LABORATORY PRIMATE NEWSLETTER

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POLICY STATEMENT

The *Laboratory Primate Newsletter* provides a central source of information about nonhuman primates and related matters to scientists who use these animals in their research and those whose work supports such research. The *Newsletter* (1) provides information on care and breeding of nonhuman primates for laboratory research, (2) disseminates general information and news about the world of primate research (such as announcements of meetings, research projects, sources of information, nomenclature changes), (3) helps meet the special research needs of individual investigators by publishing requests for research material or for information related to specific research problems, and (4) serves the cause of conservation of nonhuman primates by publishing information on that topic. As a rule, research articles or summaries accepted for the *Newsletter* have some practical implications or provide general information likely to be of interest to investigators in a variety of areas of primate research. However, special consideration will be given to articles containing data on primates not conveniently publishable elsewhere. General descriptions of current research projects on primates will also be welcome.

The *Newsletter* appears quarterly and is intended primarily for persons doing research with nonhuman primates. Back issues may be purchased for $5.00 each. Beginning with this issue, we will not be printing paper issues, except those we will send to subscribers who have paid in advance. We will not accept future subscriptions, unless subscribers are willing to pay $60/year within the U.S.; $80/year outside the U.S. (Please make checks payable to Brown University.) Readers with access to electronic mail may receive the nongraphic contents of each issue by sending the message **subscribe LPN-L your-own-name** to **listserv@listserv.brown.edu** Current and back issues of the *Newsletter* are available on the World Wide Web at <http://www.brown.edu/primate>. Persons who have absolutely no access to the Web, or to the electronic mailing, may ask to have paper copies sent to them.

The publication lag is typically no longer than the three months between issues and can be as short as a few weeks. The deadline for inclusion of a note or article in any given issue of the *Newsletter* has in practice been somewhat flexible, but is technically the tenth of December, March, June, or September, depending on which issue is scheduled to appear next. Reprints will not be supplied under any circumstances, but authors may reproduce their own articles in any quantity.

PREPARATION OF ARTICLES FOR THE *NEWSLETTER.* – Articles, notes, and announcements may be submitted by mail, e-mail, or computer disk, but a printed copy of manuscripts of any length or complexity should *also* be sent by regular mail. Articles in the References section should be referred to in the text by author(s) and date of publication, e.g., Smith (1960) or (Smith & Jones, 1962). Names of journals should be spelled out completely in the References section. Technical names of monkeys should be indicated at least once in each note and article. In general, to avoid inconsistencies within the *Newsletter*, the scientific names used will be those in *Mammal Species of The World: A Taxonomic and Geographic Reference,* 2nd Ed. D. E. Wilson & D. M. Reeder (Eds.). Washington, DC: Smithsonian Institution Press, 1993. For an introduction to and review of primate nomenclature see the chapter by Maryeva Terry in A. M. Schrier (Ed.), *Behavioral Primatology: Advances in Research and Theory* (Vol. 1). Hillsdale, NJ: Lawrence Erlbaum Associates, 1977.

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Cover illustration of an infant rhesus monkey (*Macaca mulatta*),
by Penny Lapham

A Video-Display Approach to Environmental Enrichment for Macaques

Arturo Kiyama, Angela J. Taylor, James L. McCarty, and Fraser A. W. Wilson
University of Arizona

Introduction

Environmental enrichment is defined as the provision of stimuli that promote the expression of species-typical behavioral and mental activities in an understimulating environment (Reinhardt, 1997). Most enrichment studies have provided inanimate devices and objects for singly-caged non-human primates, and there are mixed conclusions as to whether these devices promote the psychological well-being of captive primates. This may be because primates become bored with the object after a day or so and it no longer has any significant positive effects on the behavior of the primate (Line and Morgan, 1991). In contrast, studies using large numbers of visual images found that monkeys were very willing to work simply for the presentation of unfamiliar pictures; boredom - as indexed by habituation - occurs, but monkeys evidently enjoy the novelty and complexity of images (Humphrey, 1972; Wilson & Goldman-Rakic, 1994). According to Line et al. (1989), an apparatus that a monkey can control (manipulate) and also get a response from will be played with longer and used more often.

As part of an environmental enrichment program for rhesus monkeys at the University of Arizona, monkeys were given a bar press device in their home cages; bar presses were detected by a computer which was programmed to present video images to the animal contingent upon bar pressing. The purpose of this study was to provide the monkeys with a stimulating task that required bar manipulation and additionally provided the intrinsic reinforcement of novel visual stimuli.

Materials and Methods

Subjects and Housing: Two rhesus monkeys (Macaca mulatta), named Ambi and Dexter, were used as subjects in this investigation. Both monkeys were males, in good health, and approximately two years of age at the time of the study. Each animal underwent the same video enrichment process. The daily diet of each animal, which was given around 2 p.m., consisted of fruits, vegetables, and 20 Tekled monkey chow biscuits; the subjects had free access to water. The monkeys were housed in separate (32" wide x 29" long x 32" high) cages in a room with other monkeys. They had visual, auditory, and olfactory access to each other. When not involved in the enrichment study, each monkey was a subject in a different laboratory study: Dexter learned to press a bar to discriminate various figures on a computer screen, while Ambi was trained to perform a foraging task for food.

The Computer-based Video Presentation System: The software used to present the stimuli was CORTEX. CORTEX was written by programmers at the National Institutes of Health (NIH) to control behavioral experiments in primates, and in particular to collect neurophysiological data from experiments on the visual system. It is a general-purpose program in which laboratory devices can easily be connected to and controlled by a computer, and therefore suitable for this enrichment project. The setup consisted of two computers linked via 19,200-baud serial ports. One computer collected the data, and controlled the presentation of the stimuli on the other. The monitor screen was facing the monkey, approximately 18" away. There were two distinct locations for the monitors. For the first 17 test days, the monitor was eight inches above the monkey's head, and for the last 10 days the monitor was directly in front of the monkey's face. In both setups, a video camera mounted above the monitor recorded the monkey's eye and hand movements. The bar-press/response manipulandum was a 6-inch-long lever connected to an electromechanical microswitch encased in a black metal housing and mounted on the cage.

The Enrichment Paradigm and Video Equipment: A new image was presented to the monkey each time the bar was pressed, and remained on the screen for the duration of the press. On any given test day, the maximum number of different images that could be seen by the monkey was 100. On that test day, the images were presented again in the same sequence when the monkey made more than 100 bar presses. A total of five picture sets (100 images each) were used over a period of 7 weeks; each set was shown an average of five times (minimum = 2; maximum = 7), and was shown repetitively across days once the set was introduced. The images were obtained commercially (PhotoDisc). Each set had similar subject matter. The theme of the first three sets was Agriculture; that of the last two, Health and Medicine.

The computer system was inexpensive. The total cost was about $400: two used 486 PC computer systems ($100 each), a ComputerBoards DIO-24 TTL I/O card ($80), an equipment rack that held the monitors and computers ($60), materials (wire, microswitch, potentiometer) for the press box ($20), a compact disc containing the library of images ($30), and the CORTEX freeware <cog.nimh.nih.gov/CORTEX/>, which required images in

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PCX (8-bit color depth) format. Software for running the system is available to interested persons.

Data Collection: Trials were run in the morning or early afternoon for approximately one hour; both monkeys were tested on each testing day, usually four times per week. Twenty-nine 1-hour samples were attempted and a total of 21 hours of data was collected and analyzed for each monkey; software bugs caused some data loss early in the experiments. Three types of data (sampled at 1 KHz) were recorded: TIME in milliseconds (ms) from the first bar press of the session; the DURATION of the bar press (ms); and the IMAGE NUMBER (i.e., 1-100). TIME allows us to look at the response patterning across the test session. The DURATION of the bar press is the number of ms that the monkey held the bar down. The IMAGE NUMBER represents the individual image that was presented to the monkey.

The experimenter began the trials by setting up the equipment, moving the subject's cage so that the monkey being tested could not see the other monkeys in the room, minimizing distraction. The experimenter returned at the end of the trial period (approximately one hour) and promptly shut down the program. In order to verify that the monkeys were actually looking at the screen and not trying to dismantle the bar-press, the monkeys were video recorded for the first 12 one-hour periods. Once the characteristic pattern of the monkey's viewing behavior was determined, the video recordings were discontinued.

Data Analysis: Data were entered into a spreadsheet (Microsoft Excel), and summary statistics (mean and standard deviation) on behavioral performance were calculated. Where appropriate, statistical tests (analysis of variance; linear regression) were computed with a significance level set at 0.05.

The data consisted of three different measures: (1) mean bar presses per hour; (2) mean interval (time between bar presses); and (3) mean duration (of each bar press). These statistics were used to determine how often and for how long the subjects were actually bar-pressing, and whether they were viewing the stimuli or just playing with the manipulandum.

(1) Bar presses per hour were calculated for sessions in which data were recorded for more than twenty minutes – equipment problems caused premature curtailing of the testing sessions on three occasions. The measure was calculated as presses in one session/total session time (ms) * 60 (minutes). The mean bar presses per hour gives a standard statistic that summarizes overall work in an average individual session.

(2) Mean interval was calculated by subtracting the time of each bar press from the time of the next one, and taking the mean of these differences. Mean interval between bar presses indicates how often the subject pressed the bar.

(3) The mean duration of each bar press is a potential index of how long the monkey was looking at the stimuli. It should be noted that the videotape recording was also used to determine if the subject was actually viewing the stimuli when pressing the bar.

Results

Table 1 provides summary statistics of the behaviors of the monkeys. There were both similarities and differences between the monkeys. The similarities were threefold: both monkeys were engaged by the task, actively lever pressing in every test session; and the average lever press response durations were similar for both monkeys (*Table 1*). We also found that, for both monkeys, the number of bar presses tended to increase with experience. Dexter showed a rapid increase in daily response output, from 84 trials on day 1 to >500 trials on day 5; the maximal number of trials (836) occurred on day 17. Ambi's daily responses tended to increase across the testing sessions, with the fewest number of trials (6) on day 1, and the maximum number (209) on day 19. Large fluctuations in the number of trials on different days were observed for both monkeys.

	Ambi	**Dexter**
Number of lever presses per hour		
- minimum	6	70
- maximum	209	836
- mean	71	428
- total in all sessions	1498	9208
Mean stimulus duration (sec)	1.8	1.5
Mean interstimulus interval (sec)	64.2	8.3
Median interstimulus interval (sec)	7.6	2.2

Table 1.

There were two striking differences in the behaviors of the two monkeys. First, Ambi performed an average of 71 responses/hour; in contrast, Dexter performed an average of 428 bar presses/hour. Moreover, the interval between bar presses was much longer for Ambi than for Dexter (Table 1). Whereas Dexter usually lever-pressed at a uniform rate with short breaks (20-60 seconds) at regular intervals, there was a greater proportion of long breaks in Ambi's bar pressing (20-400 seconds), and Ambi usually stopped before the end of the test session. Differences in the intervals between bar pressing were also found when median values (Table 1) of bar pressing rate were calculated for intervals in which both monkeys were fully engaged in the task, though the intervals were clearly longer for Ambi.

We also found that the two monkey's patterns of viewing the video monitor were very different. It was evident from observation of the videotaped records that

Dexter was completely absorbed in bar pressing and watching the resultant images; in contrast, Ambi rarely looked at the images that resulted from the bar-pressing, as he was apparently playing with the lever press. Thus, observation of the videotaped records and the behavioral measures of bar pressing indicated that Ambi was not doing the task in the same way as Dexter. We concluded that Ambi was interested in manipulating the response lever, but not in the resulting image.

Although Ambi's data were not subjected to further analysis, we examined the effects of stimulus repetition in Dexter's data sets, as each image was usually presented two or more times during a session. We found on 19 of 21 test days that the average stimulus duration was slightly greater at the end of daily testing sessions than at the beginning, an average difference of 149 ms; on two days fewer than 100 trials were observed and these data could not be used. Paired t-test comparison on duration data from the first and the last blocks was usually not statistically significant. We also examined the effect of repetitively presenting the same stimulus set across a number of days. We examined press duration as function of the number of times a stimulus set had been presented with linear regression analysis; only 3 of 15 data sets with more than 300 trials showed significant trends. Thus bar pressing and watching the images were largely constant across each session.

Discussion

The present analysis established that for one of the monkeys (Dexter) the enrichment device was fully utilized for the time it was available. Dexter performed an average of 428 bar presses per hour, the videotape records showing total preoccupation with the task for the 1-hour testing periods. Dexter's viewing of the images became progressively longer throughout the testing session, providing further evidence that the task was absorbing for this monkey.

Ambi, in contrast, appeared to engage in bar pressing for the opportunity to press the bar: 70 lever presses per hour on average, consistent with previous studies showing that macaques appear to enjoy motor acts (Line et al. 1989). We infer that Ambi did not press the lever for the stimuli – he pressed the lever but rarely viewed the video images that resulted from the pressing. Thus, while both monkeys found the lever and video-display enriching (as measured by the time and effort spent lever-pressing), they did so for different reasons.

Ambi's lack of interest in the images may have resulted from several aspects of the experiment. First, Ambi had not received training in a visual discrimination task with fruit juice as a reinforcer, as Dexter had. Second, the initial position of the video display, 8" above the monkey's head, may have been detrimental to learning the relationship between lever pressing and the resultant images; moreover, the procedure of watching a monitor and the relationship of stimulus presentation to lever-pressing were already familiar to Dexter because of his discrimination training. Nevertheless, the number of lever presses made by Ambi did increase across testing sessions, and thus this activity appears to provide a form of enrichment.

In conclusion, we believe that the paradigm used in this study is useful in two ways. As we have argued, both monkeys spent periods of time working with the computer system and thus it provides a means of occupying the time spent by monkeys when confined to their home cages; both monkeys were also occupied in laboratory testing on the same days in which the enrichment apparatus was used. Additionally, computer-based systems may provide primates with preliminary training in the research programs in which individual laboratories are working. Our future objectives will be to examine the memory abilities of animals in the enrichment paradigms (for example, the duration of memory for the stimuli shown in the tasks), as well as the influence of gender and age on behavior.

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Limits on Blood Drawing

Thomas Ferrell, of Calvert Labs, sent the following question to the Comparative Medicine e-list: "Do you have rules or guidelines for the maximum number of blood draws in a 24-hour period before you require an indwelling catheter, cannula, or vascular access port (VAP)? The concern here is the number of needle sticks."

Responses

Major Hospital: Do you draw blood on awake or sedated primates? If you sedate, it would be easier and less stressful on the monkey and the people to go ahead and put in a short-term saphenous IV catheter. If you are doing this daily, you might consider a VAP. Also, here is a reference for use of a fiberglass tape cast over a saphenous catheter for a 2-week period: Pierre A. Conti et al., "Immobilization of a chronic intravenous catheter in the saphenous vein of African green and rhesus monkeys", *Laboratory Animal Science*, 1979, *29,* 234-236.

We perform multiple sessions of serial blood draws. Here is a summary of our standard procedure: "Sedate with 5mg/kg ketamine. Place 1 or 2 Surflo saphenous IV catheters (depending on the study). The catheter is cut near the hub and a 2-foot silastic catheter line is attached to the Surflo catheter (being careful that the catheter is not sucked into the leg). Place primate in a restraint chair and allow to recover from ketamine (usually 20-45 minutes); if an awake animal is not required, you need not wait. Legs are secured to the chair with bandage tape to prevent the animal from pulling the catheters out. Fruit and treats are offered as an indication that the animal has awakened. Commence blood draws: for our experiments, experimental drugs are administered and blood drawn about every 15 minutes for 2-3 hours, i.e., 8-12 samples. Up to 50 ml blood may be drawn per session (based on body weight calculation); an equal volume of saline is infused following each sample for volume replacement to the animal. The interval for this procedure is a least 3 weeks for any given animal."

Major Pharmaceutical Company: I've been associated with a lot of pharmacokinetics/toxicokinetics (PK/TK) work over the years from the investigator perspective and the IACUC perspective. In my experience the standard PK/TK study has 6-8 blood draws over 24 hrs (e.g., 0.5, 1, 2, 4, 6, 8, 12, 24 hrs.). These are almost always done without catheterization/ports. However, I have worked in exclusive PK/TK groups where animals were ported and then used for multiple studies following a washout period between each use. The issue wasn't the number of sticks/day; it was more how to do repeated collections over time (months) and not completely destroy the veins. I would also note that human volunteers are routinely bled 12-18 times/day in Phase 1 studies. As long as blood volume is not an issue I'd have no problem bleeding monkeys 12-18 times. That assumes the monkey cooperates. As I'm sure you know, there are some monkeys you can only bleed once before they become very stressed. Generally in PK/TK colonies where monkeys are used frequently they become very accustomed to the routine – with a little positive reinforcement they will put their arm out of the cage to be bled (not quite).

Major Pharmaceutical Company: I have tried to get information like this in the past; generally people respond that they follow the protocol and primarily watch the total blood volume. In my experience, when we are in the protocol review meetings (I sit in as the vet) I encourage the toxicologists and the biometabolism and bioanalytics people to make an effort to reduce sample size and time points. I would advise your IACUC to take a role in making decisions for sponsored studies at your facility. In many current cases, the Contract Research Organization's (CRO) guidelines allow the sponsors' "study monitor" to agree to the standard from your laboratory. In cases where the CRO guidelines must be exceeded, your IACUC can request scientific justification from the sponsor and make an informed decision on a case-by-case basis.

In our experience, catheters are used by some researchers, at least for the close-together early time points. The down sides are that the animals usually must remain restrained to avoid pulling out the "temporary" indwelling catheter and the stress of remaining chaired may be more than the stress of catching them again for the next bleeding. The temperament and the former experience of the animal should be assessed so you can make an informed decision as to what would be best for this particular animal. Placing a catheter without local anesthesia can be more painful than a needle stick and, to my knowledge, there are no "safety needles" available yet for catheters. So you need to consider the relative risks to your personnel if the needles you are using are not safety needles.

Regional Primate Center: We've done 16 blood draws per animal over the course of one 24-hour period. It was a short-term study. We repeated the samples two weeks later.

