environment which takes into account the physiological and ethological needs of the species*" as (later) stated in Annex III of the Directive and we saw no reason to scientifically prove this was good for the dogs and no signs that it interfered with the models we used the dogs for.

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Figure 4. Novo Nordisk RABBIT PEN
A pen system that measures 150x200 cm / 59x79 in (i.e. 30.000 cm² / 4.650 in²). The pens are fixed to the wall at waist height to minimise bending and lifting by animal care staff and to facilitate catching the rabbits. Plastic sheeting prevents the rabbits from escaping and reduces room allergen levels. Each pen is divided in two along its length by a partition that has pop holes to allow the rabbits to run through. Aspen bedding and a gnawing stick are provided and a shelter is placed on each side of the partition, so that rabbits can hide or hop on top. The rabbits have access to hay and are provided carrots, apples, etc. twice a week. The rabbits are housed in groups of 10 for short-term or eight for long-term projects.

Similarly, we saw no reason to scientifically prove that it was better for female rabbits to be group housed in large pen systems (Fig. 4) instead of single housed in the rather small cages we used to have. We use many rabbits for antibody production and we believed so much in the new housing system that we considered it a waste of time and money to setup scientific protocols to prove our idea was good.

It hadn't been scientifically proven in the beginning that animals prefer to be in rather small barren cages. So why would we now have to scientifically prove that it is better to be in a large cage?

We believe improved housing with provision of environmental enrichment will cover the basic needs of the animals to a much higher degree than the traditional cage systems; therefore, we recommend that housing like this should be used for housing of experimental animals. Beyond ensuring much better welfare of the animals, the new systems are much more pleasant and inviting, creating a much better working environment and contributing to a broader acceptance by the public of experimental animal use.

Acknowledgements
Especially, I would like to thank Lars Friis Mikkelsen for many fruitful discussions regarding the enriched rat cage studies. However, all collaborators are thanked for the excellent science and common sense they have invested in the studies described. But, most importantly, I would like to acknowledge all the animal caretakers and animal technicians for their daily commitment to ensuring good animal welfare.

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Casey J. Acklin, Undergraduate, College of the Atlantic, Bar Harbor, ME

Fresh Façades for Rodent Homes: Revisiting Enrichment...Naturally

*Imagine that you are choosing a place to stay for the ideal anti-stress vacation. You have had a hard week at work, and you just want to get away and relax. You could choose a bare bones hotel with just a bed, blank walls, and a toilet, but such minimalist surroundings might **add** to your stress, not take it away! Instead you decide on an all-inclusive beachfront resort, where there is a luxury spa, the rooms have flat-screen televisions and Jacuzzi tubs, and the staff caters to your every whim, because that hotel will provide a more entertaining and pleasurable experience.*

Laboratory rodents live day after day in environments resembling that first hotel. There are no amenities and no activities for these animals; they are simply given food, water, and a place to sleep. This type of caging environment maximizes efficiency for the laboratory facility, minimizing cost and time needed for upkeep, but the collateral damage appears in the animals themselves. Barren cages raise stress levels, reduce brain function, and even alter normal physiological cycles, causing the animals to be active when they should be sleeping. These consequences of standard laboratory caging not only hurt the animals but also the research itself. Artificially high stress levels and abnormal behaviors can influence research results to the point where they barely resemble the results gleaned from a healthy animal.

To remedy this issue, researchers use environmental enrichment: devices or materials that allow animals to perform the behaviors they would in the wild. Providing enrichment—such as softer bedding, a running wheel, multiple types of nesting material, and a hut for climbing and hiding—has proven to be effective for reducing anxiety and increasing cognitive functioning in laboratory rodents. Even this enrichment, though, is effective only to a point. After all, imagine if instead of soaking up the sun and frolicking in the surf on a beach in Jamaica, you had to swim at an indoor pool, where sand is replicated using bits of gravel and artificial waves simulate the natural movement of the ocean. It just wouldn't be the same as *really* laying on the beach, surrounded by palm trees. Currently, enrichment consists of a variety of plastic toys to promote natural behaviors, but why use artificial devices when you could use natural materials like the animals experience in their native environment? It only makes sense that natural enrichment devices would be even more effective at reducing stress than synthetic ones.

Of course, we are not able to exactly reproduce a laboratory animal's true environment as if it were living in the outside world, but our goal was to get even more creative and bring a little of the outside in—and so we did. We set out to test the effects of three different caging

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environments for laboratory rats: standard, synthetic, and natural. Would one environment prove better than another? Would synthetic and natural be equivalent? Would natural be worse? These were some of the questions we set out to determine. We needed to know if we were making a helpful contribution to animal welfare. Thus we began the process of housing development, receiving all of our IACUC appropriate permits and zoning regulations along the way.

