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Enrichment RECORD

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Caring=Enrichment

THE Enrichment RECORD

Please direct all inquiries to
Rhoda Weiner, Editor: *rmbw19@verizon.net*

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 *rmbw19@verizon.net*
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IN THIS ISSUE | SUMMER 2014

How Cute Is That?

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 enrichment on the science
- Building the case for integrating enrichment into research design

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In Other Words

Nothing says "CARING" like enrichment.

In this 20th issue of *The Enrichment Record*, we are celebrating a new way of talking about animal research and joining the crusade to engage the public in a whole new way. If we can change the topic of conversation to focus on the myriad of ways we care about and for laboratory animals, people will listen. And they will begin to understand because we will be talking about something they really care about: how we treat the animals; what we do to prevent or minimize pain and suffering.

Leading the charge to change the way we talk about animal research is an amazing one-woman dynamo named Cindy Buckmaster. Cindy wants us to go public with the world's best-kept secret: that the field of laboratory animal research is peopled with trained professionals who really care about both animals and people. She's been spreading the word at meetings and conferences all over the country, and the response to her call for action has been phenomenal. Her message is going viral and is motivating people to find their own authentic voice and speak out quietly but truthfully regarding what they do and how they do it. She believes that by showing how much we care and what we care about, we can bring people together and breed compassion for all living things.

How Cute Is That?
Because a picture is worth a thousand words, we asked you all to submit photos that show cute animals thriving in your care. We got a wonderful response and had a hard time choosing from a wide assortment of special pictures that say so much about CARING in our community. You will find a great selection of "Cute & Caring" photos throughout this issue.

All are captioned: *How Cute Is That?*

Jayne Mackta

Jayne Mackta, Publisher
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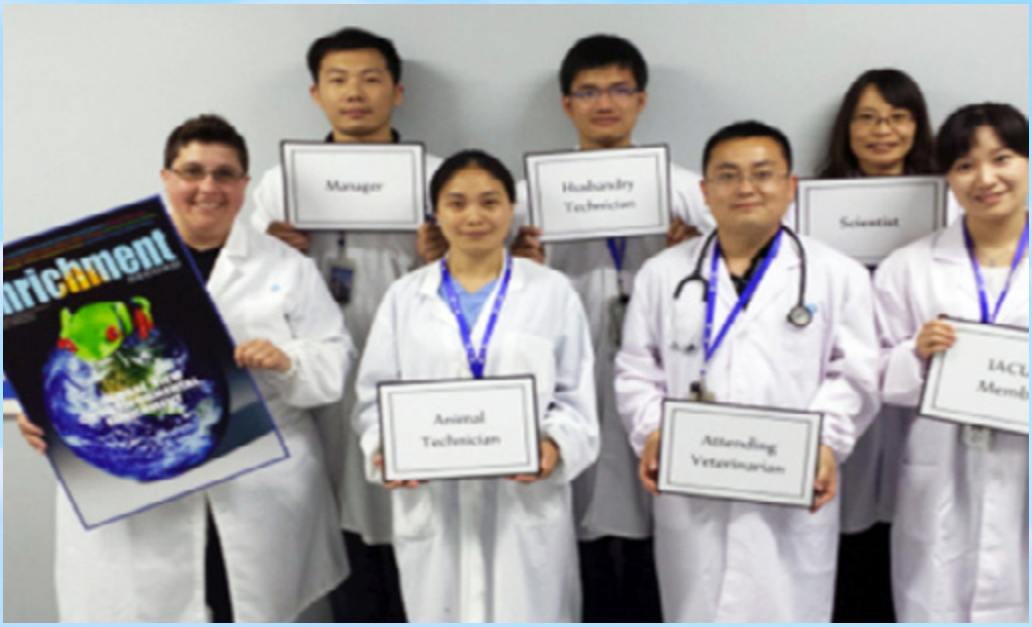
OUR READERS TELL US

Being on the other side of the world, *The Enrichment Record* keeps me and the gang up to date on current practices. It inspires and encourages everyone to put their thinking caps on and to come up with creative ideas for enrichment. It stimulates conversation and thought within the group which can only benefit animal welfare and consequently lead to better science.



—**Sandra Burlock** and the **Wuxi AppTec, Suzhou gang**

How Cute Is That?

Article

James C. Ha, PhD, CAAB and **Nathan Andrews, BSc**

Department of Psychology, University of Washington
(based on a talk presented by Dr. Ha at the Boston Enrichment Symposium in March 2014)

The Future of Enrichment for Lab Animals

Over the last 30+ years, enrichment has become a staple in animal care for a wide range of captive environments. But there has been relatively little study of its effectiveness. More importantly, the modern science of animal behavior has, in many cases, left enrichment behind with repeated use of simple methods and lack of a deeper understanding of problem behavior. We suggest that there are new revolutions in animal behavior, including in technology (for data logging and enrichment itself), behavioral genetics, learning theory, and temperament and personality, all of which can contribute to better animal welfare. But first, before we look forward, we need to know where we have been.

Laboratories, zoos and aquaria, domestic animal shelters, farms and the like have all contributed a great deal to our understanding of the benefit of enrichment to the psychological well-being of captive animals. Outside of laboratories and farms, many studies suffer from extremely low sample sizes and a lack of experimental control of many important aspects of the environment. When these shortcomings become so rampant in the literature, it is necessary to take a step back and analyze the whole of the data—the perfect situation for a meta-analysis.

> ...the modern science of animal behavior has, in many cases, left enrichment behind with repeated use of simple methods and lack of a deeper understanding of problem behavior.

Three such meta-analyses have been published on the effects of environmental enrichment on captive animal behavior as a metric for welfare. In each of the prior meta-analyses, experimental design limited the focus to specific environments, behavior, and/or taxa. Shyne (2006) went so far as to attempt to explore the effectiveness of specific environmental enrichment on stereotypy, but found no significant results. Our meta-analysis went beyond the scope of the previous studies by including all captive environments and all commonly recorded behaviors. We expanded the number of studies by only requiring a change from a baseline measure. Since many of the published enrichment articles available do not report crucial data needed for calculating effect sizes, had we used the same statistical methodology as the prior studies, we would have been limited to roughly the same zoo and aquarium research and thus the same results.

By expanding the scope of our meta-analysis, we were able to tap into important trends that have not yet been addressed. Namely, we found trends indicating that specific enrichment types can be used to target specific behaviors based on the subject's taxa. We found that, without controlling for taxa, foraging-based enrichment worked better at increasing explorative behaviors than did enclosure manipulation

based enrichment. Further, we found that enrichment as a whole worked better at increasing exploration in carnivores than it did in ungulates. Along these same lines, results indicated that enrichment was more successful at influencing inactivity in carnivores than in primates; the same was found for the effect of enrichment on "other behaviors", or those which were either not able to be categorized due to low sample representation or were designated as "other" by the original authors.

When we contrasted specific enrichment types between and within taxa, we again found multiple notable results. We discovered that among carnivores, ungulates, and primates, foraging-based enrichment worked least of all for reducing stereotypy in primates. We found that foraging enrichment, specifically, worked better at increasing exploration in carnivores than in ungulates and that foraging enrichment worked better for increasing enclosure use in carnivores than in primates. All is not lost for primates, however. We found that "Other Enrichment" types (those which were not food, enclosure, sensorial, social, or toys) worked best for reducing stereotypy in primates than did foraging-based enrichment types. Within carnivores, our results suggest that foraging-based enrichment worked better than enclosure manipulations at influencing exploration. Lastly, we found that within our sample, the enrichment types that seemed to have the biggest influence on a specific taxon were not the ones being used most commonly within that taxon. Carnivores were provided the most "Other Enrichment" and both ungulates and primates were given more foraging-based enrichments than carnivores.

We discovered that among carnivores, ungulates, and primates, foraging-based enrichment worked least of all for reducing stereotypy in primates.

Our results suggest that an ethologically-supported approach to enrichment may make the use of enrichment to influence captive animal behavior more efficient. We believe that future developments in enrichment will come from creative application of technology, quicker and easier data collection to document outcomes, better understanding of behavioral genetics and evolutionary relationships and history, sophisticated application of new findings in learning theory, and the incorporation of new methods for quantifying and understanding differing animal temperaments.

Kong Qi[1,2], Sun De-mi g[2,3], Qin Chuan[1,2]

Current Understanding and Use of Environmental Enrichment in China

1. Institute of Laboratory Animal Sciences, Chinese Academy of Medical Sciences (CAMS) & Comparative Medical Center, Peking Union Medical College (PUMC); Key Laboratory of Human Disease Comparative Medicine, National Health and Family Planning Commission (NHFPC); Beijing, 100021, P. R. China.
2. Laboratory Animal Welfare & Ethics Committee, Chinese Association for Laboratory Animal Sciences (CALAS)
3. National Research Institute for Family Planning, Beijing 100081, P. R. China.

INTRODUCTION

China's scientific research and development sector is currently the second largest in the world, and laboratory animals are widely used across a range of research fields. As China's biomedical and pharmaceutical industry has grown, a laboratory animal science community has developed which now has its own specialist professional society —The Chinese Association for Laboratory Animal Sciences (CALAS). The importance of animal welfare is increasingly acknowledged in China and the value of, and need to provide, environmental enrichment is being recognized by more and more scientists. This article reflects on the current understanding and use of environmental enrichment within China.