Government Lab: We do not have rules for the maximum number of blood sticks in 24 hours; we currently draw seven samples over 24 hours. We do have rules about the maximum blood *volume* that can be drawn.

Contract Research Organization: If I have 3 or more sticks required, particularly if they are in a short period (<1 hour), I would opt for the femoral catheter. Typically a full PK study will have 4-8 draws in the first 4-hour period and then space them out from there. I would use the catheter for the 4-hour period (and have used them for

up to 6 hours), followed by regular needle sticks for subsequent draws (these are usually spaced at least two hours apart). My preference is a 20G 2" indwelling catheter (or 22G 1¼" indwelling in smaller monkeys) placed percutaneously in the femoral vein (sometimes artery, can't always tap the right vessel) on the day of the activity. Alternatives include the medial tibial vein, saphenous vein, or lateral tail vein. All can be used successfully depending on monkey size.

[*Editor's Note: There are several brands of safety catheters available on the market. Finding sufficient sites can be a problem. Catheters or VAPs solve some of the problems. Sedation, chairing, and using trained monkeys all can work in some cases. There is no simple answer. – J. S. H.*]

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Resources Wanted and Available

Interactive Sound Recording and Analysis

The first public version of Raven for Windows, an interactive sound recording and analysis program developed by the Bioacoustics Research Program at the Cornell Laboratory of Ornithology, is available online at <www.birds.cornell.edu/Raven>. It includes flexible signal displays that can show multiple simultaneous waveform, spectrogram, and spectral slice views both for saved signals and in real time during signal acquisition. Spectrograms can be displayed using any one of eight predefined color maps. A free demonstration version of the program, including the comprehensive Raven User's Manual and a set of example sound files, is available at the Website, and the fully functional version can also be purchased there. Work is in progress on a version of Raven for MacIntosh OS X, which will be released this summer, offering the same functionality as Raven for Windows. For more information, contact Russ Charif, 159 Sapsucker Woods Rd, Ithaca, NY 14850 [607-254-2408; fax: 607-254-2460; e-mail: *r.charif@cornell.edu*].

***Roots of Human Behavior,* Videotape**

Roots of Human Behavior, 12 thirty-minute lectures by Professor Barbara J. King, of The College of William and Mary, are available on DVD and VHS videotape from The Teaching Company. Dr. King conducts research on gorillas at the Smithsonian's National Zoological Park in Washington, D.C., and has studied ape and monkey behavior in Gabon, Kenya, and the Language Research Center at Georgia State University. For ordering information: Customer Service, The Teaching Company, 4151 Lafayette Center Dr., Suite 100, Chantilly, VA 20151-1232 [800-832-2412; e-mail: *custserv@teachco.com*]; or see <www.teach12.com/ttc/Assets/courseDescriptions/168.asp>.

Tool for Acoustic Analysis and Graphing

You are cordially invited to download and evaluate Sound Ruler, a free program for bioacoustics, at <soundruler.sourceforge.net>. Sound Ruler is a side project to a University of Texas PhD thesis on acoustic communication in frogs. It is open code, multiplatform, and free. Its visual interactive approach brings you the control of manual analysis and the objectivity and speed of automated analysis. It gives special attention to simple, repetitive sounds that can be quickly analyzed in great detail pulse by pulse for studies on population variation. It is being developed by Marcos Gridi-Papp, with support from the Center for Perceptual Systems and the Physalaemus Project (NSF) at the University of Texas and from CAPES – Brazil. For more information, contact Marcos Gridi-Papp, Univ. of Texas, School of Biological Sciences, Section of Integrative Biology, 140 Patterson Labs, Austin, TX 78712-1064 [512-475-6164; fax: 512-471-3878; e-mail: *mpapp@mail.utexas.edu*]; and see <listener.bfl.utexas.edu/mgpapp>.

Aids for Organizing a Congress

"As an aid to our own memory, the organizing committee of last year's Scandinavian Society for Laboratory Animal Science symposium in Oslo put together some notes on our experiences arranging that meeting and many others over the years. We offer these on the chance that others may also find them useful. A lot of the things will appear obvious or trifling, but in our experience it's often the small details that 'tip the balance' one way or the other." See <oslovet.veths.no/congresshelp>. – *Posted to* CompMed *by Adrian Smith*

The Animal Communication Project

The Animal Communication Project (ACP) is an experiment in Web publishing, which Stephen Hart hopes will develop into a useful resource on communication among animals. He writes: "In 1996, I wrote a book called *The Language of Animals*, part of the short-lived *Scientific American Focus* series. I included a wide variety of snippets about the field of animal communication. After completing the book, I realized that the text could become the basis for a multilayered Website devoted to the science of animal communication."

ACP is an open-source project. Hart has contributed the text and construction and maintenance of the site. He hopes researchers in the field will contribute in all media: text, images, sounds, QuickTime video, and links. For more information, see <acp.eugraph.com>.

Serologic Testing of Nonhuman Primates

The following posting was made to the Comparative Medicine e-list: "We would like to get an overview of serologic testing practices for nonhuman primates. That is, for viruses such as B virus, herpes simplex virus type 1 (HSV-1), measles, simian retrovirus (SRV), simian immunodeficiency virus (SIV), simian T-cell lymphotropic virus type 1 (STLV-1), filovirus etc. Do you routinely test for some or all of these agents as part of your nonhuman primate quarantine process? Do you periodically test your in-house colonies for these agents? If so, what is the frequency of testing? Do you have standard procedures for how to handle positive test results or are they handled on a case-by-case basis?" Six individuals responded:

Large Contract Research Lab: We require three negative serology panels which include everything you've listed, one to include polymerase chain reaction (PCR) from the vendor prior to shipment and then we do one panel ourselves. We retest for these agents yearly, but most of our animals don't stay around that long. Positive test results are handled on a case-by-case basis.

Academic Institution: For our macaque colony, quarantined animals are tested for B virus, SIV, SRV, STLV-1, and measles (Esoterix macaque panel A1). If positive for SIV, SRV, or STLV-1, results are confirmed at UC Davis Simian Retrovirus Lab, and animals are returned to the vendor. If negative for measles, animals are vaccinated. Since our colony contains B virus-positive animals, quarantined animals may or may not be returned to the vendor if B virus-positive.

In the past there has not been a virus surveillance program. However, we are planning to implement a viral surveillance program (same agents as above) every 1 to 2 years. These results are handled on a case-by-case basis.

If there is a personnel bite or scratch incident, B virus serology and virus isolation are performed on the animal within one hour of the incident, and its titer is checked again two weeks later.

Large Pharmaceutical Company: For new arrivals, the following testing must be completed within 3 months of shipping unless the animals are coming from one of our own aging colonies: • Herpes B: negative by serology • SRV[1]: negative by serology with virus isolation or PCR • SIV: negative by serology • STLV-1: negative by serology • Measles: positive by serology or vaccination • Hepatitis A: positive by serology or vaccination • Filovirus: negative by serology when coming to New York only.

For testing colonies already in-house, the following apply: • Herpes B: Serology repeated approximately every 6 months • SRV: Serology and PCR repeated approximately every 6 months • SIV and STLV: Serology repeated yearly.

Academic Institution: We routinely require all incoming nonhuman primates to be tested for B virus, SRV, SIV, STLV, and TB (assuming you mean macaques). Once here in quarantine, we retest B virus selectively depending on the source. Measles is tested when important to a study, but not routinely. Only TB testing is done routinely once the animals are through quarantine, but we have considered changing this.

Positives are dealt with on a case-by-case basis. In general we require negative viral serology for the agents above (negative test for TB), with exceptions made on a case-by-case basis.

Large Academic Institution: One question that I have related to your query is: which testing modality is preferred? For example, we have three animals that tested positive for SRV-1 and SRV-2 by real-time PCR of proviral DNA; but when we retested one of these animals, results were negative for SRV antibodies in serum... Which should we believe, which should we follow, etc?

Contract Research Lab: We require negatives for hepatitis B (HBV; twice), filovirus, SRV, SIV, and STLV-1 before shipment. We retest all for HBV on arrival and 8 weeks later. All are treated as "HBV status unknown" until the entire shipment has two negatives at least eight weeks apart. A positive would be euthanized immediately; then the whole group restarts the testing program. Inconclusives are retested once. Two inconclusives are treated as positive.

Large Academic Institution: We have vendors check serology for all nonhuman primates coming to our facility 10 days before shipment. They are tested again within a week of arrival at the facility and then once a year. Until recently, we had only *Papio* and *Macaca* (*mulatta* and *fascicularis*). In January we started housing some African green monkeys (*Cercopithecus aethiops*). For the *Papio* and *Macaca*, the serology was for SRV, SIV, STLV, measles, herpes B and rhesus cytomegalovirus. For the African greens, we eliminate the herpes B.

Recently we decided to allow some African greens and a rhesus macaque which are STLV-1 positive into the colony, so our standard operating procedure will be rewritten shortly.

They are all TB tested twice a year in the usual manner. We have never had a recognized case of TB in a nonhuman primate in the time that they have been on this campus. [*Editor's note*: *in my experience, monkeys are generally TB tested every quarter – G. J. H.*]

[1] Simian retrovirus SRV-1, SRV-2, and SRV-5.

Nonhuman Primate Dental Programs

In April, Lesley Colby <*lacolby@umich.edu*> sent this question to the Comparative Medicine e-list: "We are reviewing our nonhuman primate dental program and are curious about what is common at other institutions. Please answer these questions: 1. Do you work in industry, at a small academic institution, at a large academic institution, or in government? 2. What is your approximate daily NHP census? 3. Are prophylactic dental procedures performed? If so, how often? Is the frequency dependant upon the age of the animal? The species? Or are they performed only when a specific lesion is noted? 4. What personal protective equipment (PPE) is used by the individual performing the procedure? What other biohazard-related precautions are employed (especially for macaques)?" Here is a summary of responses.

Industry, with 600 macaques. Dental procedures are performed only for specific problems, using masks, gloves, and goggles/visor.

Pharmaceutical Research, with 200 animals. All NHPs receive a physical every 6 months including a brief dental exam. Prophylaxis is performed if there is evidence of scale/tartar/gingivitis. This is generally necessary only in the older animals in our rhesus, cynomolgus, squirrel, and capuchin monkey colonies. We use N95 respirator, face shield, gloves, etc.

Industry, with about 700 cynos and rhesus, almost exclusively. Dental procedures are performed as needed – caretakers monitor and report needs to vet care staff; also animals are evaluated at arrival and at least annually for need for dental care (cleaning, etc.). Broken teeth and/or issues such as an abscessed tooth are addressed as needed. We use full garb including approved safety glasses or face shield, hair cover, mask, double gloves, facility clothing (long sleeve scrubs or coveralls) or Tyvek cover, and shoe covers or facility-dedicated shoes.

Industry (subsidiary of large pharmaceutical company), with a colony that varies from 200 to 400 cynomolgus monkeys. There are about 60-65% males and 35-40% females. On average we keep our animals about 3-5 years. Most arrive as 3-5 year-olds.

Our vet techs check the animals' teeth every time the animals are sedated for TB testing. Dental cleaning consists solely of hand scaling, then rubbing the teeth and gingiva with chlorohex solution on a gauze pad. I've noticed that males tend to have worse plaque and gingival inflammation problems than females (more animals with problems and more severe). We require our vendor to cut the canines of adult males. Due to that, we have about 5 cases a year of tooth root abscesses associated with the canine teeth. We treat those by extraction, usually waiting until the affected teeth loosen somewhat.

Routine hand scaling and filing of teeth is done with our standard PPE of exam gloves, eye protection (safety glasses), N95 mask, and disposable coveralls over scrubs. I tried to make arrangements for using an ultrasonic scaler for the NHP teeth but our Health and Safety folks were requiring that this be done under a biological safety cabinet and/or using powered air purifying respirators. This just seemed too cumbersome so I haven't pursued it.

One bit of anecdotal info to pass on – when I first got here, we used to do a lot more blood work as part of colony maintenance and we decided to apply the chlorohex rinse every time the animals were sedated by the vet group (about every 2-3 months for 80% of the colony). This seemed to decrease the amount of hand scaling we had to do. Now that we don't do that anymore, it seems like the animals, especially males, have to have their teeth hand scaled every time they are sedated for TB testing (every 6 months).

Large Academic Institution (well, large for Canada), with 20-30 baboons, and rhesus, cynomolgus, and spider monkeys. Prophylaxis is performed yearly, on all species, during an annual complete exam (under anesthetic). If a lesion is noted (caries, fracture, draining tract, etc.), anesthesia and appropriate intervention are scheduled as soon as possible.

We use full PPE for handling primates – includes NIOSH-approved mask, double gloves, cap, full gown, goggles. All macaques are considered B-positive although we admit only serologically negative monkeys. Exposure (as defined by CDC) requires CDC protocol and counseling with our staff physician, who may prescribe antivirals. We do dental procedures every 6 months on all species, regardless of age or dental health. Prophylactic antibiotics are given to those who have intravenous ports. The monkeys are treated under a mobile hood (bio-safety cabinet) and the technician performing the procedure wears standard macaque PPE (Tyvek suit, double gloves, respirator mask, eye protection). Other staff in the room wear lab coats over scrubs and a surgical mask.

University, with about 37 primates. Prophylactic dental procedures were not usually performed, but I am beginning our first set in May. These will be on rhesus macaques. I assume that from now on these will be done annually. Also we are beginning to cut down the canines of our large male rhesus. I plan on wearing a respirator and suit during the procedure. All instrument tips are disposable and anything that is not disposable will be autoclaved after each animal. All of our primates are tested quarterly for TB and annually for everything else.

Large Academic Institution, with 3500 rhesus. Prophylactic dental procedures are performed yearly on individuals with dental problems or heavy tartar buildup or

diabetes, etc. Older individuals tend to have more problems, so most of our dental prophylaxes are performed on animals older than 12 years. Procedures are performed only when a specific lesion is noted.

We use a hepafiltration system by Breathe-Easy: see <www.envirosafetyproducts.com/html/Subcategories/becomponents/beturbo.htm>. I was very concerned about aerosolization of saliva resulting in herpes exposure, so I went with the Breathe-Easy system. These are very comfortable units and visibility is excellent. I would not recommend using a cavitron or performing any drilling procedures without this sort of protection.

Large Academic Institution, with 50-60 animals. No dental cleaning beyond some hand-scaling of severe tartar. Teeth are removed when loose. This policy is due to concern over creating aerosolized droplets carrying bacteria and viruses into the examination room, as well as the potential for hand injuries.

We remove teeth during the 6-month exam, during which we wear a cap, face shield and safety glasses or goggles, surgical mask, gown, gloves, scrubs, and shoe covers.

Government, with about 500 animals. Dental procedures are scheduled when indicated by physical exam findings. We use Tyvek, double gloves, and a powered air purifying respirator – hood type. We have also dedicated a room to performing these procedures to avoid broadcasting potential pathogens with the ultrasonic scaler over equipment/areas more difficult to clean.

These Two Responses Are Specific to Chimpanzees:

- We have 75 chimpanzees ranging in age from 5 years to 48 years. They are immobilized twice annually for health checks – which include teeth. Teeth are either hand scaled or cleaned with the dental machine. We have NEVER seen cavities (my dentist doesn't believe it!). We have pulled an OCCASIONAL tooth that has had an abscess – likely due to a blow!

- **Government contract facility** with 271 chimpanzees. Prophylactic dentals are performed at least once a year, rarely twice a year. Frequency is independent of age but depends on the health status of each animal, i.e., the ability to safely keep it under sedation for longer periods required for dental prophylaxis. Dental procedures are also performed when specific lesions are noted (e.g., tooth abscesses).

We use Animal Biosafety Level-2 (most animals have hepatitis B or C or human immunodeficiency virus) N-95 masks, full-face shield, double gloves, Tyvek jumpsuit, and scrubs.

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Workshop Announcements

IACUC-Advanced

IACUC-Advanced is a workshop created by the Scientists Center for Animal Welfare to train members of Institutional Animal Care and Use Committees (IACUC). This workshop is designed for experienced IACUC members and others who work with laboratory animals. The format lets small groups discuss specific, complex topics that are relevant to IACUC functions. The next workshop will be held October 28, 2003, at the National Institutes of Health in Bethesda, Maryland. For further details, including registration and program information, see <www.scaw.com> or call 301-345-3500.

ARENA IACUC 101

The Applied Research Ethics National Association (ARENA) co-sponsors one-day workshops, aimed at new IACUC members, administrators, veterinarians, IACUC trainers, animal care staff, researchers, regulatory personnel, and others interested in IACUC roles and responsibilities. These are full day "didactic and interactive" courses. The materials and information provided during the morning course will be applied during the later afternoon session when students will be challenged to consider, deliberate and develop action plans for a variety of potential IACUC scenarios. Participation of women, racial/ethnic minorities, persons with disabilities, and others who have been traditionally underrepresented in science, is encouraged.

On Wednesday, August 6, 2003, in Tucson, Arizona, the Laboratory Animal Welfare Training Exchange (LAWTE) and the NIH Office of Laboratory Animal Welfare will co-sponsor an ARENA IACUC 101 at the DoubleTree Hotel, Tucson-Reid Park. This program will be presented in conjunction with the August 7-8 LAWTE conference.

Registration information can be found at <www.lawte.org>. If you have special needs or questions, contact Grace Aranda, University of Arizona, [520-621-3931; e-mail: *garanda@u.arizona.edu*]; or Mary Lou James, Consultant, Regulatory Compliance, St. Louis, MO at [314-997-6896; e-mail: *mljames@mo.net*].

* *

Address Change

National Center for Research Resources, One Democracy Plaza, 6701 Democracy Blvd., Bethesda, MD 20817-4874.