With those ideas as blueprints, we went about constructing our rat community. The first housing block showcased basic models outfitted with a standard laboratory setup consisting of corncob bedding and a cardboard tube—relatively unexciting for animals that naturally burrow, climb, and forage, but very affordable starting homes for first time buyers. Our second subdivision featured additional laboratory amenities such as plastic devices, ripped paper, and cotton bedding, all of which are often used for environmental enrichment. To complete the housing development, our third complex utilized more eco-friendly living quarters. These homes had similar upgrades, except they were made of wood instead of plastic, alfalfa to supplement the ripped paper, and extra layers of natural bedding (wood pulp, wood chips, and straw). To top it all off, unlike most homeowners associations, we provided utilities whenever needed for all three tiers.

This design truly encouraged the animals to be themselves, allowing the rats to enjoy the enrichment whichever way they desired throughout their housing experience. We analyzed their behavior through a number of methods, and though no individuals were bound by contract, we saw very little disagreement from our rodent clients. The first evaluation was a measure of spatial memory, allowing the rats to make successive choices


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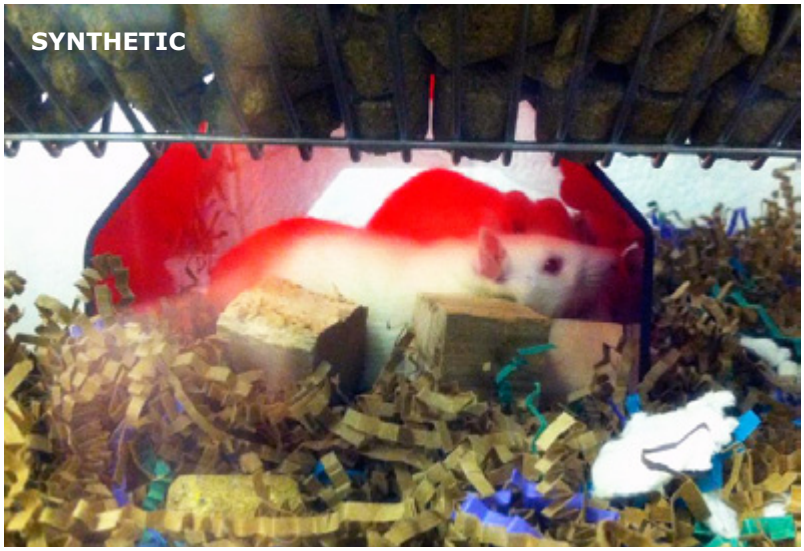
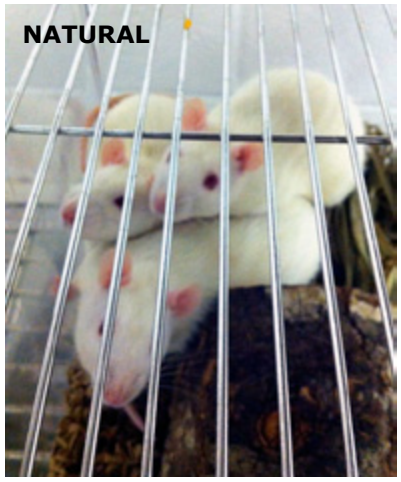

SYNTHETIC


NATURAL

to determine if they remember the previous choices they made. There's more to discover in previously un-chosen maze segments, and so alternation between choices suggested memory of prior trials. The second evaluation measured overall anxiety and exploration levels, where each animal was placed in an open arena and allowed to explore. Since rodents cling to walls as a safety mechanism, if they stayed close to the walls of the arena, they were considered to have higher anxiety. Additionally, if the rats moved around to a higher degree, they were considered to have increased exploratory behavior. The last evaluation was a measure of activity, where each animal was allowed to run on a wheel for 15 minutes and the number of rotations of the wheel was recorded. Exercise is an important part of a healthy lifestyle, and thus activity is a crucial measure of well-being. By using a combination of different evaluations, we were able to assess if and how enrichment had any beneficial effect. Simply through the nature of these tests we were also able to offer attractive perks to the residents, including open spaces, an exercise room, and memory games. We support interactive communities.



After our guests completed their evaluations, their feedback yielded some interesting information. The memory test showed that living in the natural environment significantly improved perception and information storage over non-enriched and synthetically enriched rats. Even more interesting is that the synthetic enrichment did not have any beneficial effect whatsoever. The test of anxiety showed the same result, with the natural environment emerging as the clear winner for least stress. So it seems that even in the lab, going green is the new trend. Synthetic enrichment did significantly increase exploratory behavior during the first few days of testing, but the effect faded over time, with natural enrichment showing the greatest increase in exploration. Lastly, though the activity wheel showed no significant differences between housing groups, the data did show slight increases in activity for animals living in the natural setting. What can we say? Exercise isn't always popular.