Requirements for environmental enrichment in legislation

Effectively managing the use of laboratory animals in scientific research requires steps to be taken to ensure that animals do not experience any unnecessary harm, discomfort, fear, suffering or pain. As well as giving animals a clean and comfortable living environment, along with adequate food and drinking water, animals must also be provided with the opportunities to engage in and display a normal range of natural behaviours. It is increasingly understood that enriching an animal's housing with appropriate nesting material, shelters, toys and social companions can help to provide a stimulating environment that meets the physical and psychological needs of animals. This is important for the quality of the science and for animal welfare, as well as for meeting the requirements of the law.

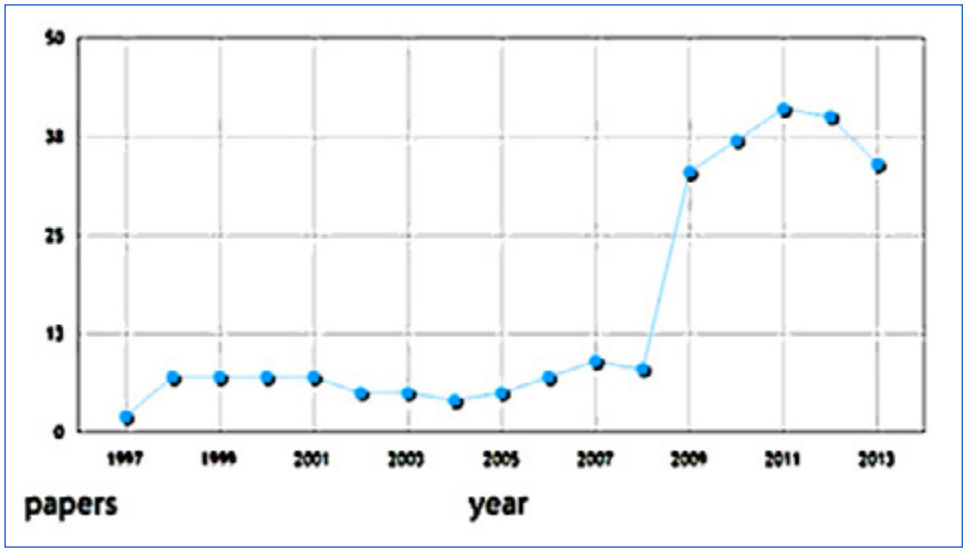
The *Guidelines on the Humane Treatment of Laboratory Animals* published by the Chinese Ministry of Science and Technology (MOST 2006) set out national standards in a number of areas relating to the use and care of laboratory animals. Importantly, these regulations include the requirement for establishments to cater to animals' behavioural and physiological needs. Two aspects of the regulation are particularly relevant to this discussion on environmental enrichment. Between them, the ninth and tenth items set out minimum space requirements for all laboratory animals, state that animals must be able to express natural behaviours including the ability to stand-up, lie down, stretch, turn around and groom[1], and require that objects and devices should be placed inside the animals' housing which will enable them to engage in exercise and play behaviour. There are additional specific provisions for animals such as non-human primates, dogs and pigs.

Understanding and implementation of environmental enrichment

A search of the CNKI database[2] of scientific papers published

[1]Pregnant or lactating animals should be provided with an additional 10% more thqn the normal minimum space requirement.

[2]This database (*http://www.cnki.net*) is similar to *PubMed* (*www.ncbi.nlm.nih.gov/pubmed*).



in Chinese shows an increase since 2008 in the number of mentions of 'environmental enrichment'.

In practice, consideration is given to providing most of the species used in research, testing and education with some level of environmental enrichment. However, although the current level of awareness and understanding about the benefits of environmental enrichment appears similar across different types of research establishments in China (e.g. private pharmaceutical companies, research institutes, government institutions), the actual ability for animal carers to provide appropriate enrichment is often limited by financial constraints or access to relevant information and resources. In addition, whilst more and more scientists are acknowledging the importance of providing environmental enrichment and will direct the people caring for their animals to prepare appropriate enrichment items, there are many other scientists for whom environmental enrichment is still considered an 'optional extra'.

Medium to large-sized laboratory animals, including non-human primates, mini-pigs, dogs and rabbits are provided with enrichment more frequently than some smaller animals, such as fish. Around 50% of establishments currently provide environmental enrichment for larger animals.

In terms of what may be seen in those research establishments that do provide environmental enrichment for their animals, rodents may receive nesting material, refuges and chew blocks, whilst hay and toys may be provided for guinea pigs and rabbits. Dogs and pigs may be allowed time to socialise with humans and given toys, and non-human primates may be given fruit, opportunities to climb and perch, mirrors and sometimes even music (see Table 1, page 10).

Sharing information about enrichment

There are five main ways that people in China currently find out about environmental enrichment and share experiences:

- The first is through the liaison that CALAS, its representatives and others in research establishments have with organizations such as AAALAC International[3], AALAS, FELASA and others through which we find out and can pass on information, experiences or products relevant to environmental enrichment.

continued on page 10

[3]There are currently 36 laboratory animal institutes in China that are AAALAC-accredited and therefore required to follow the AAALAC International animal welfare standards. Commercial institutions account for 70% of this total, research institutes 15%, government agencies 9%, non-profit organisations 3% and hospitals 3%.

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Table 1: examples of enrichment provided by some establishments

SPECIES	NATURAL BEHAVIOUR	ENRICHMENT
Mouse	Burrowing; hiding; gnawing; nest-building	Tunnel; refuge/shelter; chew block; wood chips; nesting material
Rat	Burrowing; hiding; gnawing; nest-building	Tunnel; refuge/shelter; chew block; wood chips; nesting material
Hamster	Burrowing; hiding; gnawing; nest-building	Tunnel; refuge/shelter; chew block; wood chips; nesting material
Guinea pig	Hiding; appropriate food for grazing; exercise	Refuge/shelter; hay; toys; pen housing
Rabbit	Hiding; appropriate food for grazing; exercise	Refuge/shelter; hay; toys; pen housing
Dog	Socialisation; lying; exercise	Shared exercise area and socialisation with other dogs and humans; rest area/bed; toys
Pig	Rooting; socialisation	Tyres; balls; exercise area
Non-human primate	Exercise; foraging; play	Apparatus to climb and perch on; fruit; mirror; music

- Secondly, more and more Chinese scientists working in laboratory animal science also now have experience of studying or working abroad—for example, in USA, UK, Germany, Canada and Japan. This provides exposure to what international colleagues in similar fields are doing, including how they provide environmental enrichment for the animals in their care. When scientists keep in touch with these colleagues from other countries, they can continue to exchange this kind of information once they have returned to China.
- The internet is used, particularly by young scientists, to discover information on animal care and welfare, including enrichment.
- Scientists from China regularly attend international meetings on laboratory animal science and animal welfare. They bring back information or products relevant to environmental enrichment.
- As China is a significant market for laboratory animal science, a number of companies are now established in the country that produce, market or promote environmental enrichment products.

CALAS initiatives

Representatives of CALAS liaise with a number of international organisations (in addition to those mentioned above) such as the UK Royal Society for the Prevention of Cruelty to Animals (RSPCA) and the International Fund for Animal Welfare (IFAW), and we also collaborate with scientific colleagues in USA, Canada, EU, Japan, South Korea, Singapore, Malaysia and Thailand. These relationships can include academic exchanges to share information on topics including animal welfare.

Through its activities and communications with its members, CALAS promotes the importance of animal welfare and provides knowledge and information on new initiatives on environmental enrichment and other factors relating to the care and welfare of animals. CALAS holds special training events throughout China (often in collaboration with international partners such as the RSPCA) and the CALAS Annual Meeting provides an important opportunity for exchanging information and the sharing of ideas for good practice. CALAS has been involved in the editing and publication of training and teaching resources, along with chapters in relevant books for graduates, and has liaised with others, such as the RSPCA in the translation of animal care sheets (and a website resource promoting refinement). CALAS also publishes expert reviews and articles on animal welfare in national scientific journals, such as the *Journal of Comparative Medicine*.

Acknowledgements

The authors are grateful to Barney Reed and Paul Littlefair of the RSPCA for their assistance in the preparation of this article.

Relevant reading and references

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How Cute Is That?

Article

Carolyn Allen, BS, RLATg, CMAR

Animal Behaviorist, Conventional and Enrichment Supervisor
Cincinnati Children's Hospital

Enrichment Through the Years: Reflections on Advances in the Field

I started out my career 16 years ago, working as a Primate Technician during a time before enrichment was really thought of as standard—it was newly evolving, up and coming and the road ahead held many challenges. Working with numerous lab animal species through the years, my focus mainly being on non-human primates, I have been immersed in the ever-changing world of enrichment.

My interest was sparked as I spent more and more time with the animals I cared for on a daily basis, and as I started realizing their individual personalities and likes/dislikes. It seemed so simple to me that I could offer or create something that would make them behave more like monkeys while still living in a cage. If we wanted our research to produce reliable results, why not do our best to alleviate stress and provide for species specific behaviors for our animal "models"? Why not broaden our enrichment program? Why not do more for them?