Primates de las Américas... La Página

En esta edición ofrecemos información sobre las dos próximas reuniones primatológicas hispano parlantes y noticias desde Brasil. Igualmente incluimos información de interés para análisis de datos en primatología, todos ellos accesibles en internet de manera gratuita. Cualquier información para futura publicación por favor envíela a las siguientes direcciones: Bernardo Urbani <burbani@uiuc.edu> *o Tania Urquiza-Haas* <turqheza@yahoo.com>. *Co-editores: Juan Carlos Serio-Silva* <serioju@prodigy.net.mx> *y Elva Mathiesen* <Theresa_Mathiesen@brown.edu>.

II Congreso de la AMP

La Asociación Mexicana de Primatología (AMP) celebrará su segundo congreso en la conocida "localidad primatológica" de Catemaco (Veracruz, México) durante los días 7 a 11 de septiembre del 2003. Si requiere mayor información por favor comunicarse vía correo electrónico con: Dr. José Luis Vera-Cortéz <*zeluismx@yahoo.com*>; Dr. Jorge Martínez-Contreras <*jomaco@xanum.uam.mx*>, Biól. María del Pilar Chiappa-Carrara <*chiappac@imp.edu.mx*>, o Lic. Patricia Orta-García <*filtec@xanum.uam.mx*>.

V Congreso de la Asociación Primatológica Española

La Asociación Primatológica Española (APE) realizará su próximo congreso en la ciudad de Valencia (España) entre los días 17 y 19 de septiembre del año en curso. El lema principal será "La Primatología en el Siglo XXI". Durante el congreso se debatirán algunos de los retos a los que deberá hacer frente la primatología en este siglo. Si desea más información, puede acudir a su página de internet: <www.uch.ceu.es/principal/ape/inicio.asp>.

Novedades de la Sociedad Brasileña de Primatología

Recientemente se conformó la nueva junta directiva de dicha Sociedad, integrada por: Presidente: Júlio César Bicca-Marques, PhD (PUCRS) <*jcbicca@pucrs.br*>; Vice-Presidente: Cristina Santos, PhD (UNISUL) <*sagui@cfh.ufsc.br*>; Secretaria General: MSc Marcia Maria de Assis Jardim (FZBRS) <*jardimmm@cpovo.net*>. Igualmente, la Sociedad acaba de abrir una página temporal de internet con información actualizada <planeta.terra.com.br/educacao/SBPr/>. A través de ella, solicitan y agradecen el envío de información sobre cursos de postgrado en América Latina con enfoques en tópicos primatológicos para una base de datos de libre acceso en proceso de construcción pero ya accesible.

Análisis de Datos Primatológicos

A continuación se incluyen algunas páginas de interés con programas para el análisis de datos primatológicos. Los programas estadísticos aquí sugeridos se pueden bajar de la internet y son gratu itos. A continuación la información:

1) Para análisis con control filogenético como aquellos que incluyen estudios de historias de vida ("life history"), alometría, ontogenia, heterocronia y filogenia, véase,

- CAIC: <www.bio.ic.ac.uk/evolve/software/caic/index.html>
- TreeBase: <www.herbaria.harvard.edu/treebase/>
- COMPARE: <ftp://ftp.math.utk.edu/pub//luh/PA.hqx>
- Página de internet de J. Felsenstein: <evolution/genetics.washington.edu/phylip/software.html>
- Grafen: <users.ox.ac.uk/~grafen/phylo/>

2) Para regresiones más robustas a las convencionales de programas de estadística, véase,

- RMA: <www.bio.sdsu.edu/pub/andy/RMA.html>

* * *

Ethics of Research Involving Animals

The Nuffield Council on Bioethics, London, has announced a new Working Party to consider the ethics of research involving animals. The Council, an independent body that examines the ethical issues raised by developments in medicine and biology, was established in 1991; it is funded by The Nuffield Foundation, the Medical Research Council, and The Wellcome Trust.

The members of the Working Party bring a variety of perspectives to the discussion of this controversial topic, with backgrounds including animal welfare, philosophy, science, law, and veterinary practice. The range of expertise will allow an open and informed debate of the issues. The Working Party will also hold a series of fact-finding meetings and will consult with the public using a variety of methods during the summer of 2003.

Fundamental questions will be discussed. Does research involving animals yield information applicable to humans? Are there valid alternatives? Are there morally relevant distinctions between different species such as mosquitoes, mice, and monkeys? If so, how should these differences be reflected in regulations? Can the welfare of different animals be reliably assessed?

The Council expects to publish a Report on the topic in early 2005. For further information contact Nicola Perrin [020 7681 9627; e-mail: *nperrin@nuffieldfoundation.org*].

Primate Information Services Meeting

The Primate Center Library Consortium met April 23-24, 2003, at the Wisconsin Primate Research Center (WiPRC). Joanne Brown, Ray Hamel, Matt Hoffman, and Larry Jacobsen (WiPRC Library), Cooky Abrams (Oregon PRC Library), Danny Jones (Southwest PRC Library), Jackie Pritchard and Chico Otsuka-Gooding (Washington PRC Library and *PrimateLit*), and Judith Schrier (Brown University and *Laboratory Primate Newsletter*) attended. The New England PRC Library is also part of the Consortium (but Sydney Fingold was unable to attend because she was receiving an award from the Massachusetts Health Sciences Library Network…Good work, Sydney!). The California, Tulane, and Yerkes PRCs do not have active library service programs. Document delivery to staff at these Centers is provided by the Wisconsin PRC Library and Information Service.

Larry Jacobsen, Wisconsin PRC Library Director, is the Principal Investigator for the "Coordinated Information Services (CIS) for Primate Research" grant, which pays for the Consortium. The Consortium has certain goals, including NCRR recognition of the importance of the PRC Libraries and related information services. The Consortium has conducted a survey of the PRC Libraries. A major part of the April meeting was a discussion of the results of this survey.

On Wednesday, the group was warmly welcomed by Dr. Joseph Kemnitz, Director of the WiPRC. The participants gave brief reports on their programs, including projects, staffing, budget issues, needs, collections, publications, physical space, campus/local support, and future plans. Matt Hoffman gave an overview of the WiPRC Library Internet-based service programs, and Ray Hamel described the Primate Info Net structure that has been implemented by the WiPRC Library under the CIS grant. Then Larry Jacobsen led a discussion of the draft report on the survey of PRC Libraries. Minor revisions to the survey were suggested and it was proposed that the survey be repeated regularly, perhaps every three years.

Recommendations were made regarding issues that have been observed during the period of the grant, such as the desirability of enhancing *PrimateLit* to accommodate downloading citations in a variety of formats, and maintaining support for *PrimateLit* and the *Laboratory Primate Newsletter*.

There was a general discussion about document delivery among the PRC libraries, including problems and issues regarding responsiveness.

On Thursday there was a brief tour of the Library, after which Jackie Pritchard led a discussion about the current and future status of *PrimateLit*. *– Summary prepared by D. H. Jones, Librarian, Preston G. Northrup Memorial Library, Southwest Foundation for Biomedical Research*

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Editors' Notes: Changes…

Dear Friends and Subscribers,

The *Laboratory Primate Newsletter* has just entered yet another phase in its 42-year history. To review: We started as a typed, side-stapled booklet (1962); proceeded to a typed, center-stapled booklet (1976); got computer type-setting in 1982; became available by e-mail (LPN-L) in 1991; and went onto the Web in 1996.

The number of paper issues that we mail has gone from a peak of 1150 to about 250. It is now uneconomical to send out paper issues at all. We know that some of our readers are not at all happy about trying to read the *LPN* on-line, and we share their feelings. However, we no longer are getting enough money from our grant, or from your donations (which we appreciate!) for professional printing and binding. We have used all your donations for postage, and have run out.

Therefore, we have now begun to make each issue, starting with January 2003, available in Adobe Portable Document Format (.pdf) on our Web site. pdf files are hard to read on-line, but they print out BEAUTIFULLY! You can now print out, using an Adobe Acrobat reader, pages that look EXACTLY like this hard-copy version. You can then staple the pages together and take them to the beach, to bed, or to the breakfast table!

To do this, you can go directly to <www.brown.edu/Research/Primate/42-3.pdf> on the Web, or you can go to our Home Page, <www.brown.edu/primate>, and scroll down to "Latest Issue" (or to "Back Issues" to find Volume 42, numbers 1 and 2). The link to the pdf file is just below the volume, number, and date, which are just below the cover picture. Click on it. Or you can also just open your Acrobat reader, and tell it to open <http://www.brown.edu/Research/Primate/42-3.pdf>.

Either way, once you are in the Acrobat reader, you can print out the pages – all of them, or only some, as you choose. On some printers there is an option for printing the pages back to back: Click on "print", then on "Properties", then on "More Options". Select "Flip on long edge". If your printer can't handle it, you will get a message. Otherwise, select "Ok", "Ok", and "Ok".

We understand that a few of our readers do not have access to the World Wide Web at all, and that another few have very slow access or do not have modern printers. We have produced a very few hard copies of this issue – if you are reading one now, you will notice that it is not center-stapled. These precious, hand-hewn copies have been sent to those who have paid us for the year 2003 and beyond. They were also sent to those who we know are unable to print their own copies. We will not accept any more subscriptions...but we welcome your tax-deductible contributions to help support the newsletter.

Please contact us if you are unable to use the new pdf feature to print out your own *LPN* issues. Also, please let us know if you have paid for 2003 (and/or later), but are willing to take over printing your own... I'm sorry to say that we are unable to refund any money, but you will receive our sincere thanks!

Thank you for your understanding and support!

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Announcements from Publications

***IJP* – Not Just Another Pretty Face**

The *International Journal of Primatology* has introduced a new cover. Russ Tuttle, Editor-in-Chief, writes, "Like the logo VIVAMUS, which appears on the first pages of papers and book reviews that inform us about threatened, endangered, and vulnerable taxa, the apes on our new cover should remind us of all the precious beings that are being lost daily because of human arrogance, ignorance, greed, short-sightedness, and corruption. Surely, *Homo sapiens* can do better in the 21st Century."

Linking Research to Healthy Living

"Linking Research to Healthy Living", a new publication supporting the use of nonhuman primates in lifesaving biomedical research, has been created by a Consortium of the eight National Primate Research Centers. "Our primary mission is to provide specialized resources for nonhuman primate research applicable to the solution of human health problems." The Centers are funded through the National Center for Research Resources Division of the National Institutes of Health. This 12-page color booklet with a back pocket for related materials can be downloaded, in printable format, from <www.primate.wisc.edu/pin/nprcbrochure.pdf>. The brochure's purpose is to offer the public a more comprehensive understanding of the link between nonhuman primate research studies and the benefits of that research for the public health of our nation, and our world.

Please feel free to distribute this pdf file to appropriate members of your organization. If you need to receive printed copies, contact the National Primate Research Center nearest you.

Systematics and Biodiversity

Cambridge University Press recently announced the launch of *Systematics and Biodiversity*, an international life science journal devoted to whole organism biology, especially systematics and taxonomic biodiversity. The editors are Brian Rosen (Editor in Chief), Barry Clarke, Gaden S. Robinson, and Marian Stafford, all of the British Museum (Natural History), London. The journal will emphasize the importance and multi-disciplinary significance of systematics, recording the diversity of organisms through descriptive taxonomic papers. The underlying basis of biodiversity is addressed, directly and indirectly, through studies of taxonomic relationships, and of growth, form, adaptation and function, and through analyses and syntheses of biodiversity patterns in time and space, especially with respect to environmental and human factors. Coverage also includes relevant theory, methodology, and conservation biology. *Call for papers*: *Systematics and Biodiversity* provides an outlet for the publication of descriptive taxonomic papers which, because of their length, prove difficult to publish elsewhere. It also welcomes conceptual papers and articles on, for example, adaptation, anatomy, biodiversity patterns in time and space (including response to environmental and human factors and to global change), biogeography, coevolution, conservation biology, development, evolutionary biology, functional morphology, growth and form, molecular science, phylogenetics, speciation, and systematic ecology. Subject reviews, and papers on the methodology and theory of systematics, are also included. The editors particularly encourage papers and articles which highlight the broader relevance of systematics. – *From* Neotropical Primates

Publisher Seeking New Publishing Projects

"The Blackburn Press is dedicated to keeping in print and available for purchase book titles in which other publishers have lost interest and have declared "out of print". We are especially interested in scholarly scientific book titles; much of what we publish finds textbook use at the senior undergraduate and graduate levels. If you are an author whose book is out of print, or if you are aware of an undeservedly out-of-print book that has value and should be returned to print, we'd like to hear from you.

"Out-of-print titles are our specialty but we are also interested in reviewing proposals for new book and journal publishing projects." Contact Frances Reed, P.O. Box 287, Caldwell, NJ 07006 [973-228-7077; fax: 973-228-7276; e-mail: *freed@blackburnpress.com*]; and see <www.blackburnpress.com>.

News Briefs

Wisconsin NPRC Opens New Wing

The Wisconsin National Primate Research Center at the University of Wisconsin-Madison has formally opened its new 43,000-ft^2 research wing, funded in part by facilities improvement grants totaling nearly $5 million from the National Center for Research Resources' Division of Research Infrastructure. Included in the new wing are housing space for 440 monkeys, surgical suites, and histology and pathology testing facilities. The wing also has centralized equipment for washing monkey cages, a new card-based security system, and a ventilation system that allows for constant monitoring of room temperature and humidity. In addition, the rooms for housing the monkeys and the AIDS laboratory are built to prevent the spread of microbes to the outside environment. The lobby is open to the public and contains a 36-foot-long mural and live marmosets in a glass enclosure. In addition, the facility offers a live videocast of marmosets, which is popular with elementary school children. – *From the Winter 2003 issue of the* NCRR Reporter

Alabama Primate Lab Expansion?

University of South Alabama (USA) trustees gave early approval to a $4.5 million addition to the school's primate research center, provided researchers can win a $4 million federal grant. Less certain is the plan to expand the Primate Research Laboratory.

USA receives more than $1 million a year from the National Institutes of Health to breed and study two types of South American primates – squirrel monkeys and owl monkeys. The monkeys are useful in studying human diseases, including malaria and Creutzfeldt-Jacob disease, known commonly as "mad cow disease". The lab sells monkeys and monkey tissue to researchers elsewhere and studies some human diseases at USA. The lab also studies monkey biology and diseases.

Dr. Chris Abee, the veterinarian who chairs USA's comparative medicine program, said USA's return to breeding owl monkeys in 2001, combined with other researchers' increasing needs for animal housing, means the lab has "plumb run out of space." The lab now has a 10,000-square-foot building, plus a 2,000-square-foot trailer, but is also using space in another medical building. The lab hosts more than 450 squirrel monkeys and more than 300 owl monkeys. It is the world's largest breeding facility for owl monkeys and the second-largest for squirrel monkeys.

The university has sought $4 million from the National Institutes of Health to build a 28,000-square-foot addition. The proposal will be weighed against about 120 other applications, Abee said, and only 25 or 30 will be funded. Winners will get money in September. – *Posted to* Primate-Science*, March 10*

Santa Ana Lemur Starts a Family in the Wild

A lemur from Santa Ana has become the first captive-bred member of her species to give birth in the wild after mating with a wild male. The black-and-white ruffed lemur, *Varecia variegata variegata*, named Ms. Spot, bore twins in October or November on the island of Madagascar, Santa Ana Zoo officials said. While other lemurs have become pregnant in captivity, then given birth in the wild, this is apparently the first zoo-born lemur to both mate and give birth in the wild. She was sent to Madagascar as part of a captive-breeding program. Lemurs have been in decline on Madagascar because of hunting and habitat destruction. Ms. Spot, sent to the island in November 2000, was part of the third group of captive-bred lemurs sent there from zoos around the United States.

The lemurs are first introduced to more "wild" conditions at the Duke University Primate Center in Durham, North Carolina. "These areas are naturally forested," said Connie Sweet, collection manager at the Santa Ana Zoo. "The animals become accustomed to feeding off the ground, and the trees." Then it is on to Madagascar and one more transition area, where they are introduced to vegetation native to the island before being released into the wild in the Betampona National Reserve. – *From the* Orange County Register, *posted to* Primfocus, *March 21*

Rare Gibbon Born in Australian Zoo

PERTH, Australia (*Agence France Presse*) – Zookeepers showcased one of their most treasured exhibits – a tiny, gangly two-day-old silvery gibbon (*Hylobates moloch*) to add to only a few hundred left in the world. The 344-gram female was born at the zoo Sunday to 19-year-old mother Hecla. Vets declared the newly arrived infant to be in good health.

"We're very thrilled. This is incredible," Perth Zoo chief executive Brian Easton said Wednesday. Perth Zoo is one of only three facilities internationally to breed *H. moloch* – a critically-endangered species. Hecla and her 17-year-old male partner are among only six captive breeding pairs in the world. The first of their four offspring was a female, now part of a breeding program in the United States. – *March 26, posted to* Primfocus

Joe Comes to Gorilla Haven, March 30, 2003

Gorilla Haven (GH) welcomed its first gorilla resident – a forty-year-old male gorilla silverback, given name Kabako, but everyone calls him Joe. In March GH received approval to become a non-American-Zoo-Association affiliate of the Gorilla Species Survival Plan, and also received official approval to move Joe. Phase 1 of the GH building plan includes four villas as well as an 8.5-acre habitat. Silverback Villa is complete, and Joe

will live there while the rest of Phase 1 is completed. All support facilities (including a veterinary building and recovery hospital) are ready and operational. Joe won't have access to the outside habitat, but he will have full use of Silverback VIlla, which is designed for two silverbacks, including access to both inside and outside cages – more space than he's had in many years.

Joe was born in Africa in 1963 and was captured as a youngster. He has been unable to contribute to the captive gene pool, due to his lack of interest in breeding and lack of social skills. The Birmingham (Alabama) Zoo received Joe in June, 1966. For almost twenty years, a female gorilla lived with Joe, but they acted like siblings and produced no offspring. In December, 1986, Joe was moved to Denver (Colorado) Zoo, in hopes he might be inspired to mate with females there, but Joe wasn't interested in those ladies, either. So once again, Joe was moved – this time to Gladys Porter Zoo in Brownsville, Texas, in November, 1990. At 27 years of age, Joe, a fully-grown silverback, still didn't know how to behave like a mature silverback leader. According to reports, when Joe was being introduced to the gorillas at Gladys Porter, he had severe stress-induced reactions and several times almost died. The only space for Joe was near the other gorillas, but since that was suspected of causing his medical problems and there was no room for him back in Birmingham or at another zoo, he was moved to the vet clinic, where he could receive close medical supervision and attention, as well as be away from other gorillas.