From these three tests it appears that our initial assumptions were correct: you get what you pay for! Two out of three basic evaluations clearly showed that a natural environment is the optimal choice, extending benefits not only for the animals but for the experimental results as well. Even the activity wheel, though not always the popular choice, showed similar trends despite a lack of statistical significance. We believe that this effect may largely be the result of the luxury bedding materials added to the natural caging environment; with more layers of bedding, the rats were able to practice their natural burrowing instinct, not to mention get an incredible night's sleep. Surprisingly, in most cases, we observed that synthetic enrichment did not provide any noticeable benefits, which is very different from what we expected to see, since this type of enrichment has proven to be beneficial in the past. This is a classic case of modern construction versus natural design. Our evaluations demonstrate that even the most common enrichment devices fail to provide the animals with necessary stimuli. The plastic devices we used are the same ones used in many major laboratory facilities worldwide to decrease stress levels and enhance exploration and cognition. If this enrichment truly is not helping to accomplish that goal, then standard enrichment protocols may have to be reviewed and modified. Using natural materials instead of synthetic devices could be the key to effective environmental enrichment. Without it, scientific research may pay the price. Be sure to make an appointment with your natural enrichment realtor soon—you may be pleasantly surprised.

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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: *rmbw19@verizon.net*

Massachusetts Society for Medical Research Symposium: All Creatures Big & Small

Daniel Beaudreau, LAT
Merck Research Laboratories

The fifth Annual Massachusetts Society for Medical Research Symposium: All Creatures Big & Small took place March 15, 2013. This year's symposium highlighted laboratory animal enrichment through Positive Reinforcement Training, Operant Conditioning, Pheremonology and stress reduction.

Dr. Irene Pepperberg, the keynote speaker, described her 20 years' of studies on the cognitive and communicative abilities of Grey Parrots, involving her parrot, Alex. Karen Pryor, CEO of *www.clickertraining.com* and author of several books on training, talked about using positive reinforcement training in nature, zoos, research laboratories, and households. She showed that positive reinforcement training is a great technique for species including rats, dogs, rhinos, and even crabs! Other speakers included Dr. Gina Savastano, Dr. Colena Johnson, Greg Dillon, Dr. Germain Rivard, Katenna Jones, and Dr. Nirah Shomer.

A Poster Session, sponsored by Bio-Serv, was also held and included 15 posters from several different institutions. The Symposium was sponsored by MSMR, Merck, NEBAALAS, Eisai, Brigham & Women's Hospital, Harvard and hosted by Schepens Eye Research Institute at The STARR Center. Generous support was also provided by numerous vendors: Purina Lab Diet, Process Control Solutions, Bio-Serv, The Andersons, Biomedical Sales Consultants, Ancare, Innovive, ASAP, Agilux, Harlan, Shepherd Papers, MiteARREST, Fisher, BioFresh, ALN and The Jackson Laboratory.

Enrichment Extravaganza April 10, 2013 Eli Lilly, Indianapolis, IN

Michelle A Weideman, DVM
Senior Staff Veterinarian,
MPI Research

Eli Lilly served as host for *The Enrichment Record*'s 2013 Enrichment Extravaganza, a gathering of individuals involved in enriching animal environments in a research setting. Technicians, veterinarians, behaviorists, and scientists all met to share information and ideas on this exciting and contemporary topic. Dr. Wendy Underwood, Lilly's Director of Veterinary Resources, led off with a definition of extravaganza: "a literary or musical work characterized by freedom of style and structure." She encouraged us to be inspired by this definition and allow it to guide us in meeting new people and brainstorming ideas.

The morning session featured three powerful presenters. **Dr. Karen Froberg-Fejko** (Bio-Serv) shared ideas on how to help "sell" enrichment as a cost savings measure in a budget-minded industry. One particularly engaging example included the effects of enrichment on reproductive success and a fiery conversation about the improved robustness of mouse genitals!

Dr. Steven Shapiro (MD Anderson Cancer Center at the University of Texas) encouraged us to think outside the box with non-human primate enrichment, reminding us that giving animals control over their environment is one of the most important functions of enrichment. He also encouraged us to remember an important lesson: Enrichment is for the sake of the animals, not the humans (although

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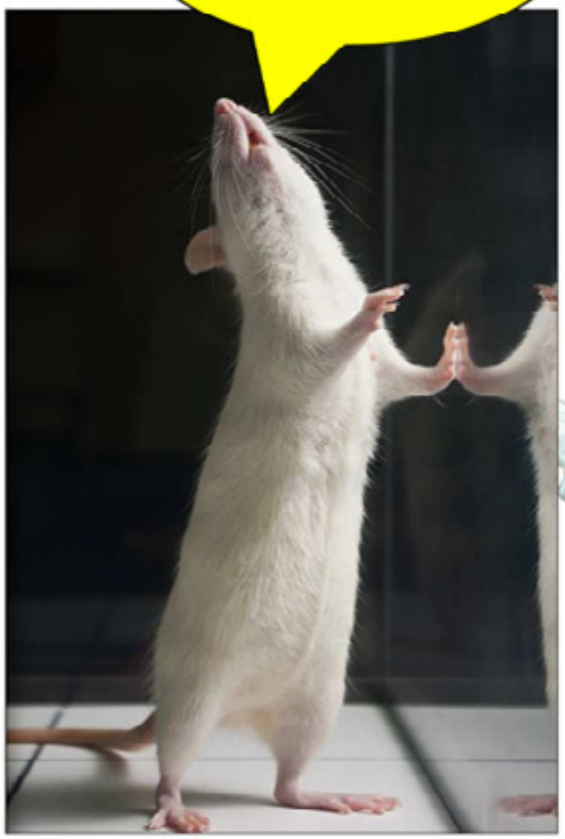

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I'm sure his brilliant Skittles Cannon successfully appeals to both!).