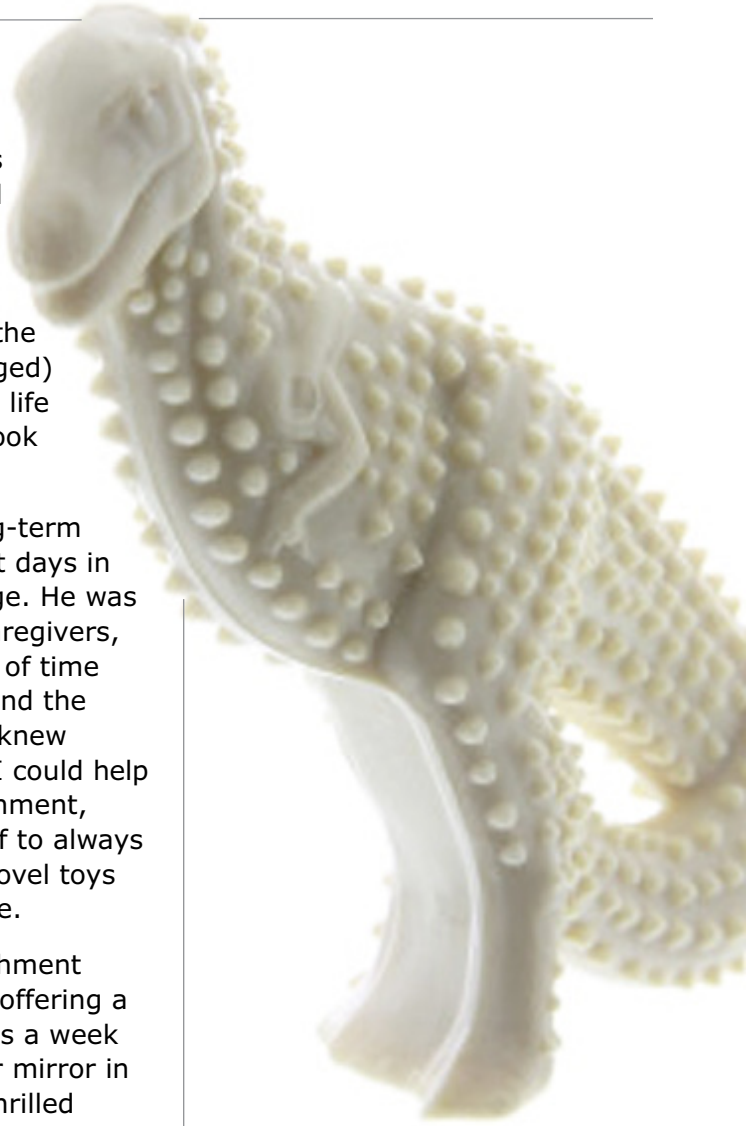
I have learned through the years that these questions, while easily answered in my own mind, present many challenges. They necessitate buy-in, proof of positive results and scientific justification, as well as time, money, effort, consistency and openness to change—on everyone's part.

A story I always like to share when I am presenting is one of a particular cynomolgus macaque that I worked with at my first job (we affectionately called him "Kojak, even though naming the animals was discouraged) who truly touched my life and changed my outlook forever.

He was on a very long-term study, and spent most days in a relatively empty cage. He was very social with his caregivers, and we all spent a lot of time interacting with him and the others in the room. I knew Kojak would thrive if I could help to improve his environment, so I challenged myself to always keep an eye out for novel toys I could add to his cage.

At the time, our enrichment program consisted of offering a single fruit a few times a week and a dumbbell toy or mirror in each cage. I was so thrilled when I purchased a nyla-bone dinosaur shaped toy for him. I excitedly put it in his cage that afternoon and left for the day soon after.

The next morning, I noticed him cowering in the back corner of his cage but thought it must be study-related, so didn't think much of it. The weekend



came and went, and Monday morning I came in to find him in the same cowering position as a few days prior; biscuits were relatively untouched in his cage. Turned out that dinosaur scared him to death, and as soon as I figured that out and removed it from his cage he was back to his normal, friendly lip-smacking self.

That experience taught me a valuable first lesson in evaluating the effectiveness of enrichment and also that I needed to separate my own anthropomorphic emotions. As much as I enjoyed doing it, providing enrichment wasn't for my benefit, or what I assumed the animals would "just love; it was for them, and I started to look at each animal as different, each personality as different, each need as different.

These factors needed to be considered across the board when I was later building an effective program. Novelty, variety and openness to change, criticism, support, as well as a focus on individual animal demeanor are key, and all of the above are trends that are becoming more and more important in this field.

As I moved on in my career, going from technician to trainer to managing enrichment and behavior programs, I have been afforded so many opportunities and challenges, most of which have been supported by those who whole heartedly believe in the positive results of a well-planned enrichment program. Also thrown into the mix, are those who doubt and question, rightfully so in some cases. Lack of time, money, staffing, support, buy-in and many other factors may negatively affect an enrichment program, but I have learned to be persistent and been able to effectively show positive results

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Recyclable, destructible, easy to access enrichment items that are novel—for sheep, non-human primates, rabbits and pigs.—*Cincinnati Children's Hospital*

Compatible social groupings and taking species specific behaviors/environmental factors into consideration can make all the difference.
—*Cincinnati Children's Hospital*

Creating an enriched home room environment for non-human primates by laminating colorful pictures and placing around room or hanging as mobiles.
—*Cincinnati Children's Hospital*

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through patience, staff involvement, presentations, teaching, study outcomes, communicating with peers in the field, and tracking (as well as tweaking when needed) my own program's strengths and weaknesses. I have found the most challenging and rewarding enrichment programs I have worked with over the years are those that start off small—almost non-existent.

Nothing motivates me more from a professional stance than starting a program from scratch and growing it into something amazing. The reward is worth all of the effort, especially when I see more and more people wanting to get involved, hear positive feedback from researchers, or when I see a significant positive difference in an animal's demeanor or behavior.

Over the years, I have seen and been a part of the evolution of enrichment which has spanned from a passive toy sitting (at times unused) on a cage floor to now paying closer attention to species specific behaviors using, but not limited to: scent, sound, visual stimuli, socialization with compatible cohort(s), human interaction, animal training/positive reinforcement, foraging opportunities, destructible items, water, more desirable and species appropriate food treats, alternative social opportunities (mixed species), and taking individual needs, responses, and personalities (temperament testing) into consideration.

Human interaction is such a positive form of enrichment for social species.

From a budgetary standpoint, there is no doubt that creativity is a must. Enrichment can be expensive. Recycling items from the vivarium can do wonders for a low budget enrichment program—all it takes is a little novel thought and the involvement of the staff to come up with creative ideas—something we have no shortage of here!

Looking back, I wouldn't choose any different path. I am beyond grateful to have been a part of this enrichment evolution, and I have every confidence it will only get better. I have the support of colleagues and have learned to celebrate the successes and take a lesson from the failures. The term "Enrichment" is everywhere now—and the emphasis many companies/ facilities place on it, many to the point of employing specific enrichment personnel positions, is so wonderful to see and hear about! I strive to be a mentor to my staff and to those who are interested in following this career path, and I am grateful to my own mentors and colleagues who have been a part of and support the power of enrichment.

Article

Mary Megan Sparks, BS, RVT, LAT
Chris Boehm, MEd, DVM, MS, DACLAM
Deb Hickman, DVM, MS, DACLAM
Indiana University School of Medicine

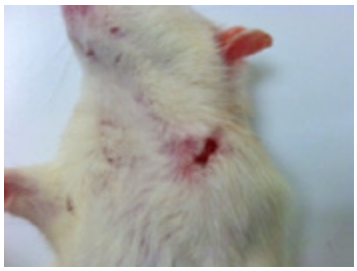
Pumice Stone Enrichment as an Intervention to Self-injurious Behavior in P Rats

Rotational outbred adult rats phenotypically selected to prefer drinking alcohol ("P" rat) have a tendency to present with self-inflicted wounds generally around the neck, chest and shoulder areas. Historically, the interventions used for P rat sores have been antibiotic ointment, chlorhexidine rinse, wound powder or cardboard houses. These interventions rarely produced wound healing or an end to self-inflicting behavior.

Pumice stones, such as those used in parrot enrichment, were recently introduced as an alternative treatment and seemed to really aid in healing the sores. Their nails were trimmed without their knowledge.

We decided to start a study where there would be five treatment categories: control, pumice stone, triple antibiotic ointment (TABO), Columbia wound powder (CWP), and cardboard huts. Rats with new sores that had never been treated before were put on the study. We wanted to see just how well the pumice stone would aid in healing compared to the other alternatives. Each rat was photographed and its wounds were measured every two weeks.