Bruce Rendall, a professional animal transporter, drove Joe to GH in his air-conditioned and heated trailer from Brownsville. GH also hired Stephanie Scanlin, Joe's former caregiver at GPZ, to accompany Joe on the move to GH, and to stay there and help the resident caregivers. Pete Halliday, GH's project manager and longtime gorilla caregiver, also accompanied Joe on the road trip. And Joe's current vet at GPZ, Dr. Kim Herrin, used personal vacation time to travel with Joe, too.

Joe seems quite relaxed, curious, and playful at GH, rolling around in the hay, climbing up to look out his windows, and watching with great interest and curiosity as his "staff" work around him. There will be no media or visitors allowed to see Joe for at least the first several months he's at GH, to give him the time and space he needs to settle into his new home and environment.

Jane Dewar asks those who remember Joe from Birmingham, Denver, or Brownsville to e-mail any stories or photos you would like to share to <*jdewar@gorillahaven.org*>! Meanwhile, visit <www.gorillahaven.org> for pictures and more about Joe and GH.

Sweden Bans Experiments on Great Apes

Sweden's Board of Agriculture together with Sweden's National Board for Laboratory Animals recently decided on new regulations for using animals in research. One of the most important changes is that great apes and nine species of gibbons will be exempt from use in experiments from June, 2003. Only non-invasive behavioral studies of these animals will be allowed in the future.

"No great apes or gibbon apes are currently used in experiments in Sweden, but the ban is still a matter of great ideological importance," says the Campaign Manager at Animal Rights Sweden, the country's largest animal rights organization. "The decision marks an important shift in official policy, since it implicitly recognizes the individual moral worth of primates. Hopefully, the ban can be seen as a first step towards extending moral and legal rights to millions of other animals suffering in experiments." – *From an April 10 press release by Animal Rights Sweden, posted to* primfocus

Victory for Chimpanzees in Cameroon

On April 14, 2003, it was reported by Reuters News Agency that in Cameroon "any restaurant caught serving meat from endangered animals [including chimpanzee, gorilla, and elephant] could face up to three years in prison and a fine of more than $16,000." Denis Koulagna, Cameroon's Director of Wildlife of the Ministry of the Environment and Forestry (MINEF), recognized that these species "may be exterminated within a decade if hunting for so-called 'bushmeat' was not stopped."

Viruses of a Feather

Are birds the elusive reservoir of Ebola virus? It's a possibility, say researchers, who note the similarities between Ebola and avian retroviruses. In northwestern Congo and the border regions of Gabon, Ebola infection is approaching an "endemic situation", said WHO spokesperson Jon Liden. The infection is known to spread swiftly through health care settings with poor hygiene standards, but nobody yet knows the virus's ultimate source.

"(We) can't say anything of great certainty," said Liden, "we just do not have enough data." Nevertheless, WHO has warned that the virus certainly enters the human population from animals, predominantly primates, which are being hunted in the forest, he says.

Primates, however, cannot be Ebola's original host, says David Sanders of Purdue University, because the virus kills primates "far too rapidly". A dead host is far less effective than a live host at spreading the infection. Avian retroviruses and Ebola had a common ancestor, says Sanders, and that ancestor likely infected birds. It is possible that birds are the current reservoir of Ebola, he suggests.

Sanders' research, conducted with Anthony Sanchez of the U.S. Centers for Disease Control and graduate student Scott Jeffers, shows that Ebola virus and avian sar-

coma and leukosis virus have some functional similarities. The researchers created "pseudotyped" viruses with envelope glycoproteins from Ebola and avian retrovirus cores. "It's a surrogate," explains Sanders, "but as far as we can tell the entry process always mimics the entry process of the normal (Ebola) virus."

In studying different "pseudotype" versions, not only did the team learn more about the entry process of Ebola, but it also became clear that the glycoproteins of Ebola and avian retroviruses have similar biochemical and structural properties. Previous studies had only shown genetic similarities between the two types.

It certainly would not be the first time that an avian virus has jumped the species barrier. Influenza A is a familiar example of a pathogen that causes little harm to its host – birds – but in its adaptation to a foreign host may be deadly. This tendency of pathogens to "evolve to less virulence" is why non-human primates are an unlikely reservoir of Ebola, Sanders explains. Furthermore, primates do not range over the whole of the territory where Ebola outbreaks have occurred. A small, migratory animal would be a more likely source. African bird populations have migration patterns consistent with where Ebola is found. In Tanzania and Kenya, where Ebola outbreaks have not occurred, the bird populations are distinct from those populations in areas where outbreaks have occurred – farther west and into Congo. Sanders admits, however, that there is not yet any field evidence of Ebola in birds. – *by Alexandra Venter, from* BioMedNet*, April 24, 2003*

Joe Erwin Announces Retirement

On his 62nd birthday, April 20, Joseph M. Erwin announced his retirement, effective immediately. Dr. Erwin plans to continue consulting and will expand his commitment to writing about issues relevant to the care, conservation, and understanding of primates. Joe has been an important member of the primatology community for many years. He incorporated the American Society of Primatologists in 1976 and later served as President of that organization. He is Founding Editor of the *American Journal of Primatology*. Joe is editor or co-editor of nine books, including the five-volume reference tome, *Comparative Primate Biology*. He initiated the Sulawesi Primate Project, a multidisciplinary field Project in Indonesia, in 1985, and the Great Ape Aging Project, a cooperative and collaborative project involving many zoological gardens and research institutions, in 1997. Send congratulations and commiserations to Joseph M. Erwin, 4139 Gem Bridge Rd, Needmore, PA 17238 [717-573-2081; e-mail: *joemerwin@aol.com*].

Venereal Disease Among Baboons – Tanzania

NAIROBI, (African Eye News Service [Nelspruit]) Tanzanian wildlife researchers are frantically working around the clock to unravel a mystery venereal disease that has hit olive baboons at Manyara National Park. Male baboons in the park are reported to be dying in excruciating pain after contracting the as yet unidentified disease. A team of experts from Sokoine Agricultural University and Tanzania's Wildlife Research Institute has flown to the park to set up field laboratories and identify a possible cause for the disease. Game experts in Kenya have also shown interest, with Kenya's Institute of Primate Research in Nairobi requesting specimens to help identify and possibly isolate the bacterial disease.

The growing regional interest was sparked by fears that this outbreak in Manyara National Park may spread to baboon populations in the nearby Kenyan Tsavo National Park and elsewhere. "We are worried, but have the capacity to identify the disease because of our experience after decades of research on primates. We therefore want to cooperate with our counterparts in Tanzania," the Institute said in a statement.

Tanzanian authorities have confirmed that over 200 baboons are reported to have contracted the mystery disease, which attacks the animal's reproductive organs. Conservation officials are not yet sure whether the disease is sexually transmitted, although local rangers and park employees are describing the disease as syphilis. Manyara National Park chief warden Marietta Kibasa confirmed at the weekend that several male baboons had died after their genitals were "torn apart" by the disease.

"The baboon troops here are in great trouble. Infected males are in great pain," added park ecologist Emilian Kihwele. Kihwele confirmed that Tanzania's top conservation scientists were examining samples from the infected baboons in an attempt to pinpoint the exact nature, cycle, and possible cause of the disease. Wardens are also closely monitoring affected baboon troops in a bid to prevent them from moving to new areas. – *April 28, 2003. Byline: Wachira Kigotho*

Monkey Disease in Karnataka, India

Eight people were reported dead in Shimoga district, in the southern Indian state of Karnataka, where an outbreak of the Kyasanur Forest Disease, or "monkey disease", has affected more than 500 people, local media reported here on May 3. The virus was reported in the same area in 1957, when it was first recognized, and there were subsequent epidemics in 1981 and later in 1983-84. Doctors in the area are worried that there could be more deaths if preventive measures are not taken quickly.

The disease is transmitted from infected monkeys by ticks that subsequently bite humans who might venture into the forest for firewood or for other purposes. The symptoms are high fever, headache, vomiting and eventually bleeding from the nose and throat. There is no specific treatment for the disease, but it can be prevented by vaccination of the population at risk, controlling the tick

population by chemical spraying, and using insect repellents on clothing.

Health department officials are continuing to report the virus, and symptomatic treatment is being given to patients. Mobile units have been sent to all the affected areas to control the disease. Vaccine is available for the local population as a preventive measure and efforts are being made to contain the outbreak. – *Islamic Republic News Agency, posted to* primfocus *May 4*

Pusey Executive Director of JGI Research Programs

The Jane Goodall Institute has named Dr. Anne Pusey Executive Director of the Institute's diverse primate research programs, a newly created position. Dr. Pusey currently serves as director of the Jane Goodall Institute Center for Primate Studies at the University of Minnesota and is a professor in that institution's Department of Ecology, Evolution, and Behavior.

Announcing the appointment, Dr. Jane Goodall, the Institute's founder, cited Dr. Pusey's extensive knowledge of primate research issues and protocols and her direct experience with the Institute's programs, including the ongoing chimpanzee behavioral research being conducted at Gombe Stream National Park in Tanzania. Dr. Pusey received an undergraduate degree in zoology from Oxford University in 1970. She was a research assistant at Gombe National Park where she studied chimpanzee adolescence, and earned a PhD from Stanford University. – *from a press release by the Institute*

Gorillas Return Safely from Nigeria to Cameroon

On Friday, May 23, the adolescent female gorillas "Brighter" and "Twigs" were repatriated to Cameroon from Nigeria, where they had lived for many years as pets in the northern metropolis of Kano. The gorillas were purchased as infants by a Lebanese businessman who saw them in the market and felt pity for them. He tried unsuccessfully several times to find permanent homes for them. The gorillas (ages 6 and 9 years) are products of the bush meat trade and are believed to be western lowland gorillas (*G. g. gorilla*), and not Cross River gorillas (*G. g. diehli*). They were smuggled, in separate incidents, into Nigeria as infants, to eventually wind up for sale in Kano. In December 2002, they were put under house arrest by the federal Ministry of Environment as a violation of CITES protocols.

After months of trying to coordinate the effort, the NGO Pandrillus was able to successfully carry off the repatriation on Friday. The gorillas were transferred to Kano International Airport, flown on domestic carrier "IRS" to Lagos and loaded into a Cameroon Airlines 757-400 jet for the 70-minute flight to Douala. On the ground in Douala the gorillas were off-loaded to continue their journey in a Ministry of Environment and Forests (MINEF) truck to their new home in Southwest Province, where they will join a group of eight gorillas, ranging in age from 3 to 13 years, once they complete quarantine.

The Limbe Wildlife Center, a collaborative effort between MINEF and Pandrillus, is also home to orphan chimpanzees, drills, mandrills, baboons, and eight other monkey species. It was created in 1993. Pandrillus also established and operates the Drill Rehabilitation and Breeding Center in Cross River State, Nigeria. The costs for Brighter's and Twigs' repatriation were provided equally by the U.N. Environment Project's Great Apes Survival Project, Nairobi, and the Pan African Sanctuary Alliance. For further information, contact: Tony Chasar, Manager, Limbe Wildlife Center, Cameroon [e-mail: *Limbewc @aol.com*] or Liza Gadsby, Director, Pandrillus Foundation, Calabar, Nigeria [e-mail: *drill@hyperia.com*]. – *Reported on* Alloprimate *by Shirley McGreal, May 28*

[*Note: Jane Dewar, Founder of Gorilla Haven, was at the Limbe Center to observe the arrival of Brighter and Twigs. She will be posting a complete account of what she saw, along with more background information, at* <www.gorilla-haven.org> *in the near future.*]

SPF Monkeys To Support AIDS Research

To ensure that NIH-funded scientists have access to the animal resources needed for AIDS research, the National Center for Research Resources has awarded six new cooperative agreements to primate centers in the United States and Puerto Rico. As part of the agreements, the institutions will breed specific-pathogen-free (SPF) macaque monkeys that are free of three common retroviruses that can interfere with AIDS experiments – simian immunodeficiency virus, Type D simian retrovirus, and simian T-lymphotropic virus. The monkeys will also be free of herpes B-virus, which on rare occasions has infected and killed human caretakers. In addition, some of the macaques will carry genes for certain major histocompatibility complex molecules that have been shown to intensify the immune response to SIV.

The new awardees are the Caribbean Primate Research Center Program in Puerto Rico and the National Primate Research Centers in California, Georgia, Louisiana, Oregon, and Washington. Besides breeding SPF monkeys, some centers will also conduct research on breeding and diagnostic screening methods. For example, the California NPRC is developing a single blood assay for detecting multiple viruses, which will enable high-throughput screening at reduced cost. – *From the* NCRR Reporter, *Spring 2003*

Gorilla Death at Detroit Zoo

Detroit Zoo officials were stunned by the death June 4 of Cora the gorilla. She succumbed to a stroke at age 24,

roughly half the usual life span for gorillas, zoo officials said. She was in the prime of young adult-hood; she loved to run; she had passed a heart exam with flying colors less than a year ago. She ate tons of fruits and vegetables and seemed in excellent health – all 220 pounds of her. The usually playful Cora caught a bacterial infection of the lungs and brain that apparently brought on a hemorrhagic stroke. Her remains will be cremated. More should be known next week about the bacteria blamed for Cora's death. – *© 2003 Detroit Free Press Inc.*

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Positions Available

Faculty Position in Comparative Medicine – Maryland

The Program of Comparative Medicine, University of Maryland School of Medicine, invites applications for a full-time position as Assistant Professor of Comparative Medicine with a joint appointment as attending veterinarian within our program of Veterinary Resources. This is also an educational opportunity, as our ACLAM-recognized training program will provide training toward board certification. The requirement is a DVM, VMD, or equivalent degree. Clinical experience and experience/interest in immunology or microbiology (infectious diseases) is desirable. The position includes some clinical duties and IACUC membership. Approximately 50% of the position involves research collaboration with the Director. Salary is commensurate with experience and qualifications, and ranges from $50 to $80K plus benefits.

Send a letter of application, CV, and names, phone numbers, and e-mail addresses of three references to Dr. Louis DeTolla, Director, Comparative Medicine, MSTF G-100, 10 S. Pine St, Baltimore, MD 21201 [410-706-8537; fax: 410-706-8538; e-mail: *detolla@vetmed.umaryland.edu*]. The University of Maryland is an AA/EOE employer.

Clinical Veterinarian – Madison, Wisconsin

The University of Wisconsin Medical School – Laboratory Animal Resources is currently seeking a highly motivated, service-oriented laboratory animal veterinarian. The Medical School is an AAALAC-accredited unit with 80,000 square feet of facilities. Species include all traditional laboratory models including nonhuman primates. There are active programs in ophthalmology, surgery, cardiology, neurophysiology, and other clinical and basic sciences. Qualified applicants will have a DVM or VMD, a license to practice veterinary medicine in any U.S. state, at least two years' experience in laboratory animal medicine, and preferably be ACLAM-board eligible or a diplomate. Salary is commensurate with qualifications and experience. Information about University employment benefits and a Web posting of the position vacancy listing can be viewed at <www.ohr.wisc.edu>. To apply, please submit a letter of interest, curriculum vitae and the names of at least three references to: Alison Jarvis, DVM, Associate Director, Lab. Animal Resources, K4/114 Clinical Science Center, 600 Highland Ave., Madison, WI 53792-1654 [e-mail: *asjarvis@wisc.edu*]. Applications will be accepted until a suitable hire is made. We are an AA/EOE employer. We promote excellence through diversity and encourage all qualified individuals to apply.

Caretaker – New York City

The Animal Care Facility at Lehman College will be hiring an animal caretaker, with general husbandry duties including health and environmental monitoring, cage washing, feeding, and environmental enrichment of the macaque colony. This person will also assist with veterinary procedures, TB testing, and wound management. The facility also houses a small rodent population. The position is full or part-time, but weekends are mandatory, and there are rotating holidays. We expect this person to have had previous experience with macaques and to be a high school graduate; an associate's degree would be preferred. We also require AALAS certification at ALAT level. The salary will depend on qualifications. Contact Maria E. Reaves, Lehman College, Animal Care Facility, 250 Bedford Park Blvd. West, Bronx, NY 10468 [fax: 718-960-8236; e-mail: *mreaves@lehman.cuny.edu*].

Animal Husbandry Supervisor – MIT

The Division of Comparative Medicine at MIT is seeking an Area Supervisor for their AAALAC-accredited animal resource program. The Division provides animal husbandry and veterinary and clinical care for all animals used in biomedical research at MIT. The Division oversees animal facilities with a daily census of 65,000 animals and employs 66 animal technicians. The Supervisor will supervise the operation of an animal facility on the MIT campus; be fully cognizant of the detailed operation of the facility; and ensure that animal husbandry procedures are carried out properly and according to established standard operating procedures. Requirements include a BS in biology, animal science, or a related field; one-to-three years of directly related supervisory experience in an animal resource program (must include experience with primates); and strong communication and writing skills. LATG certification is preferred.

Send a cover letter and resume to Bruce Brown, MIT Div. of Comparative Medicine, 16-849, 77 Massachusetts Ave, Cambridge, MA 02139 [e-mail: *bbrown@mit.edu*].

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Meeting Announcements

The second **Tropical Montane Cloud Forest Symposium** will be held July 28 to August 2, 2003, at the Hawai'i Preparatory Academy. The focus will be "Mountains in the mist: Science for conserving and managing tropical montane cloud forests". Contact Lawrence S. Hamilton [802-425-6509; e-mail: *druid@gmavt.net*].

The 2003 meeting of the **American Society of Primatologists** will be held July 31 to August 2 in Calgary, Alberta, Canada, sponsored by the University of Calgary. See <www.asp.org>, or contact James Paterson [e-mail: *paterson@ucalgary.ca*] for details.