Dr. Alex Wakefield (Covance, Greenfield, IN) helped us face some hard truths about the *dark side* of enrichment by using *Star Wars* metaphors. As soon as the phrase "Luke, I am your Attending Veterinarian," rang through the auditorium, we knew that *the force was with us* and this would not be any ordinary discussion. Dr. Wakefield presented some of the considerations and obstacles to enrichment and how to overcome each. He reminded us that like the proverbial horse and water, you can lead a dog to a treat, but you can't always get it to eat. By the end of these three fantastic talks, we were all inspired to consider enrichment from new perspectives, not only for the sake of our animals but for our budgets as well, learning that better awareness of both business needs and animal needs can lead to a convergence of ideas that can improve our enrichment programs as a whole.

The Poster Session featured excellent posters describing innovative ideas for novel enrichment items for a variety of species, including rodents, ferrets, swine, dogs, and poultry. Sarah Hassinger, a veterinary medicine student from Michigan State won high honors with her poster "**Evaluation of gnawing devices in pair housed Long-Evans Rats**." Adding to the dialogue were several program sponsors who were on hand to answer questions and present new products. It was a great opportunity for attendees to mix and mingle, ask questions, and make new contacts.

Sarah Hassinger (left), Veterinary Medicine student from Michigan State, with Poster Award presenters Dr. Gerald Smith, Eli Lilly & Dr. Karen Froberg-Fejko, Bio-Serv.

After lunch, there were 7 workshop options:

Using the scientific literature to evaluate your enrichment program for rats & mice: *Dr. Gerald Smith, Eli Lilly and Company*

Enrichment for rabbits in a laboratory environment:
Dr. Karen Froberg-Fejko, Bio-Serv

If we could talk to the animals: a multi-faceted approach to evaluating how husbandry affects well-being: *Dr. Deb Hickman, Indiana University*

Decreasing the stress of blood collection in laboratory animals through acclimation, technique, and remote blood collection technology:
Dr. Alex Wakefield, Covance Greenfield (IN) Laboratories

Enrichment in a tox environment:
Genny Andrews-Kelly, Huntingdon Life Sciences

Re-homing lab animals: establishing and maintaining a successful adoption program: *Genny Andrews-Kelly, Huntingdon Life Sciences*

Challenges in enriching animal environments in a contract research organization: *Dr. Michelle Weidman, MPI Research*

Unfortunately our current cloning technology did not allow me to attend all the workshops offered, but the feedback I received was amazing. The discussions that occurred reinforced how important it is that we have these opportunities to gather and learn. The freedom of style and structure that guided the EE created an environment that truly encouraged the sharing of new ideas and innovations. I look forward to meeting up with you all again at the next Extravaganza!

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Resources

Great book produced by BPRC in the Netherlands and EUPrim-Net.

Enrichment Manual for Macaques and Marmosets
ISBN/EAN 978-90-812355-2-5
http://www.euprim-net.eu/network/BPRC_Manual_Macaques_Marmosets.pdf
Please place your orders informally at website@bprc.nl

New Website!
Better Labs = Better Lives
http://betterlabsbetterlives.org/

This website was launched on LAREF by Dr. Catherine E. Hagan, an Assistant Professor at the University of Missouri, College of Veterinary Medicine. *Better Labs = Better Lives* is a one-year pilot project to test the viability of crowd-source direct funding for enhancing laboratory animal enrichment programs. The goals of the project are:

- To publicly acknowledge the compassion and dedication of people who are working in research who provide care and enrichment to improve the lives of the animals.
- Connect people who need money or resources to improve laboratory animal lives with people who want to contribute to animal welfare.
- Offer support and encouragement to people who work with animals in research

Refining rabbit care—A resource for those working with rabbits in research

In 2008, the UFAW/RSPCA Rabbit Behaviour and Welfare Group produced a resource that sets out practical guidance on fulfilling the basic needs of the rabbit. *Refining rabbit care—a resource for those working with rabbits in research* (2008) is based on the current laboratory animal science and welfare literature and on the expertise of the authors, who have long-standing experience of rabbit husbandry and care in a laboratory environment.