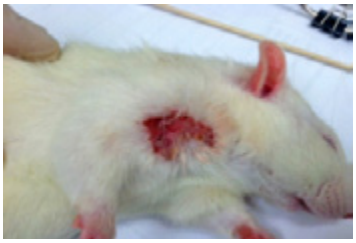
Rat #3—Pumice Stone



Rat #3 *before receiving a pumice stone in his cage.*

Rat #3—*4 weeks after having a pumice stone in his cage. The lesion never returned.*

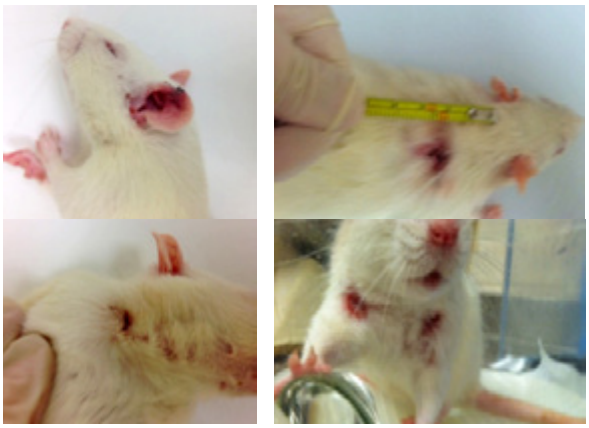
Rat #1—TABO treatment



Rat #1 *before TABO treatment.*

Rat #1—*6 weeks after TABO treatment on Monday, Wednesday and Friday. Was euthanized early because of the severity of the sore.*

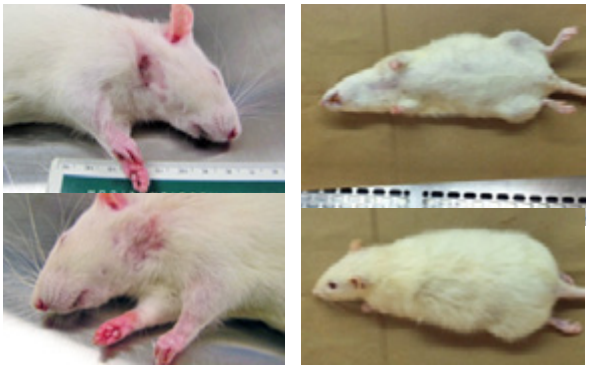
Rat #8—Rat Hut



Rat #8 *before introduction of a rat hut.*

Rat #8 *after 10 weeks with a constant supply of rat huts. This rat acquired new deeper, larger sores during treatment.*

Rat #6—Pumice Stone



Rat #6 *before given pumice stone.*

Rat #6 *after 12 weeks with the pumice stone in cage. All the lesions were healed.*

As you can see from the pictures, rat #3 and rat #6 healed up completely from the pumice stone 'treatment', while the rats on the TABO and the rat hut treatments did not get any better. (We have not put a rat on the CWP treatment yet.) Our study is continuing to ensure that these results are not isolated events, so we can statistically prove that the pumice stone intervention is the best treatment for these self-inflicted sores.

Treatment	# healed	# not healed
TABO	*0/2*	*2/2*
Pumice	*3/5*	*2/5*
Control	*1/3*	*2/3*
Huts	*2/4*	*2/4*
CWP	*0/0*	*0/0*

Article

Jessica Peveler, BA, RVT, RLATG

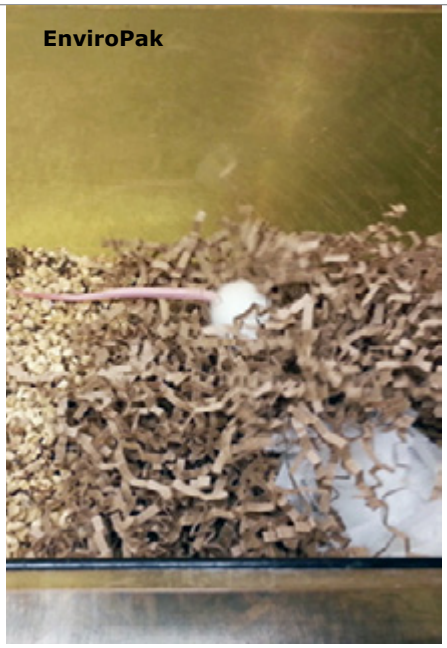
Environmental Enrichment Coordinator, Animal Health Technician
Laboratory Animal Resource Center, Indiana University School of Medicine

Comparison of Mouse Nesting Materials: Comparing Apples to Oranges

Because mice represent the largest quantity of animals used, improved environmental enrichment for mice should be a priority. Nesting material is the best first step in this process because it is relatively low cost, easy to use, generally accepted by investigators, and has been demonstrated to have the most benefit with the least detrimental consequences[1-8].

Our previous mouse enrichment consisted of a single facial tissue added to mouse cages before autoclaving. SOPs instructed that extra tissue be added as necessary when the original became soiled, torn, or flattened beyond use. Practically, however, this very rarely happened. Further, cages were enriched with one tissue, regardless of housing density, gender, or breeding status.

Although our facial tissue was cheap and easy to use, we determined that it was only about 1 gram of nesting enrichment, whereas current literature recommends 6-8 grams[9, 10]. When comparing costs of different nesting enrichments, it is imperative that you understand how much nesting material you are getting per gram! When we calculated the cost of our "cheap" tissue with 8 grams in the cage (six sheets!), it turned out that the popular Enviro-dri



shredded paper was less expensive per gram.

We observed various nesting samples, photographing every few days how the nest sustained over time. In the end, we agreed that paper strip enrichment had the most advantages: dust free, unlikely to entangle, easy to use, inexpensive. One under-appreciated benefit of multiple-piece nesting material is that it enriches multiple animals in a cage simultaneously, without competition. There are several options for paper sources so we had to then evaluate and compare cost and ergonomics.

A question that can only be answered by each individual facility is this: how much is ergonomics worth? Many of the paper strip enrichment options come in pre-packaged portions. The first advantage of this packaging style is that it is easier to dispense and generally less messy than loose paper. Secondly, it has the added benefit of occupying the mice by making them work for their enrichment. Prepackaging can also be a disadvantage, however, as sickly animals may not have the drive to acquire materials for building nests. For this reason, it is prudent, like many enrichment strategies, to have a "universal" enrichment and one or two alter-

Nesting Comparison Chart

SUPPLIER	PRODUCT	COST	COST PER CAGE	APPROX COST/YEAR	DESCRIPTION
Current Practice		$33.88/case of 30 boxes (100 tissue/cage)	$0.01	$3,616.00	Facial tissue 1 sheet = 1.1g
Sheperd Specialty Papers	Enviro-dri	$48.95/25# box (1417.5 cages)	$0.03	$11,050.56	Krinkled paper dispensed at 8g
Bio Serv	Rodent Nesting Sheets Certified	$70/case of 5,600	$0.04	$12,000.00	8x4.5" Lint Free paper sheets. 3 sheets = 1.3g
Andersons	Crink-l'Nest	$49.73/10 kg case (1250 cages)	$0.04	$12,730.88	Krinkled paper in white or brown 8g
Sheperd Specialty Papers	Enviro-dri Irradiated	$65.40/25# box (1417.5 cages)	$0.05	$14,761.60	Krinkled paper at 8g
Sheperd Specialty Papers	Enviro-dri Certified	$31.00/10# box (567 cages)	$0.05	$17,494.40	Krinkled paper at 8g
Current Practice		$33.88/case of 30 boxes (100 tissue/box)	$0.07	$21,683.2	Facial tissue 6 sheets = 8g
Sheperd Specialty Papers	Alpha twist	$30.75/8# box (453.5 cages)	$0.07	$21,697.60	Multi-layered paper chopped into short lenghts 8g
WF Fisher and Son	Enviro Pak	$83/case of 1000	$0.08	$26,560.00	Approx 6g Enviro-dri in tea bag
WF Fisher and Son	Enviro Pak Irradiated	$96/case of 1000	$0.10	$30,720.00	Approx 6g Enviro-dri in tea bag
WF Fisher and Son	Enviro Pak Certified	$100/case of 1000	$0.10	$32,000.00	Approx 6g Enviro-dri in tea bag
Bio Serv	Rodent Nesting Sheets Certified	$70/case of 5,600 (ordering 20+ cases)	$0.13	$40,000.00	8x4.5" Lint Free paper sheets. 10 sheets = 4.5g
Harlan	Diamond Twists	$83/case of 1900	$0.17	$55,904.00	4.5" twisted paper (1.9 g) Unrolls to 12" long (by 4.5" tall). 4 twists approx = 8 g
Sheperd Specialty Papers	2x2 Alpha-Nest	$91/case of 2000	$0.14	$43,680.00	2x2" Cotton Fiber Squares. 3 pieces approx = 8g
Ancare	Nestlets	$176.20/case of 3600	$0.15	$46,826.56	2" Cotton Fiber Squares. 3 pieces approx = 8g
Sheperd Specialty Papers	2x2 Alpha-Nest Irradiated	$101/case of 2000	$0.15	$48,480.00	2x2" Cotton Fiber Squares. 3 pieces approx = 8g
Andersons	Bed-r'Nest	$136.64/case of 800	$0.17	$54,656.00	Balled crinkle paper 7.5-8g
WF Fisher and Son (Fiber Core, LLC)	Small Rodent Foraging Box	$206/case of 378	$0.54	$174,368.00	4x1" box containing avg 6.39g Enviro-dri
WF Fisher and Son (Fiber Core, LLC)	Small Rodent Foraging Box Irradiated	$215/case of 378	$0.57	$181,760.00	4x1" box containing avg 6.39g Enviro-dri
WF Fisher and Son (Fiber Core, LLC)	Extra Small Rodent Foraging Box	$430/case of 378	$1.14	$363,840.00	2x1" box containing avg 3.02g Enviro-dri
WF Fisher and Son (Fiber Core, LLC)	Extra Small Rodent Foraging Box Irradiated	$445/case of 378	$1.18	$376.640.00	2x1" box containing avg 3.02g Enviro-dri

Our facility has approx 12,000 mouse cages, changed every two weeks. 12,00 cages changed x 26 times (weeks) = 312,00 cages/year. Rounded up to 320,000 to account for spot changes, flooded cages, and some cages that are changed weekly instead of every other week.

nates for special circumstances. Research indicates that mice prefer and perform better when able to make complex nests[2, 3, 6, 7, 11], but visibility of cage occupants then becomes a concern. This is a complicated issue for facilities, investigators, animal care staff, and regulators to navigate.