The **19th International BioAcoustic Congress** will be held August 10-16, 2003, in Belem, Para, Brazil, supported in part by the Federal University of Para and the Museu Paraense Emilio Goeldi, as well as by private sponsors. Topics cover a wide spectrum of themes, including "Primates and Man". Further details and news will appear at <www.cultura.ufpa.br/ibac>, or contact Prof. Dr. Maria Luisa (Malu) da Silva [+ 55 19 3289 4030; e-mail: *ibacbrazil@uol.com.br*].

The **2nd Mexican Primatological Association Congress** will be held September 7-11, 2003, in Catemaco, Veracruz. The theme will be "Mexican Perspectives in Primatology". Contact Dr. José Luis Vera-Cortés [(52-55) 5661-4679; 5661-4987; and 5663-0857; fax: (52-55) 5661-1787; e-mail: *zeluismx@yahoo.com*].

A conference on **The Barbary Macaque: Comparative and Evolutionary Perspectives** will be held November 5-8, 2003, in Gibraltar, sponsored by the Gibraltar Ornithological and Natural History Society, the German Primate Center, and the Chicago Field Museum. There will be a special workshop on Conservation Management, and poster and video sessions. There will also be a 5-day post-conference excursion to Barbary macaque habitat in Morocco. Contact Keith Hodges [e-mail: *khodges@gwdg.de*]; and see <www.gib.gi/gonhs/gibraltar/congress.htm>.

The German Primate Center (DPZ) will host an international conference, **Cooperation in Primates and Humans: Mechanisms and Evolution,** December 9-12, 2003. Invited speakers will summarize and evaluate recent empirical and theoretical work dealing with mechanisms and evolutionary consequences of cooperation, including altruism, reciprocity, kin selection, nepotism, game theory, market models, cooperative hunting, cooperative breeding, food sharing, reconciliation, coalitions, group selection and culture. Confirmed invited speakers include F. Aureli, L. Barrett, C. Boesch, B. Chapais, T. Clutton-Brock, E. Fehr, P. Hammerstein, B. König, M. Milinski, J. Mitani, R. Noe, C. van Schaik, J. Silk, R. Trivers, and F. de Waal. You are invited to submit abstracts for relevant oral (15 minutes) and poster contributions (deadline: August 1). The conference is also open to guests without presentations (registration deadline: October 15). Additional details are available from Peter Kappeler [e-mail: *pkappel@gwdg.de*]; or see: <www.dpz.gwdg.de/voe_page/GFT2003/index.htm>.

The **41st Animal Behavior Society Meeting** will be held in Oaxaca, Mexico, June 12-16, 2004. For the first time, the Animal Behavior Society will meet outside English-speaking North America, with the vision of becoming a more geographically diverse society. Scientists from the Universidad Nacional Autónoma de México (in Mexico City), the Universidad Autónoma de Tlaxcala (in Tlaxcala, Tlaxcala) and the Instituto de Ecología (in Xalapa, Veracruz) will host the meeting. For more information, see <www.ecologia.edu.mx/abs2004/>, or contact Shan D. Duncan, 2611 East 10th Street, #170, Bloomington, IN 47405 [e-mail: *sdduncan@abs.animalbehavior.org*].

The **IXth FELASA (Federation of European Laboratory Animal Science Associations) Symposium** will be held in Nantes, France, June 14-17, 2004. Nantes is a richly historical, yet modern and dynamic, city situated in the Department of "Loire Atlantique" on the French Atlantic coast. The main topic of this Symposium is "Internationalization and Harmonization of Laboratory Animal Care and Use Issues". The first announcement and the pre-registration form are at <www.afstal.com>.

As part of the Celebrations of its 600th Anniversary, Torino University will host the **XXth Congress of the International Primatological Society** (IPS), August 23-28, 2004, organized by the Department of Animal and Human Biology, the Associazione Primatologica Italiana, and the European Federation for Primatology. This conference will offer an excellent opportunity for a general view of the field. All major topics of primatology will be discussed, with an emphasis on their interactions with other specialized branches of modern biology. Special attention will be paid also to the implementation of recent discoveries on primate welfare and conservation. Detailed information is available now at <www.ips2004.unito.it>, or contact Cristina Giacoma, IPS 2004, Via Accademia Albertina 17, I-10123 Torino, Italy [39-011-6704761; fax: +39-011-6704732; e-mail: *ips2004@unito.it*].

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Research and Educational Opportunities

Interdisciplinary Training for Undergraduates

The leading edge of research in the biological sciences increasingly makes use of concepts and techniques from the mathematical sciences. Likewise, the mathematical sciences have a long history of developing new concepts from biological problems. Continued progress requires a growing pool of individuals with competence in both of these fields. The Directorate for Biological Sciences (BIO), the Directorate for Education and Human Resources (EHR), and the Division of Mathematical Sciences (DMS) in the Directorate for Mathematics and Physical Sciences (MPS) at the National Science Foundation (NSF) are making available opportunities for the scientific community to enhance interdisciplinary education and training for undergraduates at the intersection of the biological and mathematical sciences. They invite supplemental funding requests for projects that intensify undergraduate education at this interface through research experiences and changes in curricula and other educational practices.

All activities should be linked to leading edge research combining the mathematical and biological sciences and to the preparation of students for work in this intersection. We especially encourage activities that include participation of underrepresented groups and students at minority-serving institutions and two-year colleges.

General questions may be directed to: Michael Steuerwalt [e-mail: *msteuerw@nsf.gov*] in DMS, Sam Scheiner [e-mail: *sscheine@nsf.gov*] in BIO, or Calvin Williams [e-mail: *cwilliam@nsf.gov*] in EHR. For detailed descriptions of relevant programs, please consult <www.nsf.gov/bio>, <www.nsf.gov/her>, and <www.nsf.gov/mps/divisions/dms/start.htm>. If you have questions about specific programs in BIO, EHR, and DMS, please contact the program officers listed on the Websites or the relevant program announcement. All are at NSF, 4201 Wilson Blvd, Arlington, VA 22230.

Dutch Graduate School to Focus on Alternatives

The University of Utrecht is launching a new graduate school devoted to the replacement of animal-based experiments with non-animal alternative methods. The University is collaborating on this project with the Netherlands Center for Alternatives (NCA) and the Dutch anti-vivisection group. Students in the program will learn how to design and validate alternative tests in an animal-free curriculum. According to Frank Lommers, head of the University of Utrecht's Institute of Life Sciences and Chemistry, "Our students will create and help produce alternatives that [address] questions from society and research. This way the number of animal experiments will be strongly reduced, without a negative effect on the quality of research...." – *Source: University of Utrecht press release*

Graduate Program – Laboratory Animal Science

The Department of Pathobiology, Ontario Veterinary College, University of Guelph, offers a three-year Doctor of Veterinary Science (DVSc) degree program in laboratory animal science, commencing September 1, 2003. The core doctorate program includes education and training in laboratory animal medicine and pathology, and graduate research experience. Applied clinical and administrative training will be conducted in part at nearby research institutions including: McMaster University, the University Health Network (Toronto), and the University of Western Ontario. The program will give candidates broad experience in laboratory animal science in Canada. The Department is committed to innovation in research. Graduate research opportunities include, but are not limited to, the study of infectious disease and mechanisms of disease resistance in laboratory and domestic animal species, toxicologic pathology, and laboratory animal anesthesia and analgesia. The research program is designed to encourage independent thought, emphasizing experimental design and reasoning, data interpretation, and development of strong written and oral communication skills. This is an outstanding opportunity for the right candidate; graduates of this program will have significant career opportunities in laboratory animal medicine and pathology and in the biomedical sciences.

The DVSc program requires a comprehensive examination and a thesis defended successfully prior to graduation. A stipend is awarded annually upon satisfactory progress. Applicants must possess a DVM or equivalent, be eligible for licensure in veterinary medicine in Ontario, and meet academic standards for admission to the Faculty of Graduate Studies at the University of Guelph. Selection is based on a combination of academic criteria, relevant interest and experience, referees' evaluations, and an assessment of the candidate's career goals and motivation.

For application forms and further information, see <www.ovc.uoguelph.ca/pathobio/graduate.shtm>. Interested candidates should submit contact information for three references, a CV, copies of transcripts, a statement of career goals, and an application to the Graduate Secretary, Dept of Pathobiology, Ontario Vet. College, Univ. of Guelph, Guelph, ON, N1G 2W1 Canada [e-mail: *lbamsey@uoguelph.ca*]. Program inquiries may be directed to Dr. Patricia V. Turner [519-824-4120, x 54497; e-mail: *pvturner@uoguelph.ca*].

Certificate in Lab Animal Science – Philadelphia

Drexel University College of Medicine in Philadelphia announces the creation of a Certificate in Laboratory

Animal Science program (CLAS). CLAS is intended for individuals who have three or more years of experience working in a laboratory animal facility but do not have a baccalaureate (BS or BA) degree. A letter of nomination from the individual's supervisor must accompany all applications. Courses offered include Organizational Management; Financial Management; Architecture, Engineering, and Planning of Laboratory Animal Facilities; Biology and Care of Laboratory Animals; and Diseases of Laboratory Animals. Elective courses are also available. The program starts in August, 2003, and can be completed in two semesters. Most of the classes are held in the late afternoon or evening, enabling one to continue working while learning. Individuals who successfully complete the program will be awarded a Certificate of Completion by Drexel University. For more information please contact Julian Mesina [e-mail: *jmesina@drexel.edu*] or Rick Huneke [e-mail: *rbh25@drexel.edu*].

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Information Requested or Available

New Software from Noldus: MatMan

Noldus Information Technology has released a new version of MatMan, its software tool for the analysis of sociometric, behavioral profile and behavioral transition matrices. MatMan 1.1 has been optimized for Windows XP and Office XP. The most important features are: • Analyze social dominance among observed individuals: Compute linear hierarchy (Landau's h, Kendall's K, Chi-square), reorder matrix to fit linear hierarchy, create rank differences matrix. • Matrix correlation: Analyze associations between different types of behavioral or other dyadic relationships amongst the individuals of a group. Calculate correlation measures (Mantel's Z, Pearson's product-moment correlation, Dietz R, Spearman's rho), permutation test, rowwise matrix correlation, partial rowwise matrix correlation. • Structure of behavior: Use behavioral transition matrices to calculate expected values, standardized residuals and chi-square, adjusted residuals, and normalized values. • Matrix manipulation: Transform values into ranks, reorder rows and columns, transpose matrix, combine matrices, etc. For more information, see <www.noldus.com/products/matman/>.

Ape Tourism and Human Diseases

"Ape tourism and human diseases: How close should we get? A critical review of the rules and regulations governing park management & tourism for the wild mountain gorilla, *Gorilla gorilla beringei*" is an unpublished report of a consultancy for the International Gorilla Conservation Program. Jaco Homsy, MD, MPH, evaluated guidelines in place for mountain gorilla tourism and assessed the risks of disease transmission between humans and great apes. In light of available epidemiological data, Homsy made recommendations concerning the implementation of and adherence to these regulations. This 79-page report is now available from the Wildlife Information Network at <www.wildlifeinformation.org/Subdirectories_for_Search/SampleEL/greatape.pdf>.

Dian Fossey Information

Hope Walker is currently working on a non-fiction manuscript about the family, life, and tragic murder of Dr. Dian Fossey. She has been collecting information for over ten years and hopes "to offer a more accurate and compassionate history of one of the most misunderstood and vilified scientists of the 20th century." Ms. Walker would like to hear from individuals who knew or met Dr. Fossey, or who have related photographs, letters, notes, audio or video recordings, etc. Please contact Ms. Walker at P.O. Box 2101, Port Townsend, WA 98368 [e-mail: *gorillas@waypt.com*].

Theoretical Primatology Project

Clara Jones invites readers of the *LPN* to be aware of the Theoretical Primatology Project (see <www.primate.wisc.edu/pin/idp/idp/entry/576>) if you are interested in theory, both non-mathematical and, especially, mathematical. The most recent issue of the *Theoretical Primatology Project Newsletter* (Vol. 1, Issue 5) has just been distributed (electronically). Please feel free to request a copy from Clara [e-mail: *theoreticalprimatology@hotmail.com*] if you think you might want to become a participant in, and/or subscriber to, this project. In the near future, we will have a Website whose address will be available at the URL above.

More Interesting Websites

• Lomir Biomedical: handling, restraint, and enrichment devices: <www.lomir.com>

• Steiner Enterprises: enrichment and restraint devices: <www.steineronline.com>

• *Wild Means Wild,* a children's activity book: <www.acesanctuaries.org/Kids/Activity_Book.html>

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Grants Available

Innovation Grant Program: HIV Vaccine Research

The National Institute of Allergy and Infectious Diseases (NIAID) and the National Institute of Dental and Craniofacial Research (NIDCR) announce a continuation of the Innovation Grant Program for AIDS Vaccine Research, implemented on the recommendation of the AIDS Vaccine Research Working Group. This program encourages the entrance of novel and innovative vaccine discovery and development concepts into the research pipeline. As such, the emphasis is on supporting prophylactic vaccine research projects that are particularly innovative, novel, may be high risk/high impact, and that exhibit the potential to advance AIDS prophylactic vaccine design or evaluation. Applications are especially welcome from both experienced investigators not currently active in the field of AIDS research, and from young investigators beginning their work in this field. The Innovation Grant Program uses a grant mechanism that provides funding for projects that are exploratory and that are intended to generate preliminary data for further studies.

Applications targeting any scientific area(s) related to AIDS prophylactic vaccine research are encouraged. Before application receipt dates, scientific areas of particular programmatic interest may be posted at <www.niaid.nih.gov/daids/vaccine/innovation.htm>. Periodically, these areas are chosen based on advice received from the AIDS Vaccine Research Working Group, and emerge from meetings, workshops, and discussions with program staff. Applicants are strongly encouraged to contact program staff and visit the Website before submitting an application. Applications for research aimed at targeted areas are especially encouraged, but applicants are not required to focus on only those areas.

All pertinent areas of investigation contributing to the development of an efficacious HIV/AIDS vaccine are welcome. The safety evaluation of immunogens in infected animals or people can be included if these studies directly support the development of a prophylactic vaccine. For information on programs that support therapeutic vaccine development, please contact program staff.

These grants are intended to provide short-duration support for preliminary studies of a highly speculative nature, which are expected to yield, within this time frame, sufficient information upon which to base a well-planned and rigorous series of further investigations. Applicants may request up to two years of support limited to $150,000 per annum in direct cost.

Direct questions to: Jon Warren, Division of AIDS, NIAID, Rm 4104, MSC-7628, 6700-B Rockledge Dr., Bethesda, MD 20892-7628 [301-402-0633; fax: 301-402-3684; e-mail: *jw374e@nih.gov*]; or Mostafa Nokta, Div. of Basic and Translational Sciences, NIDCR, 45 Center Dr., Bldg 45, Rm 4AN-18H, MSC-6402, Bethesda, MD 20892-6402 [301-594-7985; fax: 301-480-8319; e-mail: *Mostafa.Nokta@nih.gov*]. See <grants1.nih.gov/grants/guide/pa-files/PA-03-082.html>.

HIV-1-Induced Cell Injury in the Nervous System

The National Institute of Neurological Disorders and Stroke (NINDS) and the National Institute of Mental Health (NIMH) invite applications to promote research into the role of neuroinflammation in the initiation and expansion of cellular injury and death in the context of HIV-1 infection of the central nervous system (CNS). The intent of this announcement is to intensify interest and investigator-initiated research, to attract new investigators to this field, and to mobilize interdisciplinary approaches. Studies to be funded in response to this PAS could include development of animal models of HIV-1-induced neuroinflammation.

Direct questions to: Michael Nunn, Neural Environment Cluster, NINDS, Room 2118 [301-496-1431; fax: 301-480-2424; e-mail: *mn52e@nih.gov*]; or Kathy L. Kopnisky, Center for Mental Health Research on AIDS, NIMH, Room 6199 [301-443-7726; fax: 301-443-9719; e-mail: *kkopnisk@mail.nih.gov*]. Both are at 6001 Executive Blvd., Bethesda, MD 20892. See <grants1.nih.gov/grants/guide/pa-files/PAS-03-084.html>.

Mentored Career Development – AIDS Research

The National Institute of Neurological Disorders and Stroke (NINDS) and the National Institute of Mental Health (NIMH) invite applications for Mentored Clinical Scientist Development Awards (K08s) or Mentored Patient-Oriented Research Career Development Awards (K23s) from physicians and basic scientists interested in pursuing research related to HIV infection of the nervous system. The intent is to encourage research and career development for individuals with a strong commitment to a research career in the area of NeuroAIDS, either in one of the basic sciences relevant to NeuroAIDS or in clinically-oriented research. Research related to the neuropathogenesis, the role of viral or host genetic factors, inflammatory mechanisms, peripheral neuropathy, or neurological dysfunction in the setting of anti-retroviral therapy is of particular interest.

Candidates for this award must have earned a doctoral degree by the time the award is made. The applicant institution must agree that the candidate can commit a minimum of 75 percent professional effort (of a full-time position) to the career development plan. Candidates must be U.S. citizens or noncitizen nationals, or must

have been lawfully admitted for permanent residence by the time of award. Individuals on temporary or student visas are not eligible for this award. Foreign institutions are not eligible to apply.

Direct questions to Michael Nunn, Program Director, Neural Environment Cluster, address above; or Jeymohan Joseph, Chief, HIV Neurovirology, Genetics and Molecular Therapeutics Program, Center for Mental Health Research on AIDS, NIMH, 6001 Executive Blvd., Rm 6202, Bethesda, MD 20892 [301-443-3012; fax: 301-443-9719; e-mail: *jjeymoha@mail.nih.gov*].

HIV Vaccine Research and Design Program

The National Institute of Allergy and Infectious Diseases (NIAID) of the National Institutes of Health (NIH) invites applications for research aimed at obtaining a safe and efficacious vaccine against HIV or AIDS. Vaccine research requires contributions from multiple fields including immunology, virology, molecular biology, viral disease pathogenesis, and animal modeling. This program supports multidisciplinary AIDS vaccine-related studies.