Download a copy here:
http://www.rspca.org.uk/ImageLocator/LocateAsset?asset=document&assetId=1232712644330&mode=prd

For more information, contact:
rabbits@rspca.org.uk

Upcoming Meetings

50TH ANNUAL CONFERENCE ANIMAL BEHAVIOR SOCIETY
July 28-August 1, 2013
University of Colorado
Boulder, CO
http://www.colorado.edu/ebio/abs2013/

SYMPOSIUM ON SOCIAL HOUSING OF LABORATORY ANIMALS
August 22-23, 2013
Natcher Center, NIH
Bethesda, MD
http://caat.jhsph.edu/programs/workshops/social_housing.html

ENRICHMENT LEADERSHIP EXCHANGE
September 10, 2013
Wake Forest Innovation Quarter
Winston-Salem, NC
http://enrichmentconference.com

PRIMATE TRAINING SEMINAR
September 30-October 2, 2013
Biomedical Primate Research Center
Netherlands
Space is limited to 30
Contact: *sbrando@animalconcepts.eu*
http://www.animalconcepts.eu/styled-4/styled-21/styled-14/index.html

11TH INTERNATIONAL CONFERENCE ON ENVIRONMENTAL ENRICHMENT
October 15-18, 2013
Kwalata Game Ranch, Dinokeng Conservancy
45 km from Pretoria
South Africa
http://www.enrichment.org/miniwebfile.php?Region=ICEE&File=11icee.html&File2=11icee_sb.html&fNotFlag=1

INNOVATIVE ENVIRONMENTAL ENRICHMENT SYMPOSIUM
Sunday, October 27, 2013
Satellite to National AALAS
Baltimore, MD
http://www.virtualvivarium.com/about-us/upcoming-events/environmental_Enrichment_Symposium.asp

7TH TRAINING AND ENRICHMENT WORKSHOP FOR ZOO AND AQUARIUM ANIMALS (TEWZA)
November 11-15, 2013
Moody Gardens
Galveston, TX
http://www.enrichment.org/MiniWebs/International/tewzaa.pdf

PRIMADAPTION
November 17-21, 2013
Panther Tracks Learning Center Southwestern Florida
Contact Dr. William Singleton, Animal Care Training Services (ACTS)
484-574-7455
http://actstraining.com/workshops/

PRIMATE TRAINING & ENRICHMENT WORKSHOP
February 24-28, 2014
MD Anderson Cancer Center
Bastrop, Texas
Completed pre-registration form for each participant due on or before December 1, 2013
http://www.mdanderson.org/education-and-research/departments-programs-and-labs/programs-centers-institutes/michale-e-keeling-center-for-comparative-medicine-and-research/educational-programs/primate-training-enrichment-workshop.html

Please send notification of your Upcoming Meetings to Rhoda Weiner at *rmbw19@verizon.net*

Primadaption Workshop

TRAINING AND ENRICHMENT THAT CONSTANTLY EVOLVES TO MEET THE REALISTIC NEEDS OF NON-HUMAN PRIMATES IN LABORATORY SETTINGS

November 17-21, 2013
Panther Tracks Learning Center (PTLC)
Immokalee, FL

PTLC is located on 640 acres in the everglades in Southwestern Florida.

Hosted by Primate Products, Inc., in collaboration with Animal Care Training Services (ACTS), Primadaption is a training and enrichment approach based on the idea that traditional methods of training and enrichment for captive NHP are not always compatible with resources available at many facilities. The goal of the workshop is to create a realistic training and enrichment program that can change and grow according to the specific needs of individual facilities. This is achieved through Applied Behaviorism, which integrates environmental enrichment, NHP training, and behavioral management.

The Workshop will include:

1. Enrichment and Social Housing Strategies

2. Training—Hands-On Training session with naïve and trained NHP

3. Tools necessary to take knowledge learned back to the workplace

24.0 CEUs for AALAS Certification Registry are available upon workshop completion.

For more information, please contact:
William Singleton
Animal Care Training Services (ACTS)
(484) 574-7455—Cell
(484) 684-7268—Office
William@actstraining.com

http://www.primateproducts.com/blog/wp-content/uploads/2013/03/Primadaption_Workshop_Flier_2013.pdf

International Enrichment Conference Planned for September 10

INTERNATIONAL ENRICHMENT CONFERENCE
Planned for Sept. 10

The Enrichment Record, in partnership with Veterinary Bioscience Institute (VBI), announces the first **Enrichment Leadership Exchange (ELE)**, a "hybrid" conference for sharing international enrichment strategies, on September 10 at the Wake Forest Innovation Quarter, Winston-Salem, NC. Participants can attend in-person or online and will explore evidence-based strategies for improving animal welfare while controlling costs and maintaining data integrity. The ELE offers an unparalleled opportunity to engage with colleagues in an open dialog focusing on practical solutions to a wide spectrum of challenges identified by the global LAS community.

The Keynote Speaker Is Dr. Jan Lund Ottesen, Vice President and Head of Laboratory Animal Science, Novo Nordisk A/S, Denmark.

The morning program will also feature a panel discussion on "Understanding Animal Behavior" moderated by Dr. Kemp Covington from GSK.