In our institution, at least, it can be argued that nesting material has equivalent complications in regards to visibility when compared to progressively cloudy cages that are equally obfuscating. Further, we must be careful to not exclude paper strip material specifically due to decreased visibility when it is more about the amount of nesting material; 8 grams of facial tissue or compressed cotton squares are equally concealing.

In conclusion, when considering what enrichment to use in your facility, it is important to fully evaluate your options. "Nesting material" is a general description for various products with differing cost and function.

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Talking to Animals in Your Care: A Discussion on LAREF

Discussion Participants
Genevieve Andrews-Kelly (Genny), Meagan Mccallum (Megs), Evelyn Skoumbourdis, Thomas Ferrell (Tom), Harriet Hoffman, Jeannine Cason Rodgers, Renee Gainer, Kaile Bennett, Meagan L. Shetler, David W. Cawston, Polly Schultz, J.B. Barley (Jas), Kayla Shayne, Jacqueline Schwartz, Natasha Down, Russell Yothers, Autumn Sorrells, Lynette Chave, Viktor Reinhardt

Erik Moreau, *Moderator*

I had discussions with some Trainers who emphasized the importance of talking to your animals while they acclimate to a new environment and handling procedures, and, once the acclimation period is completed, to continue having "conversations" with the animals.

Do you talk to your animals? If you do, what species are you working with? Do you find it is making a difference when you talk to your animals on a regular basis?
—Erik

***Photo by Amanda Majakoski**|Flickr Creative Commons*

I definitely talk to all my animals: dogs, macaques, rabbits, swine and rodents. When I train new employees, I always encourage them to talk to the animals in their charge. Every time we are in an animal room, there is communication happening between us and our animals. More than just through words, we are communicating emotionally and with our body language. These friendly "conversations" set and maintain a positive tone when we are with our animals. The conversations with my animals are highlights of my day!
—Genny

In my current position, I mostly work with and talk to dogs and rats. I do, however, have years of previous experience working with and talking with cynomolgus macaques, rabbits, guinea pigs and mice. Whenever I am around my animals, I talk about random things just so they can hear my voice. I always talk in what I feel are calm and soothing tones, which I do think really helps the animals to be at ease when I am with them. Talking and sometimes singing to the animals makes me feel relaxed and calm which, I assume, projects into the room at large and creates good vibes for all.*—Megs*

Photo by Annie Reinhardt

I talk to all animals with whom I work—including the rodents. When entering an animal room, I will greet everybody with "Hi guys/gals, Greetings meece, Afternoon ladies/gents," etc. Not all animals are able to see the door, and not all animals have keen eyesight. Thus, I feel my vocal welcome lets all animals in the room know that someone has entered. I know it does something positive because the animals' body language shows me they are not alarmed or afraid when I have entered. I will then speak to them as I walk around the room and while I work with individual animals or groups of animals. It's just something I've always done. It sometimes happens that I have extended conversations with the larger animals, and I get responses from rabbits, dogs, monkeys and swine. Occasionally I'll sing. I'm not very good at it, but some of the monkeys and swine I am working with really respond nicely to it. Perhaps they like things off key?! Talking (and singing) to the animals in my charge makes them familiar with me and probably helps them understand I mean no harm to them.—*Evelyn*

Not only do I talk to all the animals in my charge but, on occasion, also sing to them. I tell the staff that the rodents are really good listeners and don't mind the terrible singing! —*Renee*

Singing may not always be the best form of communication. I had an aged mare who could hear very little, but on me starting up singing in the stables, she would consistently run away—even from her food. I also had a cat who showed the very same reaction, though perhaps this says more about my singing than anything else! —*Lynette*

The vervet monkeys I am training seem to like it when I sing. When they hear "In the jungle, the mighty jungle, the lion sleeps tonight: oweemaway, oweemaway ..." they all come right up to the front of the cages and look at me: "YAY! The crazy lady with the 'clicker game' (what I imagine they think of positive reinforcement training) is here!" It's always amusing to see their excited faces.—*Jeannine*

I am not a good singer, so I also only talk to the animals in my charge, regardless of species. I very much agree that it benefits not only the animals but also myself; it makes the animals relaxed in my presence and it makes me happy to be with them. Besides talking to my pets at home, I was first introduced to the importance of talking to animals when I volunteered at a University swine complex. The Manager had such a great rapport with his pigs! Every room he walked into, he greeted the pigs. At that time, I did not understand why he called them all "Birds." I have a better appreciation now as I too will call my animals some pretty silly things.—*Erik*

Whenever I walk into their room, I talk to my critters—especially large animals—and continue talking to them while I am with them. IMHO, not the words as much as the tone of my voice serves to keep things level, myself included. Even if I'm only talking to myself, I crack myself up sometimes. —*Tom*

I agree with you 100%! Talking to the animals in a happy soothing tone helps in fostering a friendly relationship with them. They do recognize you by your voice or by the sound of your walk or cart you push, even before you enter their room. I work with a colleague who, whenever he walks into a room of monkeys—be it in the morning, at lunch or in the late afternoon—greets the animals with "Good morning." This is usually a higher pitch and it sounds the same every time. Always cracks me up, but the monkeys know who he is by gosh, just by those words, or is it just by the sound of those words? I talk to all the animals in our facility. Sometimes I find myself singing and dancing in a non-human primate room, and

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I do believe the monkeys look at me like I am crazy; I just tell them "come on dance with me." Hahaha, maybe I am! —*Harriet*

Talk, sing, dance! Nothing better than a captive audience—LOL.—*Jeannine*

Totally Agree!!!—*Harriet*

Walking into a monkey room, a pig room, a rabbit room or a rodent room, I also greet everyone with "Hello" or "Good morning." I believe this is a kind of courtesy, letting the animals know who is about to enter. They will not be frightened as they already know that a completely harmless and trustworthy human is coming.—*Renee*

Photo by Liddy Roberts | Flickr Creative Commons

When acclimating new macaques while they're in quarantine, I spend some time each day sitting near their cages and read to them. This gives me something to say and allows me to avert my eyes naturally so they get comfortable with me. I have the impression that the reading lets them get used to conversational tones in my voice. Usually, I give them something to snack on during these visits to associate my voice with favored treats. Later, when the animals are on behavioral studies, I am talking to them all the time, saying positive reinforcement/affirmations or explaining what I'm doing or what I'm about to do. They also have nicknames that I use when addressing individual animals.—*Kaile*

Having a good conversation with your animals and humming or singing when you are in their room provides high quality environmental enrichment for both the animals and for you. The vocal contact with your animals is the basic foundation for the development of a trust relationship with them. Your voice is certainly of more value for them than sound emitted from a radio or CD player. When I worked with rhesus and stump-tailed macaques, I always greeted the animals cheerfully when entering their rooms, and I kept vocal contact while visiting them individually. They recognized my voice and knew from their own experience that they could trust me, so they always remained quiet while I was with them, even when I had to give injections or take blood samples.—*Viktor*

Rabbits appear more at ease when I talk or sing a lot, thereby creating a kind of soothing background sound. Pigs love a good conversation, especially when I include some lip-smacks; it's a language they understand! I do talk to rodents, even though we do all our work with them under hoods, so they cannot hear me. When talking to them, it is more for my sake, keeping me in a peaceful state of mind that hopefully affects the rodents in a positive way. Monkeys show with their body language that they like it when

***Photo by Clayton** | Flickr Creative Commons*

I chat with them or sing while cleaning their room. Since dogs can learn the meaning of words, talking to them is a very valuable tool for me when I work with them.—*Meagan*

Your comments really sum up what I was about to say. I believe that talking to our animals helps us and helps them. I stopped with my daughter yesterday to see some dairy heifers out on pasture that we drove past. They were very typical cattle, shy but curious and spooky at first. The more we talked to them, the more they settled down. When we left after about 20 minutes, the fence line was full of heifers looking for more attention.—*David*

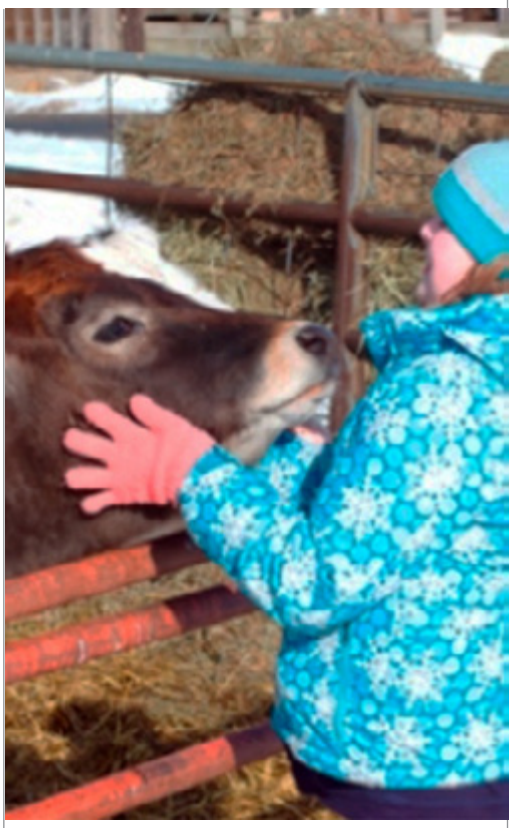

Photo by David W. Cawston

Speaking to the macaques in my care fosters trust and friendship relationships with them! It helps them understand my intentions, and when they respond in their macaque-way, that helps me understand what's going on their heads. No need for an interpreter (:-) —*Polly*