The overall objective of this program and announcement is to advance vaccine concepts further towards the development of an AIDS vaccine. To that end, applicants may target any area of AIDS vaccine research. These areas include, but are not limited to: development of viral and bacterial vector systems, development of improved animal model systems to address vaccine efficacy, and studies of immune responses from existing vaccine cohort samples. Other areas may include studies of HIV immunogen structure as it relates to improving immunogenicity, or approaches to increase the immunogenicity of HIV antigens. Extensive modeling of vaccine concepts in nonhuman primates may also be included. The safety evaluation of immunogens in infected animals may be included if these studies directly support the development of a prophylactic vaccine. Applicants are required to delineate in their application discrete goals with measurable milestones and include criteria that can be used in deciding when to proceed to the next phase of vaccine development. Clinical studies involving humans and/or vaccine research focused solely on therapeutic applications would not be considered appropriate.

Direct questions to: Dr. Michael Pensiero, Division of AIDS, NIAID, Rm 4109, MSC-7628, 6700-B Rockledge Dr., Bethesda, MD 20892-7628 [301-435-3749; fax: 301-402-3684; e-mail: *mp338m@nih.gov*]. Application receipt dates are November 13, 2003, November 15, 2004, and November 14, 2005.

Institutional Animal Resources

The National Center for Research Resources (NCRR) encourages the submission of individual animal resource improvement grant applications from biomedical research institutions. The major objective of this program is to upgrade animal facilities in the United States to support the conduct of Public Health Service (PHS)-supported biomedical and behavioral research. A related objective is to assist such institutions in complying with the USDA Animal Welfare Act and Department of Health and Human Services policies related to the care and use of laboratory animals. Support is limited to alterations and renovations to improve laboratory animal facilities, and to the purchase of major equipment items for animal resources, diagnostic laboratories, transgenic animal resources, or similar associated activities.

The mechanism available for the support of these improvement projects is the Grant for Repair, Renovation, and Modernization of Existing Research Facilities. The total budget request for the improvement grant application and award is limited to $700,000 (direct costs). The $700,000 request may be used (a) entirely for movable equipment (e.g., cages, static racks); (b) for renovation, repair or modernizing the facility and fixed equipment; and (c) in any combination of option (a) and (b) to reach the $700,000 maximum request limit of the award. Facilities and administrative costs are not allowed. The matching requirement for all applicants has been eliminated. This is a change from past announcements.

Improvement grants are *not* intended to provide support for: • general operational support for the resource (e.g., funding for personnel or consumable supplies for routine animal care); • specialized research equipment or facilities for use by only a few investigators; • new construction, including the completion of shell space; • equipment intended for teaching or non-research purposes; or • office and research equipment, computers, or data processing items.

Direct inquiries about programmatic issues to Willie D. McCullough, Room 6132 [301-435-0766; fax: 301-480-3770; e-mail: *mcculloughw@ncrr.nih.gov*]. Direct inquiries about engineering and architectural issues to Esmail Torkashvan, Room 6136 [301-435-0766; fax: 301-480-3770; e-mail: *torkashvane@ncrr.nih.gov*]. Both are at the Div. of Research Infrastructure, NCRR, 6705 Rockledge Dr., MSC 7965, Bethesda, MD 20892-7965. See <grants1.nih.gov/grants/guide/pa-files/PAR-03-077.html>.

Studies of Congenital Urinary Tract Obstruction

Congenital obstructive uropathy is one of the major causes of chronic kidney disease and end-stage renal disease (ESRD) in infants and children. The pathogenesis of this disorder, however, remains poorly understood. Many controversies and clinical uncertainties exist in the detection, prognosis, and effective treatment strategies for this condition. The impact of early fetal detection and neona-

tal intervention, the long-term effects of watchful waiting and the various surgical interventions have not been well studied and documented. There is also no consensus on the indications for, or ideal timing of, surgical intervention. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) wishes to address these scientific and clinical uncertainties related to the development, treatment, and prognosis of congenital obstructive uropathy by encouraging and facilitating research in diverse areas. These areas include the development of reliable animal models of the disorder and evaluation of the long-term effectiveness of various treatment strategies.

Direct questions to Marva M. Moxey-Mims, Pediatric Nephrology Program Director, Rm 639 [301-594-7717; fax: 301-480-3510; e-mail: *mm726k@nih.gov*]; Leroy M. Nyberg, Urology Program Director, Room 627 [301-594-7717; fax: 301-480-3510; e-mail: *ln10f@nih.gov*]; or Stuart Howards, Senior Scientific Advisor, Urology, Room 627 [301) 594-7717; fax: 301-480-3510; e-mail: *sh359d@nih.gov*]. All are Division of Kidney, Urologic and Hematologic Diseases, NIDDK, 6707 Democracy Blvd., Bethesda, MD 20892-5458. Applications submitted in response to this program announcement will be accepted at the standard application deadlines; see <grants.nih.gov/grants/dates.htm>.

NIH Exploratory/Developmental Research Grants

An announcement redefining the National Institutes of Health (NIH) Exploratory/Developmental Research Grant Award (R21) mechanism has been posted at <grants.nih.gov/grants/guide/pa-files/PA-03-107.html>. The announcement extends the R21's use as an investigator-initiated mechanism to a number of NIH Institutes and Centers. The R21 is intended to encourage exploratory and developmental research projects, and to foster the introduction of novel scientific ideas, model systems, tools, agents, targets, and technologies that have the potential to substantially advance biomedical research, by providing support for the early and conceptual stages of these projects. Exploratory/developmental grant support is for new projects only; competing continuation applications will not be accepted.

NIH Small Research Grant Program (R03)

An announcement redefining the NIH Small Grant (R03) mechanism extends its use to investigator-initiated applications at a number of Institutes and Centers. The R03 award supports small research projects that can be carried out in a short period of time with limited resources. Examples of the types of projects that can be supported include: • Pilot or feasibility studies • Secondary analysis of existing data • Small, self-contained research projects • Development of research methodology • Development of new research technology. See <grants.nih.gov/grants/guide/pa-files/PA-03-108.html> for detailed information.

Developmental Psychopharmacology

The National Institutes of Mental Health (NIMH), Child Health and Human Development (NICHD), and Drug Abuse (NIDA) request research grant applications to study the possible clinically significant effects that various psychotropic medications may have on the brain when administered during the developing phase from birth to early adulthood. The main goal is to generate data that are relevant to the clinical use of psychotherapeutic medications in children and adolescents with respect to safety and/or efficacy within dose ranges, schedules, and routes of administration that are usually employed therapeutically. The ultimate purpose is to increase our knowledge of the safety and effectiveness of psychopharmacological treatments administered to children and adolescents.

Currently, very limited experimental data indicate that exposure of animals to psychotropic medications such as serotonergic or antidopaminergic agents in early life can result in specific biochemical and molecular changes in the adult CNS. In some cases, these changes can persist upon drug discontinuation and into adulthood. Interpretation of results of these experiments is limited by the compounds, doses, administration regimens and routes employed, and by the lack of studies of chronic neurochemical or behavioral drug effects. These and other methodological limitations of previous studies have restricted generalizations of the results of these few animal studies to humans. Integrative studies in both nonhuman primates and preliminary studies in other species are encouraged.

Questions may be directed to: Lois Winsky, Div. of Neuroscience and Basic Behavioral Research, NIMH, 6001 Executive Blvd, Rm 7184, MSC 9641, Bethesda, MD 20892-9641 [301-443-5288; fax: 301-402-4740; e-mail: *lois@helix.nih.gov*]; Benedetto Vitiello, Div. of Services and Intervention Research, NIMH, 6001 Executive Blvd, Rm 7147, MSC 9633, Bethesda, MD 20892-9633 [301-443-4283; fax: 301-443-4045; e-mail: *bvitiell@nih.gov*]; George P. Giacoia, Center for Research in Mothers and Children, NICHD, 6100 Executive Blvd, Rm 4B11B, Bethesda, MD 20982-5288 [301-496-5589; fax: 301-480-9791; e-mail: *gg65m@nih.gov*]; or Nancy S. Pilotte, Div. of Neuroscience and Behavioral Research, NIDA, 6001 Executive Blvd, Rm 4282, MSC 9555, Bethesda, MD 20892-9555 [301-435-1317; fax: 301-594-6043; e-mail: *npilotte@mail.nih.gov*].

Genetics, Behavior, and Aging

The National Institute on Aging (NIA) solicits novel research integrating genetics, behavior and aging. Human and nonhuman studies are needed to advance our understanding of the genetic and environmental influences and

processes affecting variability in behavior and its functional sequelae with age. This includes studies that help elucidate the relationships between levels of and change in behavior to health, functional competence, and quality of life of older adults. This program is framed around two broad categories of questions: (1) gene-to-behavior questions concerning the nature and role of genetic influences on behaviors at older ages, and how these genetic effects vary with age; and (2) questions about dynamic processes including gene-environment interactions, gene-environment covariation, age-related genetic effects, and how behaviors interact with and affect genetic expression. The behaviors that are eligible for study under this program should be critical to quality of life among the aged, either as outcomes or as mediators of physical or cognitive health and function. Examples of relevant behavioral domains include, but are not limited to: social behaviors, resilience, vitality, adaptivity, personality, vulnerability to stress, health behaviors, social cognition, cognitive abilities, cognitive flexibility, cognitive reserve, learning, and functional abilities.

A major goal of this program is to encourage innovative research integrating knowledge and methodologies from genetics, gerontology, and the behavioral and social sciences. Applications should articulate the interdisciplinary dimensions and components of the proposed research, and explain how the collective expertise of the research team meets these interdisciplinary requirements with regard to the specific aims to be investigated.

Direct your questions to: Angie Chon-Lee, Behavioral & Social Research Program, NIA, Gateway Bldg, Room 533, Bethesda, MD 20892-9205 [301-594 5943; fax: 301-402-0051; e-mail: *Chon-LeA@nia.nih.gov*]; or Marilyn M. Miller, Neuroscience and Neuropsychology of Aging Program, NIA, Gateway Bldg, Suite 350, 7201 Wisconsin Ave., Bethesda, MD 20892-9205 [301-496-9350; fax: 301- 496-1494; e-mail: *Millerm@nia.nih.gov*].

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Travelers' Health Notes: International Assn for Medical Assistance to Travelers

The International Association for Medical Assistance to Travelers (IAMAT), a volunteer group, compiles an annual list of doctors around the world who meet the organization's criteria, who speak English or another second language, and who agree to charge a specific fee. The 2003 Directory lists the current schedule of fees as US$55 for an office visit, US$75 for a house (or hotel) call, and US$95 for night, Sunday, and holiday calls. These fees do not include consultants, laboratory procedures, hospitalization, or other expenses. The current listing of doctors and centers includes 125 countries and territories.

IAMAT also publishes and provides to its members pamphlets on immunization and malaria. IAMAT has a scholarship program for physicians from developing countries to attend travel medicine training courses in North America. For information, contact IAMAT, 40 Regal Rd, Guelph, Ontario, N1K 1B5, Canada [519-836-0102]; 417 Center St, Lewiston, NY 14092, U.S.A. [716-754-4883]; P.O. Box 5049, Christchurch 5, New Zealand; or 57 Voirets, 1212 Grand-Lancy-Geneva, Switzerland [e-mail: *info@iamat.org*]; or see <www.iamat.org>.

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Volunteer Opportunities

Field Assistant – Madagascar

An opportunity is available for a field assistant in Ranomafana National Park, Madagascar. The assistant will help with 1) fecal collections from *Eulemur rubriventer* 5 days per week, 2) botanical plot assessments once per month, 3) censuses once per month, 4) feeding behavior data collection, and 5) computer data entry approximately two hours per week. This is a great opportunity for people who want to conduct their own independent studies as well. For a description of the park. see the Institute for the Conservation of Tropical Environments' Website: <naples.cc.sunysb.edu/CAS/icteweb.nsf/pages/rano>.

The ideal person will have experience in fieldwork, camping, and international travel; a background in biology, anthropology, or a related field; and a flexible schedule for being in the field. This is a physically demanding rainforest, so applicants should be in decent physical condition. Some ability to speak and understand French or Malagasy is desirable, but not required.

This position is for 3 to 18 months, starting September, 2003; application deadline is July 1, 2003. Send (preferably by e-mail) a CV and two letters of recommendation to Ms. Stacey Tecot, University of Texas, Anthropology and Archeology, 1 University Station C3200, Austin, TX 78705 [e-mail: *stecot@mail.utexas.edu*]. Contact Stacey for more information.

Colobus Trust – Kenya

The Colobus Trust in Diani, Kenya, has a few places open for volunteers. See <www.colobustrust.org>, or contact Wakuluzu, Friends of the Colobus Trust, P.O. Box 5380, Diani, Kenya [+254 (0)127 3519; e-mail: *wakuluzu@colobustrust.org*]. The Born Free Foundation supports the Colobus Trust in their mission to protect and preserve the Angolan Colobus and its habitat.

Recent Books and Articles

(Addresses are those of first authors unless otherwise indicated)

Books

• *Sexual Selection and Reproductive Competition in Primates: New Perspectives and Directions. Special Topics in Primatology, Volume 3.* C. B. Jones (Ed.); J. Wallis (Series Ed.). American Society of Primatologists, 2003. 600 pp. [Price: $25.00 + Shipping (U.S. $4.00, non-U.S. $9.00). Payment must be in U.S. funds. Make checks payable to ASP and send to Steve Schapiro, UTMDA Science Park, Rt. 2, Box 151-B1, Bastrop, TX 78602]

Contents: Foreword, by J. H. Manson; Chapters by N. Shahnoor & C. B. Jones; K. B. Strier; R. Hager; C. B. Jones & G. Agoramoorthy; M. S. Gerald; S. Watson, W. Bingham, R. Stavisky, A. Gray, & M. B. Fontenot; W. Saltzman; H. Vervaecke, J. Stevens, & L. Van Elsacker; D. M. Reeder; E. W. Heymann; C. M. Crockett; R. A. Palombit; J. M. Setchell; R. Thomsen, J. Soltis, & C. Teltscher; J. C. Bicca-Marques; M. M. Robbins; T. J. Bergman & J. C. Beehner; J. W. Froehlich; and C. L. Nunn.

• *The Guenons: Diversity and Adaptation in African Monkeys.* M. E. Glenn & M. Cords (Eds.). New York: Kluwer Academic / Plenum, 2002. [Price: $139.00]

Contents: *I. Evolutionary Biology and Biogeography*. Chapters by T. M. Butyoski; A. J. Tosi, P. J. Buzzard, J. C. Morales, & D. J. Melnick; T. R. Disotell & R. L. Raaum; J.-P. Gautier, R. Vercauteren Drubbel, & P. Deleporte; B. A. Kaplin; M. Colyn & P. Deleporte; K. M. Detwiler; and K. A. Horsburgh, E. Matisoo-Smith, M. E. Glenn, & K. J. Bensen.

II. Behavior. Chapters by W. S. McGraw; M. E. Glenn, R. Matsuda, & K. J. Bensen; T. L. Windfelder & J. S. Lwanga; A. Treves & P. Baguma; L. A. Isbell, D. L. Cheney, & R. M. Seyfarth; M. Cords; M. C. Macleod, C. Ross, & M. J. Lawes; K. Pazol, A. A. Carlson, & T. E. Ziegler; J. Chism & W. Rogers; S. Forster & M. Cords; E. A. Worch; and K. Zuberbuhler.

III. Ecology. Chapters by J. E. Lambert; C. A. Chapman, L. J. Chapman, M. Cords, J. M. Gathua, A. Gautier-Hion, J. E. Lambert, K. Rode, C. E. G. Tutin, & L. J. T. White; and S. H. Curtin.

IV. Conservation. Chapters by M. J. Lawes; T. Ukizintambara & C. Thebaud; T. M. Butynski; and M. Cords & M. E. Glenn.

• *Nutrient Requirements of Nonhuman Primates* (Second Revised Edition). National Research Council of the National Academies. Washington, DC: National Academies Press, 2003. [Price: $59.95 (paperback); $36 (pdf; see <www.nap.edu>)]

Contents: Feeding ecology, digestive strategies, and implications for feeding programs in captivity; Energy; Carbohydrates and fiber; Protein; Fats and fatty acids; Minerals; Vitamins; Water; Pathophysiologic and life-stage considerations; Diet formulation, effects of processing, factors affecting intake, and dietary husbandry; Nutrient requirements; Composition of foods and feed ingredients; and Food as a component of environmental enhancement.

• *Coping with Challenges: Welfare in Animals Including Humans*. Dahlem Workshop Report 87. D. M. Broom (Ed.). Berlin: Dahlem Univ. Press, 2000. [Price: $40.00]

• *Juvenile Primates: Life History, Development, and Behavior.* M. E. Pereira & L. A. Fairbanks (Eds.). Chicago: University of Chicago Press, 2002. [Price: $30]

• *What It Means To Be 98% Chimpanzee: Apes, People, and Their Genes.* J. Marks. Berkeley: University of California Press, 2002. [Price: $27.50].

• *Primate Life Histories and Socioecology*. P. M. Kappeler & M. E. Pereira (Eds.). Chicago: University of Chicago Press, 2003. 416 pp. [Price: $75.00 (cloth); $30.00 (paper)].

Contents: Foreword, by R. D. Martin; Primate life histories and socioecology, by P. M. Kappeler, M. E. Pereira & C. P. van Schaik.

Life History and Socioecology. Chapters by A. Purvis, A. J. Webster, P.-M. Agapow, K. E. Jones & N. J. B. Isaac; P. C. Lee & P. M. Kappeler; S. C. Alberts & J. Altmann; C. H. Janson; and J. U. Ganzhorn, S. Klaus, S. Ortmann & J. Schmid.

Development. Chapters by M. E. Pereira & S. R. Leigh; L. R. Godfrey, K. E. Samonds, W. L. Jungers & M. R. Sutherland; and K. Hawkes, J. F. O'Connell & N. G. Blurton-Jones.