ENRICHMENT LEADERSHIP EXCHANGE
sharing international enrichment strategies

Panelists include Evelyn K. Skoumbourdis, Thomas Jefferson University; Jay Kaplan, Wake Forest University; and Lara Metrione, South-East Zoo Alliance for Reproduction and Conservation.

There will be two tracks exploring "Practical Data-driven Solutions" during the afternoon:

Accommodating Animal Behavior in Housing & Study Design

Nutritional Enrichment

The Poster Session will include three pre-selected presentations, both in-person and virtual.

At this time, the following companies are supporting the ELE:
Bio-Serv:
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Purina LabDiet:
Platinum Founding Sponsor
Huntingdon Life Sciences:
Gold Founding Sponsor
Shepherd Specialty Papers:
Silver Founding Sponsor
The Andersons:
Breakfast Sponsor

Registration Options
In-Person Attendance
$150 (per person) for individuals
$135 (per person) for groups of 3 or more from same institution

Online Attendance
$90 (per person)
$75 (per person) for groups of 3 or more from same institution

To register or learn more about sponsorship options: *http://enrichmentconference.com*

Questions? Contact Denise Bianco: *bianco@enrichmentrecord.com*

Symposium on Social Housing of Laboratory Animals

August 22-23, 2013
Natcher Center, NIH, Bethesda, MD

Preliminary Agenda

Day 1: Thursday, August 22 – Social Housing of Nonhuman Primates

8:00-8:30 – Continental Breakfast
8:30-9:30 – Keynote: Mollie Bloomsmith, Emory
9:30-10:15 – Behavioral intervention/temperament testing: Kristine Coleman, ORPRC
10:15-10:45 – Break, visit vendors
10:45-11:30 – Group Socialization: Steve Schapiro, MD Anderson
11:30-12:30 – Federal Oversight and Peer-Review Perspectives on Social Housing: Representatives from USDA, OLAW, AAALAC
12:30-1:30 – Lunch
1:30-2:15 – The importance of collecting data: Keely Harding, Charles River
2:15-2:25 – Explanation of Breakout sessions, split into groups
2:25-3:10 – Breakout 1
3:10-3:55 – Breakout 2
3:55-4:05 – Break
4:05-4:50 – Breakout 3

Suggested Breakout Topics:

1) Techniques/How-Tos
2) Special Cases – Experimental
3) Special Cases – Hard to pair animals
4) Oversight issues and perspectives
5) Peer review "best practices"

Day 2: Friday, August 23 – Social Housing of other Laboratory Animals

8-8:30 – Continental Breakfast
8:30-9:00 – Dogs: LaVonne Meunier, GlaxoSmithKline
9:00-10:00 – Rodents: Brianna Gaskill, Charles River
10:00-10:30 – Break, visit vendors
10:30-11:15 – Rabbits: Karen Froberg, Bio-Serv
11:15-12:00 – Pigs: Candace Croney, Purdue
12:00-1:00 – Lunch
1:00-2:00 – An Historical Perspective on Social Housing: Kathryn Bayne, AAALAC
2:00-2:10 – Explanation of Breakout sessions, split into groups
2:10-2:55 – Breakout 1
2:55-3:05 – Break, change rooms
3:05-3:50 – Breakout 2
3:50-4:00 – Break, change rooms
4:00-4:45 – Breakout 3

Breakout Topics:

1) Dogs
2) Rodents
3) Rabbits
4) Pigs

Registration fee: $200 for both days, $125 for one day
Government: $150 for both days, $75 for one day

Full details and registration:
http://caat.jhsph.edu/programs/workshops/social_housing.html

Autumn Dawn Sorrells, M.S., CMAR, RLATG

Animal Behaviorist, Environmental Enrichment Coordinator, Animal Husbandry Manager,
University of California, San Francisco (UCSF)—Laboratory Animal Resource Center (LARC)

When humans benefit from the service of animals in any capacity, we maintain an obligation to provide those animals with the best care we can possibly manage. Environmental Enrichment allows us to address those aspects of animal care not easily accommodated in captivity. It is important because it is constantly challenging us to do better by the animals, reminding us of the shortcomings of a captive environment. We demonstrate true humanity when we respect and honor the service provided to us by animals through a thoughtful focus on all of their needs.

A researcher, behaviorist, author, manager, and San Francisco Softball League player, Autumn Sorrells is totally dedicated to improving the lives of the animals she meets in captivity. By designing and performing research focused on environmental enrichment, she hopes to learn how we can better respect and honor those animals that do so much for us.

In her current capacity, Autumn focuses on supervising animal care technicians to ensure optimal care for laboratory animals of all species. Her passion is designing and implementing enrichment programs for the various animals being studied, including primates, rodents, cats, dogs, ferrets, rabbits, swine, sheep, and amphibians and implementing social housing programs for all social species. She also supports clinical cases with behavioral data, providing recommendations based on behavioral assessments and evaluations.

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The Environmental Enrichment Program was originally designed to address the promotion of "psychological well-being of non-human primates," outlined by the 1985 Amendments to the Animal Welfare Act (AWA). Since its installation, the program has expanded to include all species in biomedical research.