Rather than talking, I start hooting whenever I'm approaching a room of our macaques; just to let them know I'm coming. They always hoot back—and the husbandry techs always laugh at me :o) —*Jeannine*

I think communicating with animals in their own language is even better than talking to them in human language which they don't understand, albeit probably "feel" its meaning. —*Viktor*

When I am with the macaques, I can't even tell you how often I hoot, grunt, lip-smack and make the curious humming sound without even being aware of it. This "monkey talk" may sound pretty silly to an outsider, but I can tell you, it connects me deeply with these creatures who depend on my proper understanding of their needs, wishes, pains and frustrations.—*Polly*

The hooting has also become a kind of background communication with my macaques. I once casually hooted while leading an inspection team

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Photo by Stan Hiatt

in the room when one of my boys was begging for a treat; Whoops!—*Kaile*

A happy lip-smack conversation with macaques—especially cynos—has always been a highlight for me! I've also had the good fortune to converse with pigtails—humming while presenting a duckbill face—and with baboons, the happiest grunters on Earth.—*Evelyn*

I often wonder if non-human primates sometimes misunderstand us when we wear the obligatory face mask/goggles. Lip-smacking is a "vocabulary" I very often use when communicating with our macaques. I do realize that they can't see my puckered lips—a facial expression that is part of the macaque-typical lip-smacking—yet I do it anyway.—*Kaile*

The monkeys do hear when you smack your lips, and they can also see the movement of the mask while you do the lip-smacking gesture. I think these signs are enough for them to understand your message. Many of my macaques lip-smack back in typical macaque fashion when I lip-smack in front of them, irrespective of the fact that I wear a facial mask.—*Harriet*

I talk to all my animals, primarily rodents and rabbits, but also farm animals, birds and amphibia, even though I've yet to see any response from the latter. All the warm-blooded animals appear to recognize my voice. When they hear me, they will come forward to the front of their cage/pen, knowing that I always come with good intentions—if not with favored treats. Pigs will always "talk" back when I address them.—*Jas*

I keep a conversation going with all my animals—mice, dogs, fish and reptiles. As such, they know all my secrets, so I hope they never learn to talk. It's probably anthropomorphism, but sharing my thoughts and emotions with them feels like it may be therapeutic for all of us.—*Kayla*

Photo by Kayla Shayne

It is possible that some animals do not actually hear us when we talk to them because the sound of a typical human voice is not within their hearing range. This may apply to rodents, but perhaps also to large animals such as pigs; so when we are talking to these animals, we may as well just be talking to ourselves!—*Russell*

That is a good observation. I wonder, though, if such an animal doesn't pick up the energy that is created by the human voice—without actually hearing the voice with his/her ear drums—and feels/

decodes the quality of that energy in some way. It doesn't really matter if animals can hear us anyway as they don't speak our language, but they can most likely feel the positive or negative energy that accompanies the vibration of our voice.—*Autumn*

I agree, it's all about the energy that we project. I suppose the talking or singing helps us in projecting the energy that is created by our positive or negative intentions and emotions. The "whisperer" in us all does not require actual audible speech. All of that aside, don't get me wrong, I talk to my animals every day— sometimes in my language, and sometimes in theirs!—*Russell*

The words that we speak/sing in the presence of animals carry our emotional energy; it is the emotional quality of this energy that the animals can understand. There is no cheating possible! You can tell an animal (or a little kid) nice things, but when these words do not correspond with your true intentions, the animal will not "believe"/trust you. I find it amazing how animals (and little kids) can "read our minds" or, perhaps more correctly, "read our hearts."—*Viktor*

When I enter their room and say "Good morning," all the rats and all the guinea pigs in my charge come to the front of their cages without fail; they have learned to recognize my voice, as I am talking most of the time when I am with them. The guinea pigs get particularly excited, as my voice is a signal for them that they are going to get the hay they love so much. —*Jacqueline*

It seems to me that talking to another creature with whom we interact frequently is a spontaneous response. I have worked with a principal investigator who talked to rats before, during and after he did experimental surgeries with them. The talking may help to stay in a relatively balanced state of mind, even in potentially disturbing situations. —*Viktor*

It is not an uncommon experience for me to come into a room where a researcher is having a chat with his/her mice. Pretty much all our PIs talk to their animals before and during surgery as well as after surgery when the animals are recovering. I think we all see it as essential for the animal who is subjected to a potentially painful and/or distressing situation to know someone they know is around. As with humans, hearing seems to be the last sense that switches off during surgery and the animals always seem to go in and out of anesthesia much calmer when the surgeon is talking to them rather than doing his/her job in silence.

Likewise with euthanasia, we make sure that the last thing an animal hears is the voice of someone they are familiar with.—*Jas*

Being with and talking to animals who know me well is particularly important when they are recovering from surgery in single cages. It seems to me that hearing my voice makes them feel a little bit better, less scared and, especially, less lonely.—*Natasha*

Talking to/with the animals in your care not only provides freely available environmental enrichment but also can serve as a tool. It has been and is my experience that talking reassuringly and compassionately to a highly distressed, seriously injured or seriously handicapped animal has a comforting effect that enables me to examine and treat the animal as needed without triggering a flight response. "It's okay, I want to help you" is a magic phrase that animals in distress seem to understand. —*Viktor*

How Cute Is That?

Article

Bruce W. Kennedy, MS, RLATG, CMAR, CPIA

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The Value of Incorporating Webinars into Training Programs

I teach a lab animal management course to veterinary technician students at Cal Poly Pomona. Ours is one of the few four-year programs of the many AVMA-accredited schools. The curriculum requires teaching about laboratory animal procedures along with other typical subjects: Office and Hospital Procedures, Client Relations, and Communications; Pharmacy and Pharmacology; Nursing; Anesthesia; Surgical Nursing; Laboratory Procedures; Imaging; and Avian, Exotic, Small Mammals and Fish Procedures. It's challenging to cover so much content, and I have found webinars to be a useful adjunct to my teaching repertoire.

Many of my students expect to work in traditional veterinary clinics and haven't thought critically about other opportunities where they can work with animals, such as zoos, research facilities, shelters, or rehabilitation and ecology centers. One of my objectives is to introduce these varied uses of animals and the processes by which treatments and therapies are developed to care for all of them. The link is research, and since an enriched environment is increasingly recognized as a critical component of any captive animal's welfare, I am always looking for engaging ways to expose my students to these topics.

This course is self-directed learning! I don't want to 'preach' to the students. My intention is to provide several sources of materials that enable the students to discover the benefits of animal research and the importance of addressing and incorporating various processes, like environmental enrichment.

Whether live or recorded, webinars offer students the chance to explore various subjects related to the curriculum at their own pace. They can delve into a particular topic as deeply as they wish—devoting more time than I might during class. They hear a new voice—that of an expert with much more knowledge in their particular field than I possess. They view images and video footage to which I don't have ready access.

There are so many advantages.

As a professor, I need to be sure that students are doing more than merely sitting before a screen. So, to evaluate the learning, I create assignments designed to meet different objectives. For example, I might assign a 750-word essay after watching a film on the ethics of animal usage. I also award "p-points" for participation.

From my syllabus

This assignment is meant to get you involved in animal research activities outside of class. If you touch, smell, read, see, or hear something about animal research, write it up as a comment (summary of the event and your thoughts/reflections as it relates to class) and send it to Blackboard. They can be obtained in many, many ways. For example: responding to emails from biomed listserves; participating in CBRA activities (visiting the website, doing outreach talks about animal science); watching animal research movies (theater, NOVA, Discovery channel, etc.); accessing the AALAS learning library (ALL); commenting on animals in the news (TV, web, newspaper, magazines, PDFs that I post on Blackboard); sending me

emails about management and its relationship to working with animals. Be creative! I've given you some suggestions, but use your mind and explore your interests. Items are worth 4 points and I grade (1 to 4) based upon your insight to the item and the quality of your writing.

#1. theater movie (e.g., "Planet of The Apes", "Dr. Doolittle") or TV show (e.g., medical show involving animals), something the general public would watch

#2. something about animal research (doesn't have to be biomedical) in print, like a newspaper or a magazine (*Time, Newsweek, Discover, Popular Science, LA Times, Wall Street Journal*, etc.)

#3. biomedical advocacy group, like CSBR or AALAS or VBI or enrichment site or others, find one

#4. conversation about a disease, using lab animals to study it, with someone close (e.g., boy/girl friend or family member or mentor)

#5 and #6. something (two of them!) about animal research studies posted on e-Clips or similar media site

#7, #8, #9, and #10. your choice (almost anything including YouTube) related to class.