Evolution of Primate Brains. Chapters by R. O. Deaner, R. A. Barton & C. P. van Schaik; C. Ross; and R. I. M. Dunbar.

Where Do We Go From Here? Primate life histories and future research, by S. C. Stearns, M. E. Pereira & P. M. Kappeler. Appendix – A primate life history database.

• *Eating Apes.* D. Peterson. *California Studies in Food and Culture, 6*. With an Afterword and Photographs by K. Ammann and a Foreword by J. K. Museveni, First Lady of Uganda. Berkeley: University of California Press, 2003. 333 pp. [Price: $24.95; the first chapter is available free at <www.ucpress.edu/books/pages/9403/9403.ch01.html>]

Journal Contents

• *Journal of Medical Primatology,* 2003, *32*[1].

Rhesus rhadinovirus infection in healthy and SIV-infected macaques at Tulane National Primate Research

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We would like to acknowledge *Primate-Science* as a source for information about new books.

Center, by K. Ruff, G. B. Baskin, L. Simpson, M. Murphey-Corb, & L. S. Levy; Naturally occurring fatal herpes simplex virus 1 infection in a family of white-faced saki monkeys (*Pithecia pithecia pithecia*), by M. D. Schrenzel, K. G. Osborn, A. Shima, R. B. Klieforth, & G. A. Maalouf; Urinary steroids, FSH and CG measurements for monitoring the ovarian cycle and pregnancy in the chimpanzee, by K. Shimizu, C. Douke, S. Fujita, T. Matsuzawa, M. Tomonaga, M. Tanaka, K. Matsubayashi, & M. Hayashi; Flow cytometric analysis of macaque whole blood for antigen-specific intracellular cytokine production by T lymphocytes, by T. S. Keeney, L. E. Nomura, H. T. Maecker, & K. Jagannadha Sastry; Proliferative response of peripheral blood lymphocytes to mitogens in the owl monkey *Aotus nancymae*, by A. Pinzón-Charry, J. P. Vernot, R. Rodríguez, & M. Elkin Patarroyo; Record review of baboons with histologically confirmed endometriosis in a large established colony, by E. J. Dick, G. B. Hubbard, L. J. Martin, & M. M. Leland; Spontaneous ovarian tumors in twelve baboons: A review of ovarian neoplasms in nonhuman primates, by C. M. Moore, G. B. Hubbard, M. M. Leland, B. G. Dunn, & R. G. Best; and Ovarian stimulation of marmoset monkeys (*Callithrix jacchus*) using recombinant human follicle stimulating hormone, by V. S. Marshall, M. A. Browne, L. Knowles, T. G. Golos, & J. A. Thomson.

• *Journal of Medical Primatology,* 2003, *32*[2].

Dendritic cells enhance detection of antigen-specific cellular immune responses by lymphocytes from rhesus macaques immunized with an HIV envelope peptide cocktail vaccine, by P. N. Nehete, R. Gambhira, B. P. Nehete, & K. Jagannadha Sastry; Quantitative evaluation of *Enterocytozoon bieneusi* infection in simian immunodeficiency virus-infected rhesus monkeys, by K. Sestak, P. P. Aye, M. Buckholt, K. G. Mansfield, A. A. Lackner, & S. Tzipori; Inhalation efficacy of RFI-641 in an African green monkey model of RSV infection, by W. J. Weiss, T. Murphy, M. E. Lynch, J. Frye, A. Buklan, B. Gray, E. Lenoy, S. Mitelman, J. O'Connell, S. Quartuccio, & C. Huntley; Distribution of three arbovirus antibodies among monkeys (*Macaca fascicularis*) in the Philippines, by S. Inoue, K. Morita, R. R. Matias, J. V. Tuplano, R. R. G. Resuello, J. R. Candelario, D. J. M. Cruz, C. A. Mapua, F. Hasebe, A. Igarashi, & F. F. Natividad; CSF 5-HIAA concentration as an early screening tool for predicting significant life history outcomes in female specific-pathogen-free (SPF) rhesus macaques (*Macaca mulatta*) maintained in captive breeding groups, by G. C. Westergaard, A. Cleveland, M. K. Trenkle, I. D. Lussier, & J. D. Higley; Identification of an amino acid responsible for the CED3 polymorphism in cynomolgus monkeys (*Macaca fascicularis*), by A. Uda, K. Tanabayashi, R. Mukai, K. Terao, & A. Yamada; Overt fatal and chronic subclinical *Encephalitozoon cuniculi* microsporidiosis in a colony of captive emperor tamarins (*Saguinus imperator*), by F. Guscetti, A. Mathis, J.-M. Hatt, & P. Deplazes; and Ectopic splenic nodules in the olive baboon (*Papio cynociphalus anubis*), by M. M. Jeneby, D. Langoi, J. M. Mwenda, & D. Chai.

• *Journal of Medical Primatology,* 2003, *32*[3].

The tree shrews: Adjuncts and alternatives to primates as models for biomedical research, by J. Cao, E.-B. Yang, J.-J. Su, Y. Li, & P. Chow; Hematology and blood biochemistry in infant baboons (*Papio hamadryas*), by L. M. Havill, C. L. Snider, M. M. Leland, G. B. Hubbard, S. R. Theriot, & M. C. Mahaney; Stereology of the myocardium in *Leontopithecus* (Lesson, 1840) Callitrichidae – Primates, by A. Pissinatti, C. H. F. Burity, & C. A. Mandarim-de-Lacerda; Cortisol responses to immobilization with Telazol or ketamine in baboons (*Papio cynocephalus*/*anubis*) and rhesus macaques (*Macaca mulatta*), by K. L. Bentson, J. P. Capitanio, & S. P. Mendoza; Effect of menstrual cycle on mucosal immunity to SHIV within the reproductive tract of baboons (*Papio anubis*): Preliminary findings, by D. O. Ochiel, E. O. Wango, C. S. Kigondu, & M. G. Otsyula; and Seasonal changes in the seminiferous epithelium of rhesus and bonnet monkeys, by F. W. Bansode, S. R. Chowdhury, & J. D. Dhar.

Magazines and Newsletters

• *IPPL News,* April, 2003, *30*[1]. [International Primate Protection League, P.O. Box 766, Summerville, SC 29484]

Includes articles on the "Taiping Four" gorillas, the Ebola epidemic in central Africa, and news from Nigeria, India, Malaysia, Chile, Vietnam, Taiwan, and the U.S.

• *Neotropical Primates: A Journal of the Neotropical Section of the IUCN/SSC Primate Specialist Group,* December, 2002, *10*[3]. [Conservation International, 1919 M St, NW, Suite 600, Washington, DC 20036]

Contents include: The muriqui population of the Estação Biológica de Caratinga, Minas Gerais, Brazil: Updates, by K. B. Strier, J. P. Boubli, V. O. Guimarães, & S. L. Mendes; Rediscovery of *Brachyteles arachnoids hypoxanthus* at the Fazenda Córrego de Areia, Minas Gerais, Brazil, by A. Hirsch, L. G. Dias, W. P. Martins, & S. Porfírio; On the diagnostic characters and geographic distribution of the "yellowhanded" titi monkey, *Callicebus lucifer*, in Peru, by E. W. Heymann, C. F. Encarnación & P. Soini; and The world's top 25 most endangered primates – 2002, by W. R. Konstant, R. A. Mittermeier, A. B. Rylands, T. M. Butynski, A. A. Eudey, J. Ganzhorn, & R. Kormos.

Reports

• *Orangutan Conservation and Reintroduction Workshop.* [Price: $35 from the Conservation Breeding Specialist Group, Species Survival Commission, 12101 Johnny Cake Ridge Rd, Apple Valley, MN 55124-8151; e-mail: *office@cbsg.org*]

Report of a workshop held June 19-22, 2002, in Palangka Raya, Kalimantan, Indonesia.

Special Journal Issues

• Mixed species exhibits in German zoological gardens: Special references on primates (Part 1). *Primate Report,* 2002, *64*.

Contents: Selected mixed species exhibits of primates and other animals in German zoological gardens, by T. Ziegler.

• Mixed species exhibits in German zoological gardens: Special references on primates (Part 2). *Primate Report,* 2003, *65*.

Contents: Background of the study, by T. Ziegler; Evaluation of the mixed-species exhibit of African elephants and hamadryas baboons in Safari Beekse Bergen, The Netherlands, by R. Deleu, R. Veenhuizen, & M. Nelissen; Ten years of tamarin mixed-species troops at Belfast Zoological Gardens, by S. M. Hardie, M. J. Prescott, & H. M. Buchanan-Smith; and Influences of mantled howlers (*Aloutta palliata*) on feeding patterns of rufous-naped tamarins (*Saguinus geoffroyi*): An experimental study, by D. R. Rasmussen & I. Broekema.

• Animal models of stroke and rehabilitation. *ILAR Journal,* 2003, *44*[2].

Contents include: Introduction, by R. J. Nudo & R. J. Nelson; Clinical Issues in animal models of stroke and rehabilitation, by S. C. Cramer; Animal models of focal and global cerebral ischemia, by R. J. Traystman; Models of focal cerebral ischemia in the nonhuman primate, by S. Fukuda & G. J. del Zoppo; Neuroprotective effects on somatotopic maps resulting from piracetam treatment and environmental enrichment after focal cortical injury, by C. Xerri, Y. Zennouj-Azougui, & J.-O. Coq; Experimental focal ischemic injury: Behavior-brain interactions and issues of animal handling and housing, by T. Schallert, M. T. Woodlee, & S. M. Fleming; Assessment of cognitive and motor deficits in a marmoset model of stroke, by J. W. B. Marshall & R. M. Ridley; and A squirrel monkey model of poststroke motor recovery, by R. J. Nudo, D. Larson, E. J. Plautz, K. M. Friel, S. Barbay, & S. B. Frost.

Anatomy and Physiology

• Human specific loss of olfactory receptor genes. Gilad, Y., Man, O., Pääbo, S., & Lancet, D. (D. L., Dept of Molecular Genetics, Weizmann Inst. of Science, Rehovot 76100, Israel). *Proceedings of the National Academy of Sciences, USA,* 2003, *100,* 3324-3327.

"Olfactory receptor (OR) genes constitute the basis for the sense of smell and are encoded by the largest mammalian gene superfamily of >1,000 genes. In humans, > 60% of these are pseudogenes. In contrast, the mouse OR repertoire, although of roughly equal size, contains only 20% pseudogenes. We asked whether the high fraction of nonfunctional OR genes is specific to humans or is a common feature of all primates. To this end, we have compared the sequences of 50 human OR coding regions, regardless of their functional annotations, to those of their putative orthologs in chimpanzees, gorillas, orangutans, and rhesus macaques. We found that humans have accumulated mutations that disrupt OR coding regions roughly 4-fold faster than any other species sampled. As a consequence, the fraction of OR pseudogenes in humans is almost twice as high as in the nonhuman primates, suggesting a human-specific process of OR gene disruption, likely due to a reduced chemosensory dependence relative to apes."

• Histology of vermiform appendix-like organ in slow loris. Kakuni, M., Makita, T., Wijayanto, H., Hondo, E., & Kiso, Y. (Y. K., Dept of Vet. Anatomy, Fac. of Agriculture, Yamaguchi Univ., 1677-1 Yoshida, Yamaguchi 753-8515, Japan). *Experimental Animals,* 2003, *52,* 71-75.

The vermiform appendix-like organ (VALO) of the slow loris was investigated for its histology and immunohistochemical characteristics. The VALO has a much thinner wall with flat folded musoca and shallower crypts than the cecal mucosa, while cellular components and population of the mucosa were similar to those of the cecum. No coalescent lymph nodules were seen in the submucosa. Immunohistochemically 5-HT-positive cells in the crypts and CD3- and CD8-positive lymphocytes in the lymph nodules were shown in the VALO as well as in the cecum. These findings suggest that the VALO is a low-differentiated vermiform appendix of the slow loris.

• Subtask sequencing in the primary visual cortex. Roelfsema, P. R., Khayat, P. S., & Spekreijse, H. (Netherlands Ophthalmic Res. Inst., Dept of Vision & Cognition, Meibergdreef 47, 1105 BA Amsterdam, The Netherlands [e-mail: *p.roelfsema@ioi.knaw.nl*]). *Proceedings of the National Academy of Sciences, USA,* 2003, *100*, 5467-5472.

"Complex visual tasks can usually be decomposed into a number of simpler subtasks. Whether such subtasks are solved serially or in parallel is subject to considerable debate. Here we investigate how subtasks are coordinated in time by recording from the primary visual cortex of macaque monkeys. The animals were trained to perform both a simple and a composite task. In the simple task, they had to mentally trace a target curve while ignoring a distractor curve. Neuronal responses in the primary visual cortex to the target curve were enhanced relative to responses to the distractor curve 130 ms after stimulus appearance. In the composite task, the monkeys searched for a colored marker and traced a curve that was attached to this marker. In an initial phase of the trials, neuronal responses reflected visual search, and the response enhancement due to curve tracing now occurred after 230 ms, 100 ms later than in the simple task. We conclude that subtasks of the composite task are carried out in a structured and sequential manner that can be monitored in the primary visual cortex."

Animal Models

• Serum leptin levels as a marker for a syndrome X-like condition in wild baboons. Banks, W. A., Altmann, J., Sapolsky, R. M., Phillips-Conroy, J. E., & Morley, J. E.

(915 North Grand Blvd, St. Louis, Missouri 63106 [e-mail: *bankswa@slu.edu*]). *Journal of Clinical Endocrinology & Metabolism,* 2003, *88,* 1234-1240.

Serum leptin levels were measured in two groups of wild male baboons, one with access to abundant quantities of food from gardens and garbage dumps near human habitations (Garbage: n = 11) and one without access (No Garbage: n = 10). A Garbage subgroup had high leptin levels (Garbage HL), whereas the rest of the Garbage group had low leptin levels (Garbage LL) similar to those in the No Garbage group. The Garbage HL individuals were obese, with higher mass, body mass index, and leptin-to-mass ratios; were resistant to insulin, with elevations in serum insulin, glucose, and insulin-to-glucose ratios; and were hyperlipidemic. This syndrome X-like condition occurred only in the Garbage HL subset. The Garbage LL subset did not differ from the No Garbage individuals in mass, body mass index, leptin-to-mass ratio, insulin, glucose, or insulin-to-glucose ratios. The highest cholesterol levels, however, occurred in the Garbage LL individuals, suggesting that susceptibility to hyperlipidemia is distinguishable from susceptibility to obesity and insulin resistance. The differences were not explained by age or social status. These results show that a subgroup of wild baboons is susceptible to developing obesity and insulin resistance and that this susceptibility is not related to age or social rank.

• Nonpathogenic SIV infection of sooty mangabeys is characterized by limited bystander immunopathology despite chronic high-level viremia. Silvestri, G., Sodora, D. L., Koup, R. A., Paiardini, M., O'Neil, S. P., McClure, H. M., Staprans, S. I., & Feinberg, M. B. (M. B. F., Dept of Medicine, Emory University School of Medicine, Atlanta, GA 30322 [e-mail: *mbf@sph.emory.edu*]). *Immunity*, 2003, *18,* 441-452.

HIV-infected humans and SIV-infected rhesus macaques who remain healthy despite long-term infection exhibit exceptionally low levels of virus replication and active antiviral cellular immune responses. In contrast, sooty mangabey monkeys that represent natural hosts for SIV infection do not develop AIDS despite high levels of virus replication and limited antiviral CD8+ T cell responses. SIV-infected mangabeys maintained preserved T lymphocyte populations and regenerative capacity and manifested far lower levels of aberrant immune activation and apoptosis than are seen in pathogenic SIV and HIV infections. These data suggest that direct consequences of virus replication alone cannot account for progressive CD4+ T cell depletion leading to AIDS. Rather, attenuated immune activation enables SIV-infected mangabeys to avoid the bystander damage seen in pathogenic infections and protects them from developing AIDS.

Behavior

• Natural concepts in a juvenile gorilla (*Gorilla gorilla gorilla*) at three levels of abstraction. Vonk, J., & MacDonald, S. E. (S. E. M., Dept of Psychology, York Univ., 4700 Keele St, Toronto, ON M3J IP3, Canada [e-mail: *suzmac@yorku.ca*]). *Journal of the Experimental Analysis of Behavior*, 2002, *78,* 315-332.

The extent to which nonhumans are able to form conceptual versus perceptual discriminations remains a matter of debate. Among the great apes, only chimpanzees have been tested for conceptual understanding, defined as the ability to form discriminations not based solely on simple perceptual features of stimuli, and to transfer this learning to novel stimuli. In the present investigation, a young captive female gorilla was trained at three levels of abstraction (concrete, intermediate, and abstract) involving sets of photographs representing natural categories (e.g., orangutans vs. humans, primates vs. nonprimate animals, animals vs. foods). Within each level of abstraction, when the gorilla had learned to discriminate positive from negative exemplars in one set of photographs, a novel set was introduced. Transfer was defined in terms of high accuracy during the first two sessions with the new stimuli. The gorilla acquired discriminations at all three levels of abstraction but showed unambiguous transfer only with the concrete and abstract stimulus sets. Detailed analyses of response patterns revealed little evidence of control by simple stimulus features. Acquisition and transfer involving abstract stimulus sets suggest a conceptual basis for gorilla categorization. The gorilla's relatively poor performance with intermediate-level discriminations parallels findings with pigeons, and suggests a need to reconsider the role of perceptual information in discriminations thought to indicate conceptual behavior in nonhumans.

• Sociability and responses to video playbacks in adult male rhesus monkeys (*Macaca mulatta*). Capitanio, J. (California NPRC, One Shields Ave, Davis, CA 95616-8686 [e-mail: *jpcapitanio@ucdavis.edu*]). *Primates,* 2002, *43,* 169-177.