Autumn's recent studies include:

Differential Effects of Environmental Enrichment for Mice: A look at the effects of differing degrees of enrichment on the ALS mouse model and disease progression

Positive Reinforcement Training and its Implications on Physiological and Behavioral Parameters in Squirrel Monkeys: Providing opportunity to volunteer to enter nest box for weighing compared to standard capture and weighing procedures

Social housing for male rats: Preferences beyond 500g: Preference testing of male rats over 500g suggests some may prefer smaller spaces with a companion over isolation in larger space

In addition, she enjoys being a part of LARC's *Adoption and Retirement Program*, dedicated to locating adoptive parents and sanctuaries for research animals. An adoption program has the potential to decrease stress and raise morale for both the research and animal care teams, and, of course, result in a long and happy life for the animal. LARC and Animal Welfare Assurance Program staff work with principal investigators to identify candidates for adoption and place appropriate animals through local adoption agencies and animal shelters.

Autumn's interest in animals started many years ago. "Like many little girls in America," she says, "I wanted to be a veterinarian…believing this was the best way to help animals. After studying animal science as an undergraduate, I learned there were scientific ways to directly ask animals questions about their conditions, so I took a path towards research instead."

An Animal Science graduate of the University of Missouri, Columbia, Autumn went on to earn her M.S. in Animal Behavior and Welfare at Purdue University. "Purdue gave me the opportunity to study animal behavior and to ask animals about the conditions that stress them," she says. "Starting out with food-producing animals at farms was a great experience, but the industry was just being newly presented with the concept of environmental enrichment and socialization. It wasn't quite ready to embrace such changes, so I looked for other opportunities to continue implementing the information I was learning from my work. That is when I met Dr. Hal Markowitz. He introduced me to the needs of the laboratory animal."

Autumn had many different work experiences along the way, including Behavior Research Assistant at Saint Louis Zoo, Zoo School Teacher at San Francisco Zoo, Zoo Keeper at Henry Doorly Zoo in Omaha and Vet Technician at St Peters Animal Hospital in MO. But Dr. Markowitz quickly became her inspiration and mentor. Professor of Biology at San Francisco State University, Hal was well known for his work with captive animals. He was, in fact, known as the Father of Environmental Enrichment, first coining the phrase "Behavioral Enrichment." Dr. Markowitz was an important influence on Autumn, and was the person who recommended that she affiliate with the University of California, San Francisco where she is today.

Autumn expresses great joy in the people she works with at UCSF. "Here is a place where positive discussion about animal welfare is free flowing and encouraged. I couldn't be prouder of the people who work so hard to make sure that the animals in their care are acknowledged, honored, and truly cared for." Autumn firmly believes the animal care staff at UCSF is second to none!

Thoughts on the Future

"Digital technology will have a profound effect on environmental enrichment," Autumn says. "As we expand into the digital era, we will be able to use space more effectively, visualizing rooms where there were cages, projecting interactive scenery and images on walls, and better simulating an animal's natural environment or cognitive and behavioral abilities. Interacting through an automated process will give our animals more choices and the freedom to be themselves!"

Ice Cube Treats for Swine

Harriet Hoffman, Enrichment and Behavior Coordinator
MPI Research, Mattawan, MI

Please provide a photo of your favorite foraging device, manipulanda, puzzle feeder, etc., along with a brief narrative. List the species that it is intended for, describe how the device is used, and include a short statement on the durability, cost, pros and cons. How much time is invested in preparation, and how does that compare with the time invested by the animals? If you have performed any behavioral evaluations and a cost analysis, include that as well.

Please send your ideas to: Genevieve Andrews-Kelly at genandr@aol.com

Thank you!

Van de Weerd et al.,(2003) suggested that objects should evoke "meaningful interactions" and also maintain responsiveness. It is meaningful for a pig to forage for food and receive positive feedback from that behavior. This enrichment item appears to keep the pigs engaged for a long period of time, while encouraging natural behaviors to help reduce boredom or frustration. Food treats can be used for rooting and foraging as constructive swine enrichment. We developed, made, and used this easy treat, and the modification options are endless. Using fruit, with a mixture of certified enrichment, gives us the ability to modify the recipe continually, providing a fresh experience for our pigs' enjoyment!

The Recipe

- ¼ C. certified Veggie Bites
- 20 oz. water
- (1) 24 oz. plastic cup
- (1) 8-inch chain
- (1) Carabineer hook

Instructions

- Add approximately ¼ cup of certified Veggie Bites (Bio-Serv) to a 24-oz. plastic cup, and then fill with water
- Using an 8-inch long chain, place 4-inches inside the cup
- Freeze the cup with food items, until solid

Note that the remaining four inches of the chain is draped outside of the cup and used to hang on the side of the cage.

Some food items will float and some will sink to the bottom of the cup, giving the swine something different at every level of the ice cube. Clean up is quick and easy!