And, on a recent final exam, I included a question directly related to *The Enrichment Record* webinars. It was given to students a week before so that they could prepare their answer.

Question 12)
Watch one of the webinars (about 60 mins).
Log-in using your own email address. (15 points)

Standardization of Environmental Enrichment for Lab Mice & Rats (Vera Baumans, DVM, PhD, DipECLAM)
https://vts.inxpo.com/Launch/Event.htm?ShowKey=16557

Rat Choice Reveals Preferences for Enrichment Objects & Bedding Conditions (Michael Noonan, PhD)
https://vts.inxpo.com/Launch/Event.htm?ShowKey=17255

After viewing, answer one of the following questions (500-750 words). Write as if you are explaining to a member of the public, who views the same video and would need help in understanding the concepts. Your answer, with editing, might appear in the publication *The Enrichment Record* *http://enrichmentrecord.com/*.

So, select one of these and one of the webinars. Incorporate what you have learned in AHS 369.
i). What is the role of enrichment as used in research studies in the lab animal facility?
ii). Share the aspects of welfare in the lab animal facility that an IACUC lay member should know.

iii). You've just been hired as an enrichment technician for ABC Labs. Describe your plan to "sell" the director on time to do it, including the costs, SOP, what the animals need, etc. (remember the budget cycle)

iv). Using your own research animal model from the protocol assignment, describe an enrichment program for it. Relate it to the natural history of the animal.

v). Why enrich captive environments?

Over the years I have found that my students enjoy learning from these different—dare I say enriching—assignments that include webinars. We know where college-aged students fit when applying the principles of adult learning (stemming from the studies by Malcolm Knowles, Stephen Brookfield, and Paulo Freire for example… that orienting the instruction to the learner and/or the problem has benefits compared to lessons that are content-centered, which are typical for children (pedagogy). Adults need motivation, a reason for learning within a context framed by their own experience. My role is to facilitate learning, and I support using webinars as an effective teaching tool for adult learners like my students.

Karen M. Froberg-Fejko, LATg, VMD

President: Bio-Serv, Flemington, NJ

Environmental Enrichment is not an option; it is essential to animals in their captive environment. It is not fluff… it is the science of understanding animal behavior and their biological and physiological needs. It is not an "extra"… we are obligated to provide it to all the animals in our care!

Totally dedicated to the humane care of laboratory animals, Karen has a wonderfully satisfying job. As president of Bio-Serv, she directly supervises the operation of a progressive corporation that manufactures and provides a line of innovative products that benefit the health and well-being of laboratory animals. She feels fortunate to have the opportunity to collaborate with investigators and animal care technicians from large and small institutions around the globe. An attentive listener, she works with her creative and responsive team to develop unique enrichment devices and custom diets that meet the vast variety of needs she has identified.

A research environment can be a stressful setting for laboratory animals. Karen focuses on Environmental Enrichment because it enhances the animal's physiological and psychological well-being, prevents stereotypical-behavior, promotes the expression of species-specific behavior and improves animal welfare.

"Here at Bio-Serv," she says "we are very lucky. At meetings, conferences and during customer visits, my co–workers and I act as a conduit for the 3Rs, sharing tips and tricks picked up from our interaction with so many wonderful people in our research community. We disseminate information…no need to reinvent the wheel!"

Karen was greatly inspired by Alan Bonner, who was Director of Veterinary Sciences at Bristol Myers Squibb where she worked for 9 years. Alan retired to become the president of Bio-Serv and Karen went to vet school. They went in different directions but never lost touch. After graduating from the University of Pennsylvania School of Veterinary Medicine, Karen worked as a veterinarian outside of the industry.

"Ten years ago, Alan called one day and asked if I would like to be president of Bio-Serv. Because he was 'my mentor', I didn't know what that meant, but trusted his opinion that I could follow in his footsteps. I was very content in my veterinary role…but had a leap of faith and took the job!"

And, as everyone who has ever worked with Karen knows, she made the right decision. What she loves best is that every day she and her team have a positive effect on how researchers work with animals. Their emphasis is on improving animal welfare, decreasing stress, increasing the validity of data, conversing with researchers about different needs of different animals, improving husbandry and, as a result, obtaining better data to find cures for debilitating diseases in both animals and human beings. "It's very rewarding to help researchers meet their goals and overcome challenges," she says. "We feel we have an enormous impact even though we are a relatively small company. Definitely a win-win!"

"Everyday, when I walk in to my job, while I know we have made amazing advances, my goal is to push the bar higher. People are still resistant, fearful of change, and many have not allocated a budget for enrichment. Here at Bio-Serv, we encourage people to share information and overcome fears."

In addition, Karen is a practicing veterinarian, treating dogs and cats at the Garden State Veterinary Hospital. As an Associate State Veterinarian for the New Jersey Racing Commission, she oversees all aspects of Standardbred and Thoroughbred horseracing in the state. A founding member of the Editorial Advisory Board of *The Enrichment Record*, Karen is a popular presenter at enrichment symposia and AALAS meetings all over the country. She volunteers her own time and encourages her co-workers to participate wherever they can contribute to the community. The first to step up and help, Karen loves eventing horses as well as breeding and showing golden retrievers.

When she is not fulfilling her many professional responsibilities, Karen devotes her boundless energy to her husband, Michael, and their 10-year old son, Colton. Calling him "a research miracle" she says that "...because of research, I have a son I adore." They live on a beautiful farm with six horses (Reiny is Karen's riding horse), 2 golden retrievers, 2 cats and numerous chickens. A truly enriching environment!

THOUGHTS ABOUT THE FUTURE OF EE

Karen is hopeful that there will be increased funding for scientifically relevant research, that the creation of innovative products will continue, and more work will be done with EE for lower species. "We've done a good job with the higher species," she says. "Now we need to focus on the smaller species such as rodents, rabbits and aquatics."

Resource

Animal Enrichment at the Oregon Zoo

The Oregon Zoo's internationally recognized enrichment program helps the zoo's animals thrive by improving their social and problem-solving skills. This video explains how enrichment activities are used at the zoo and includes some great clips of animals having fun.

CLICK ON PHOTO FOR VIDEO

Upcoming Meeting

ASSOCIATION OF ZOOS & AQUARIUMS (AZA) AND INTERNATIONAL MARINE ANIMAL TRAINER'S ASSOCIATION (IMATA) ANNUAL CONFERENCE
September 12-18, 2014
Orlando, FLA
http://www.aza.org/annualconference/

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

How Cute Is That?

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*

Environmental Enrichment Mini-Session at Zebrafish Husbandry Workshop 2014

Bobbi M. Baur, Sales Manager, Aquaneering, Inc.

The humane treatment of animals, as pets, on farms, or in the realm of scientific research, requires that their comfort and happiness be addressed. Efforts to determine appropriate environmental enrichment for rats, monkeys and other research animals have been ongoing for many years. It is becoming a more frequent discussion among husbandry specialists and researchers using aquatic models as well.

For over 12 years, Aquaneering, Inc. (an aquatic housing manufacturer) has been sponsoring a Zebrafish Husbandry Workshop at the annual Aquaculture America meeting. What began as a small gathering of enthusiasts eager to compare notes and work together to establish standards in the budding field of zebrafish as a research model has grown into a 1-1/2 day conference with 70-80 participants and over 20 talks. Although it has been a goal of the organizers for several years, 2014 was the first workshop to include talks on enrichment, with a 3-talk "mini session".

Dante D'India, Research Technician at Harvard University, presented a talk entitled "Implementing an Aquatic Animal Enrichment Program at Harvard Medical School". Prodded by the IACUC at Harvard to establish an enrichment program for the Megason Lab aquatic housing facility, Dante developed a three-pronged approach:

1. plastic plants (a place to seek shelter from the dominant fish in the tank)
2. housing with conspecifics (zebrafish prefer to be housed in groups)
3. live feed (chasing after artemia and rotifers)

Not all labs will be able to incorporate all of these enrichment elements. Some labs only feed flake food and are averse to the labor required to prepare live feeds; some technicians point out that plastic plants are an additional surface to attract bacteria or algae growth and require cleaning, boosting labor costs; and some research requires that fish be housed singly or in pairs. However, the program developed at Harvard is a solid reference for other labs and a base upon which to develop programs for labs with specialized requirements.

Patty Oden, Senior Aquatic Technician at the University of Alabama at Birmingham, presented research results in a talk entitled "Color Preferences of Zebrafish: Can They Affect Mating Behavior and Reproductive Performance?" By experimenting with the use of various colored marbles in the system tanks, the UAB team established that zebrafish DO have specific color preferences! The fish consistently produced less eggs, and the eggs had a lower survival rate, over blue marbles. Clear marbles were more acceptable, but by far the fish preferred the red marbles. These findings are relevant both for fish enrichment choices and basic husbandry decisions. Additional studies are underway at UAB to further define the effect of color choices in the

zebrafish environment on accepted measures of well-being such as embryo production.

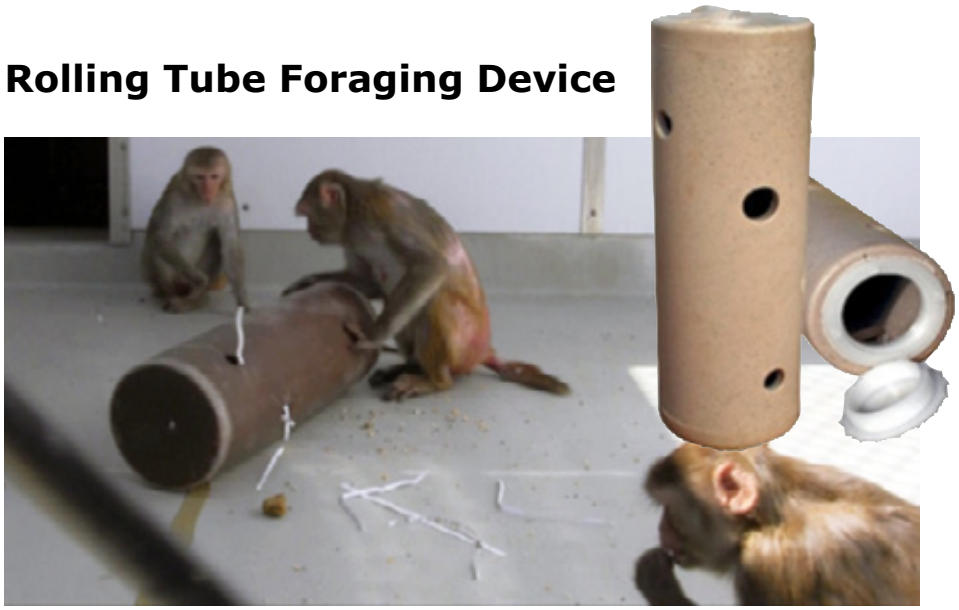
Chereen Collymore, a Veterinary Resident in the Tri-Institutional Training Program in Laboratory Animal Medicine and Science and a Post Doc at The Rockefeller University, looked at the anxiety-like behavior levels of fish housed in groups with and without "enrichment" (plastic plants) and fish housed singly with and without enrichment. She concluded that fish housed in groups did not show a significant difference in anxiety-like behavior with or without enrichment but that fish housed singly deserve further study to determine the possible benefits. Furthermore, in place preference testing, she showed that zebrafish overwhelmingly preferred to associate with other zebrafish over the plastic plant they may or may not have previously been acclimated to. The only exception was zebrafish that had been housed singly with the enrichment spent equal time between it and other zebrafish when moved to a group.

As the use of zebrafish and other aquatic animal models in scientific research continues to grow, the debate over the proper quality and quantity of environmental enrichment will grow too. The talks in our mini-session join with other voices debating the effects of enrichment (or lack thereof) on research outcomes and animal stress levels in addition to continuing to address the most basic goal of the humane housing of these animals.

Jason Cowan-Brown and **Yusra Azhar**

Behavioral Management Unit
Yerkes National Primate Center
Field Station, Lawrenceville, GA

Rolling Tube Foraging Device



Intended Species: Run housed rhesus macaques & sooty mangabeys.

Intended Behavioral Use: To increase foraging time investment among our run housed populations by them simply rolling a hollow tube with small holes filled with shredded paper and a seed/cereal mixture along the ground of their enclosure. The tubes have also been shown to encourage manipulation, exploration, and cooperative behaviors within a group.

Material/Specs/Price: 3/8" Unbreakable polyethylene tube w/cap
6"d. x 18"L
(4-5) 1" Holes
$85—*Full Product from Otto Environmental*

Cleaning/Prep Time: Routine cleaning involves the use of a chemical sanitizer. A typical cleaning time for 20-30 tubes can be between 30-60 minutes. The tubes can also be sterilized through cage washing procedures. Once dried completely, a prep time of about 30 minutes involves inserting a few handfuls of shredded paper and (one) 16oz scoop of pre-made seed/cereal mixture into the same 20-30 tubes.

Time Investment by Animals: More than 5 hours.
See enrichment assessment for more details.

Pros: Prolonged foraging time among the animals, caps and tubes are extremely durable, the device is easy to clean and prepare, inexpensive to implement.

Cons: Upfront device cost is expensive but can last for a number of years. Animals sometimes can remove caps but no safety issues have been reported when that has happened. When it has, the caps are simply pulled from the run and screwed back onto the tube. If caps are damaged, they can be replaced for $7 (*Otto Environmental*).

continued on page 30

 continued from page 31

Behavioral Assessment: An analysis was performed on rolling tubes designed for monkeys living in run housing. In this particular study, we wanted to see if there was any correlation between the amount of seed/cereal mix and shredded paper provided within these tubes and foraging and manipulation time investment.

This assessment took place over nine days within a 45-day period and involved six groups with a total number of 54 male and female rhesus subjects of various ages. For each assessment, one rolling tube with specified amounts of seed/cereal mix and shredded paper was placed into each run a particular group had available (1-2 tubes per group). Each test day, we would first perform 10-second scans (scanning for and counting the number of animals foraging and/or manipulating the tube(s)) every 5 minutes during the first 50 minutes that the group had the rolling tube (the most intense activity usually). Then after 50 minutes, we would perform 10-second scans every 35 minutes for a total of about 5 hours, on average.

Within each of these groups, we would rotate and evaluate different combined amounts of shredded paper and seed/cereal mix to see which showed the longest average time commitment in foraging and manipulation. (1 scoop = 16oz) The amounts were: 1 scoop seed/cereal, 3 scoops shredded paper; 1 scoop seed/cereal, and 1 scoop shredded paper; and lastly 2 scoops seed/cereal, 1 scoop shredded paper.

Figure 1
This stacked bar graph summarizes the combined percentage of study animals occupied in foraging and manipulating behaviors over each interval their behavior was recorded in accordance to the various amounts of shredded paper and seed/cereal mix combinations.

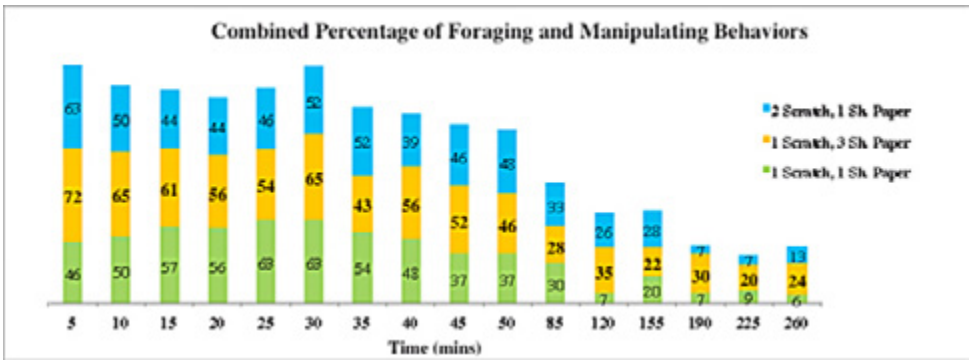


Figure 2
Overall Average Percentage of Animals Engaged in Combined Foraging/Manipulating Behaviors Based on Seed & Cereal Mix/Shredded Paper Amounts (1st 50 mins):
2 Scratch/1 Bedding: 48%
1 Scratch/3 Bedding: 57%
1 Scratch/1 Bedding: 51%

Figure 3
Overall Average Percentage of Animals Engaged in Combined Foraging/Manipulating Behaviors Based on Seed & Cereal Mix/Shredded Paper Amounts
(50 to 260 mins):
2 Scratch/1 Bedding: 19%
1 Scratch/3 Bedding: 27%
1 Scratch/1 Bedding: 13%

Conclusions: The information shown in Figures 2 & 3 summarizes the average percentage of animals foraging and manipulating duration based on each combination amount during the first 50 minutes (Fig. 2) and then up to the 260 minute timeframe (Fig. 3). We found that when we used a combination of 1 scoop of seed/cereal mix and 3 scoops of shredded paper, the monkeys used the device during 8-9% more of the time than when we provided other amounts of seed and shredded paper. Therefore, we conclude that incorporating more shredded paper may help to increase both foraging and manipulating behaviors, and that increased seed and cereal amounts did not increase the use of the device.

A NEW IDEA-SHARING COLUMN FOR THE ENRICHMENT RECORD—A SHOWCASE FOR YOUR FAVORITE ENRICHMENT DEVICE! 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

OUR READERS TELL US

As an educator, I use *The Enrichment Record*, both the magazine and webinars, as learning tools in my classroom. I teach vet tech students at Cal Poly Pomona, an AVMA-accredited university. They come initially to learn to be a RVTg at a traditional clinic. My job is to teach them about laboratory animal science, a required course in the four-year curriculum, so that they can appreciate how drugs and therapies for animals, as well as for 2-legged humans, are developed. Having the resources in the ER is a complement to my didactic presentations, to engage students in other aspects of animal science, not just lab research. My students express that they understand better the need for enrichment with all animals and particularly in the vivarium to be able to collect more reliable data. When all of these facets are put together, many students decide to enter the lab animal field, applying both their love of animals and their bachelor's degree in animal health science.

Bruce W Kennedy, MS, RLATG, CMAR, CPIA
ACUC and IRB Administrator, Lecturer
Animal & Veterinary Science, California State Polytechnic University, Pomona

How Cute Is That?

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Caring=Enrichment

HAVE YOU HEARD?

The Enrichment Record is now delivered to 30,000 animal research professionals around the world.