The frozen Veggie Bite ice cube treat is hung inside the swine chain-link type enclosure with a Carabineer hook. The swine activities observed with this enrichment included:

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1. Licking, biting, and rooting for the ice cube with its snout
2. Additional rooting behavior for pieces that had fallen
3. Playing with the chain after the ice is gone
4. More snout-to-snout contact with tactile cage mates through the chain link fence

The cost is minimal: the chain and hooks can be purchased in bulk; the 24-oz. cups are available in case quantities (and can be reused a few times); and the Veggie Bites are pennies per ¼ cup.

Because swine avoid objects that are contaminated with feces, suspending this enrichment treat encourages more interaction, while incorporating food, making it even more enjoyable. We observed that all our swine species (farm, Yucatan, and minipigs) engaged and participated with the Veggie Bite ice cube treats.

Novel Enrichment Item for Non-Human Primates

Katherine Shuster DVM and Marcie Donnelly BS, LATG, SRA
Merck and Co., Inc. Rahway, NJ

Enrichment is a critical component of any animal care and use program, especially in regards to non-human primates. It is also a requirement based on the USDA Animal Welfare Act and the ILAR *Guide for the Care and Use of Laboratory Animals*. Providing enrichment that stimulates multiple senses can be challenging, especially when working with sedentary animals that are prone to excessive weight gain. In order to provide more varied enrichment items to our primates, the Veterinary Services staff at our facility reached out to the laboratory animal community and asked for recommendations of enrichment items that would stimulate multiple senses and were lower in calories. The veterinary staff at the University of Wisconsin-Madison suggested growing wheat grass, as their primates enjoyed this as an enrichment item.

Wheat grass kits are available from multiple sources (e.g. *wheatgrasskits.com*) and usually come with enough seeds and other materials to grow 5 flats. The instructions are very simple and the grass grows quickly, only taking about a week to reach harvesting height. Our veterinary staff then takes the grass, cuts it into squares, and passes them out to all of the primates. The primates enjoy breaking the dirt apart, foraging through the grass, and taking some nibbles here and there. Our facility currently houses rhesus and cynomolgus macaques and both of these species enjoy utilizing the wheat grass. The pictures show the wheat grass prior to cutting, once it is cut into squares, and one of our rhesus macaques enjoying his grass. The primates do a very good job breaking the dirt and roots up into small pieces so it has never been a problem in cleaning the rooms or with the drains. Overall, this has provided a novel enrichment item that stimulates foraging behavior and is low in calories.

Abstract

Dry Bedding Provides Cost-Effective Enrichment for Group-Housed Rhesus Macaques (Macaca mulatta)

Doane, Cynthia J.[1]; Andrews, Kirk[2]; Schaefer, Laura Jane[2] Morelli, Nathan[2]; McAllister, Shannon[2]; Coleman, Kristine[2]

Source: *Journal of the American Association for Laboratory Animal Science*, Volume 52, Number 3, May 2013 , pp. 247-252(6)

http://aalas.publisher.ingentaconnect.com/content/aalas/jaalas/2013/00000052/00000003;jsessionid=2apbrscuf3096.alice

Dry bedding has been shown to be an effective enrichment strategy for small groups of captive nonhuman primates housed in cages or in small enclosures with concrete flooring. However, dry bedding is used infrequently for large groups because of the perception that its use is time-and resource-intensive. We investigated the cost-effectiveness of this enrichment strategy in large groups (30 to 50 subjects) of rhesus macaques. Macaques were housed under 3 comparison conditions for 4 wk: pine shavings (n = 4), aspen and pine shaving mixture (n = 4), and nonbedded control (n = 4). As measures of resource consumption, husbandry tasks were documented by using time-in-motion methodology, and water usage was determined. In addition, groups underwent behavioral observations to assess the effect of dry bedding. The time required to care for units did not differ between bedded and nonbedded units. However, significantly less water was used for sanitization of bedded compared with nonbedded units. Monkeys housed in bedded units showed more foraging (13.8% ± 1.6% of time in bedded compared with 4.0% ± 0.3% of time in nonbedded units) and less aggression and self-grooming. Dry bedding benefited the macaques, reduced water usage and costs, and did not affect human resources.

Affiliations:
1: University Animal Care, University of Arizona, Tucson, Arizona
Email: *cjdoane@email.arizona.edu*

2: Oregon National Primate Research Center, Oregon Health and Science University, Beaverton, Oregon

ADVERTISER INDEX

THE Enrichment

The Enrichment Record is a quarterly E-Zine created by the Laboratory Animal Research Community as an online forum for:

- Discussing environmental enrichment in the optimal care of laboratory animals
- Documenting best practices
- Sharing data on the impact of environmental enrichment on the science
- Building the case for integrating enrichment into research design

HAVE YOU HEARD?
The Enrichment Record is now delivered directly to 30,000 animal research professionals around the world.

Thanks to VBI's generous commitment to open discussion about environmental enrichment for laboratory animals, *The Enrichment Record* can greatly expand its reach and ability to increase community engagement at every level.