Studies of several primate species have suggested the existence of a personality dimension typically labeled "Sociability", which reflects tendency to interact with others. The hypothesis that Sociability is related to social skill was tested in the present study by exposing six high- and six low-Sociable adult male rhesus macaques to videotaped presentations of unfamiliar males displaying aggressive or affiliative behaviors. Low-Sociable animals displayed higher frequencies of yawning, lower activity, and tended to have higher durations of watching during the presentations that displayed social signals. They made significantly fewer lipsmacks to presentations that depicted no social behavior. In response to viewing threats, toothgrinds, yawns, and lipsmacks, both low- and high-Sociable animals' most frequent response was to avert their gaze; low-Sociable animals, however, had nearly twice the latency to do so than did high-Sociable animals. The low-Sociable animals' greater tendency to "sit and stare" during the videotaped playbacks suggests that low-Sociable animals have poorer social skills. The possible developmental

origins of variation in Sociability, and the consequences of such variation for survival and reproduction, are discussed.

• Heritability of fearful-anxious endophenotypes in infant rhesus macaques: A preliminary report. Williamson, D. E., Coleman, K., Bacanu, S.-A., Devlin, B. J., Rogers, J., Ryan, N. D., & Cameron, J. L. (Dept of Psychiatry, Univ. of Pittsburgh School of Medicine, Rm E-723, Western Psychiatric Institute and Clinic, 3811 O'Hara St, Pittsburgh PA 15213). *Biological Psychiatry*, 2003, *53,* 284-291.

Research efforts to discover the genetic underpinnings of anxiety and depression are challenging because of the etiologic heterogeneity inherent to these disorders. These efforts might be aided by the study of related behavioral phenotypes in model organisms, such as monkeys. Eighty-five rhesus monkeys from the Oregon NPRC were drawn from a standard matriarchal colony and tested for behavioral response in four testing paradigms designed to elicit fearful-anxious reactions. Heritabilities were estimated using variance component-based quantitative genetic analyses with much of the genetic information arising from paternal half-sibs. Individual behaviors reflecting increased distress responses (e.g., vocalizations and teeth grinding) and behavioral inhibition (e.g., latency to leave mother, latency to inspect novel fruit) showed significant heritability, even though a small number of monkeys was assessed. Exploratory factor analyses identified seven clusters of behaviors across tests, some of which were found to be heritable. These results indicate that several specific fearful-anxious behaviors in infant rhesus monkeys are heritable within this colony. Accordingly, these phenotypes, which are believed to represent the genetic liability for anxiety and depression, are good candidates for further genetic investigation in this population.

• Chimpanzees understand psychological states: The question is which ones and to what extent. Tomasello, M., Call, J., & Hare, B. (Max Planck Inst. for Evolutionary Anthropology, Inselstrasse, 22 D-04103, Leipzig, Germany [e-mail: *eva.mpg.ge*]). *Trends in Cognitive Sciences*, 2003, *7*, 153-156.

New data suggest that relatively drastic revisions are needed in our theoretical accounts of what other animal species understand about the psychological states of others. Specifically, chimpanzees seem to understand some things about what others do and do not see, or have and have not seen in the immediate past, as well as some things about others' goal-directed activities. This is especially so in competitive situations. They clearly do not have a human-like theory of mind, however, and so the challenge is to specify precisely how ape and human social cognition are similar and different.

• Chimpanzee minds: Suspiciously human? Povinelli, D. J., & Vonk, J. (Cognitive Evolution Group, University of Louisiana, 4401 W. Admiral Doyle Dr., New Iberia, LA 70560 [e-mail: *ceg@louisiana.edu*]). *Trends in Cognitive Sciences,* 2003, *7*, 157-160.

"Chimpanzees undoubtedly form concepts related to statistical regularities in behavior. But do they also construe such abstractions in terms of mental states – that is, do they possess a 'theory of mind'? Although both anecdotal and experimental data have been marshaled to support this idea, we show that no explanatory power or economy of expression is gained by such an assumption. We suggest that additional experiments will be unhelpful as long as they continue to rely upon determining whether subjects interpret behavioral invariances in terms of mental states. We propose a paradigm shift to overcome this limitation."

• Global and local processing of hierarchical visual stimuli in tufted capuchin monkeys (*Cebus apella*). Spinozzi, G., De Lillo, C., & Truppa, V. (Istituto di Scienze e Tecnologie della Cognizione, C.N.R., Reparto di Psicologia Comparata, Via Ulisse Aldrovandi, Rome 00197, Italy [e-mail: *spinozzi@pml.it*). *Journal of Comparative Psychology*, 2003, *117*, 15-23.

Capuchin monkeys' relative accuracy in the processing of the global shape or the local features of hierarchical visual stimuli was assessed. Three experiments are presented featuring manipulations of the arrangement and the density of the local elements of the stimuli. The results showed a clear advantage for local-level processing in this species, which is robust under manipulations of the density of the local elements of the stimuli. By contrast, the density of the component elements linearly affected accuracy in global processing. These findings, which support those from other studies in which a local superiority emerged in animals, challenge the generality of early claims concerning the adaptive value of global advantage in the processing of hierarchical visual patterns.

• Withholding information in semifree-ranging Tonkean macaques (*Macaca tonkeana*). Ducoing, A. M., & Thierry, B. (B. T., Equipe d'Ethol. et Ecol. Comport. des Primates, Centre d'Ecologie et Physiologie Energétiques, CNRS UPR 9010, 7 rue de l'Université, Strasbourg 67000, France [e-mail: *thierry@neurochem.u-strasbg.fr*]). *Journal of Comparative Psychology,* 2003, *117*, 67-75.

The ability of Tonkean macaques to deceive partners about the location of hidden food was investigated in four males belonging to a group raised in a two-acre park. Before releasing subjects in the search task, the experimenter prompted one of the subjects to observe where the bait was hidden. When informed, higher ranking subjects did not significantly alter their search patterns whether tested alone or in pairs. The same held for subordinates belonging to pairs with weak dominance asymmetry. To the contrary, strongly dominated subordinates modified the number of pauses when searching in pairs. They used behavioral tactics such as avoiding being followed, stopping when being watched, or taking a wrong direction. Information withholding might be a common event in macaques.

• The mother-offspring relationship as a template in social development: Reconciliation in captive brown capuchins

(*Cebus apella*). Weaver, A., & de Waal, F. B. M. (Living Links, Yerkes Primate Center, Atlanta, GA 30322 [e-mail: *dazzlingdolphins@cox.net*]). *Journal of Comparative Psychology*, 2003, *117*, 101-110.

Mother-offspring (MO) relationship quality was investigated to determine its influence on the development of reconciliation – affiliation between opponents shortly after a fight – because it influences what distressed youngsters learn about calming down. Data were longitudinal and cross-sectional observational samples of 38 MO pairs of monkeys across 24 months. An MO relationship quality index (RQI) classified each pair as secure or insecure. Reconciliation emerged in infancy. Secure youngsters had an appeasing conciliatory style, and insecure youngsters had an agitated conciliatory style. Conclusions are that reconciliation develops from the attachment behavior system and MO RQI is related to the particular conciliatory style youngsters develop by affecting how aroused they are by conflict and the subsequent socializing they seek to calm down.

Care

• Assessment of genetic management at three specific-pathogen-free rhesus macaque (*Macaca mulatta*) colonies. Kanthaswamy, S., & Smith, D. G. (Veterans Affairs Med. Center, Rm 10E08 VAMC, Iowa City, IA 52246). *Comparative Medicine*, 2002, *52*, 414-423.

"Genetic management is required to maintain genetic diversity by minimizing inbreeding and genetic subdivision in colonies of animals bred for biomedical research. Polymorphic short tandem repeat (STR) loci are useful for genetic management because they facilitate parentage assignments, genetic characterization of individuals, and estimates of baseline population genetic parameters. Using highly informative STR loci, we estimated gene diversity and F-statistics to determine the level of genetic heterogeneity and genetic structure of three specific-pathogen-free (SPF) rhesus macaque colonies. Effective population sizes, variance in male reproductive success, and rate of decrease in genetic variability also were estimated for two of the three colonies. We documented the overall success of genetic management in maintaining genetic diversity in captive colonies. We report that even genetically managed SPF colonies, despite maintaining high and stable levels of gene diversity (over 0.75), are prone to genetic subdivision due to different management strategies, founder effects, genetic isolation, and drift. These processes are accelerated by the high variances in male reproductive success and low adult sex ratios that are typical of captive rhesus macaque breeding groups, both of which reduce the effective population sizes of these groups."

• The effects of caretaker-primate relationships on primates in the laboratory. Waitt, C., Buchanan-Smith, H. M., & Morris, K. (Dept of Psychology, Univ. of Stirling, Stirling FK9 4LA, Scotland). *Journal of Applied Animal Welfare Science*, 2002, *5*, 309-319.

As contact with caretakers is likely to make up the majority of human-primate interactions in laboratories, caretakers represent an important influence in the lives of captive primates. The aim of this study was to determine how caretaker-primate relationships affected the behavior of primates in the laboratory. We examined whether stumptailed macaques (*Macaca arctoides*) who were evaluated by caretakers as being either friendly or unfriendly differed in the quality and quantity of interactions with their caretakers during husbandry procedures and in their behavior at times of high and low levels of caretaker activity. Results revealed that animals who had friendly relationships with caretakers were less disturbed by routine husbandry procedures, approached caretakers more often, and were willing to accept food offered by caretakers compared with animals considered unfriendly toward their caretakers. The study concluded that the quality of the primate-caretaker relationship may have an important impact on behavior and may have implications for the well-being of animals and caretakers, as both can benefit from positive feedback from one another.

• Physical environmental effects on infant care and development in captive *Callithrix jacchus*. Ventura, R., & Buchanan-Smith, H. M. (Address same as above [e-mail: *raffiebino@inwind.it*]). *International Journal of Primatology*, 2003, *24,* 399-413.

Environmental enrichment may affect infant care and development in captive primates. We investigated the effects of this factor in laboratory common marmosets (*C. jacchus*). An enriched physical environment enhanced the social activities of the marmosets and elicited a greater repertoire of behaviors, without negatively affecting the provision of infant care. In addition, infants in enriched cages displayed certain behaviors sooner than infants in non-enriched cages did, which suggests an increased developmental rate. Infants in enriched cages also ate more solid food and engaged in solitary play and exploration more than ones in non-enriched cages did. Play and exploration probably improve spatial cognition and motor skills, which, together with a higher degree of independence, may allow infants to cope better with laboratory routines and general social interactions later in life than their counterparts reared in less complex enclosures. We conclude that laboratories can significantly increase the welfare of marmosets by providing a more complex physical environment.

• The myth of the aggressive monkey. Reinhardt, V. (Animal Welfare Inst., P.O. Box 3650, Washington, DC 20007) *Journal of Applied Animal Welfare Science,* 2003, *5*, 321- 330.

Captive rhesus macaques are not naturally aggressive, but poor husbandry and handling practices can trigger their aggression toward conspecifics and toward the human handler. The myth of the aggressive monkey probably is based on not taking into account basic ethological princi-

ples when managing rhesus macaques in the research laboratory setting.

• Environmental enrichment of nonhuman primates, dogs and rabbits used in toxicology studies. Bayne K. A. (AAALAC International, 11300 Rockville Pike, Suite 1211, Rockville, MD 20842). *Toxicologic Pathology*, 2003, *31*[Suppl], 132-137.

The increasing emphasis on the provision of environmental enrichment to laboratory animals, vis-a-vis the USDA Animal Welfare Regulations, the Guide for the Care and Use of Laboratory Animals (NRC 1996), and a potential forthcoming policy from the USDA on the subject, can be difficult to accommodate in a toxicology research environment. A summary is provided of current requirements and recommendations. Then, strategies for meeting regulatory requirements are described for nonrodent animals used in toxicology research. Apparent in the discussion of these strategies will be an overarching recognition of the necessity to avoid introducing confounding variables into the research project and to avoid compromising animal health.

• Response to novel objects and foraging tasks by common marmoset (*Callithrix jacchus*) female pairs. Majolo, B., Buchanan-Smith, H. M., & Bell, J. (Scottish Primate Research Group, Department of Psychology, University of Stirling, Stirling FK9 4LA, Scotland [e-mail: *BESBMAJO@livjm.ac.uk*]). *Lab Animal,* 2003, *32*, 32-38.

The authors analyze the effects of enrichment devices on the behavior of common marmoset female pairs, and determine which aspects of these devices are more likely to elicit explorative behaviors, and how their presence affects aggressive and stress-related behaviors. The results support the use of enrichment devices for captive primates and show that in marmosets, their effectiveness strongly depends on location within the enclosure and the presence of hidden food.

• Change of enclosure in langur monkeys: Implications for the evaluation of environmental enrichment. Little, K. A., & Sommer, V. (V. S., Dept. of Anthropol., University College London, Gower St, London WC1E 6BT, U.K. [e-mail: *v.sommer@ucl.ac.uk*]). *Zoo Biology*, 2002, *21*, 549-559.

A group of Hanuman langurs (*Presbytis entellus*) was studied before and after it was moved from an old cage-style enclosure to a novel naturalistic environment at the London Zoo. Eating and locomotion occupied more of the langurs' time in their new enclosure, whereas dozing, allogrooming, and aggression decreased, along with an increase in inter-individual distances. These changes are attributed to the larger area, the stimulating new environment, and the langurs' increased distance from visitors. Nevertheless, the study raises questions about how to define standards of desirable environmental enrichment, as the activity patterns recorded in both the old and new enclosures are within the variation observed in the wild.

• Stereotypic and self-injurious behavior in rhesus macaques: A survey and retrospective analysis of environment and early experience. Lutz, C., Well, A., & Novak, M. (New England RPRC, Harvard Med. School, One Pine Hill Dr., P.O. Box 9102, Southborough, MA 01772-9102 [e-mail: *Corrine_Lutz@hms.harvard.edu*]). *American Journal of Primatology*, 2003, *60,* 1-15.

Abnormal behavior in captive rhesus monkeys can range from active whole-body and self-directed stereotypies to self-injurious behavior (SIB). Although abnormal behaviors are common in singly-housed rhesus monkeys, the type and frequency of these behaviors are highly variable across individual animals, and the factors influencing them are equally varied. The purpose of this investigation was to survey abnormal behavior in a large population of rhesus macaques, to characterize the relationship between stereotypies and self-injury, and to identify potential risk factors for these aberrant behaviors. Behavioral assessments of 362 individually housed rhesus monkeys were collected at the New England Regional Primate Research Center and combined with colony records. Of the 362 animals surveyed, 321 exhibited at least one abnormal behavior (mean: 2.3, range: 1-8). The most common behavior was pacing. Sex differences were apparent, with males showing more abnormal behavior than females. SIB was also associated with stereotypies. Animals with a veterinary record of self-injury exhibited a greater number of self-directed stereotypies than those that did not self-injure. Housing and protocol conditions, such as individual housing at an early age, longer time housed individually, greater number of blood draws, and nursery rearing, were shown to be risk factors for abnormal behavior. Thus, many factors may influence the development and maintenance of abnormal behavior in captive primates. Some of these factors are intrinsic to the individual (e.g., sex effects), whereas others are related to colony management practices, rearing conditions, and research protocols.

• The puzzle-feeder as feeding enrichment for common marmosets (*Callithrix jacchus*): A pilot study. De Rosa, C., Vitale, A., & Puopolo, M. (A. V., Sect. Comp. Psychol., Lab. di Fisiopatol. di Organo e di Sistema, Ist. Sup. Di Sanitá, Viale Regina Elena, 299, 00161 Rome, Italy [e-mail: *vitale@iss.it*]). *Laboratory Animals,* 2003, *37,* 100-107.

The use of a puzzle-feeder, as feeding enrichment, was investigated in three families of captive common marmosets. The study was carried out as a simultaneous choice test between two cages: one contained the puzzle-feeder, the other contained the usual food dishes, but otherwise both were arranged similarly. The monkeys were allowed to choose whether to feed from the usual dishes, or from the puzzle-feeder which required more effort. They were observed for two sessions in which they were differently motivated to feed. The enriched cage was always visited first, the marmosets managed to extract food from the puz-

zle-feeder, and spent more time eating from the puzzle-feeder when less hungry. These data contribute to a wider understanding on the use, and the effects, of feeding enrichments with different captive nonhuman primates.

Conservation

• Catastrophic ape decline in western equatorial Africa. Walsh, P. D., Abernethy, K. A., Bermejo, M., Beyers, R., de Wachter, P., Akou, M. E., Huijbregts, B., Mambounga, D. I., Toham, A. K., Kilbourn, A. M., Lahm, S. A., Latour, S., Maissels, F., Mbina, C., Mihindou, Y., Obiang, S. N., Effa, E. N., Starkey, M. P., Telfer, P., Thibault, M., Tutin, C. E. G., White, L. J. T., & Wilkie, D. S. (Dept of Ecol. & Evol. Biol., Guyot Hall, Princeton, NJ 08540 [e-mail: *pwalsh@princeton.edu*]). *Nature,* 2003, *422,* 611-614.

Because rapidly expanding human populations have devastated gorilla (*Gorilla gorilla*) and common chimpanzee (*Pan troglodytes*) habitats in East and West Africa, the relatively intact forests of western equatorial Africa have been viewed as the last stronghold of African apes. Gabon and the Republic of Congo alone are thought to hold roughly 80% of the world's gorillas and most of the common chimpanzees. Here we present survey results conservatively indicating that ape populations in Gabon declined by more than half between 1983 and 2000. The primary cause of the decline in ape numbers during this period was commercial hunting, facilitated by the rapid expansion of mechanized logging. Furthermore, Ebola hemorrhagic fever is currently spreading through ape populations in Gabon and Congo and now rivals hunting as a threat to apes. Gorillas and common chimpanzees should be elevated immediately to "critically endangered" status. Without aggressive investments in law enforcement, protected area management and Ebola prevention, the next decade will see our closest relatives pushed to the brink of extinction.

• Successful reproduction in wild-released orphan chimpanzees (*Pan troglodytes troglodytes*). Goossens, B., Setchell, J. M., Vidal, C., Dilambaka, E., & Jamart, A. (Biodiversity and Ecological Processes Group, School of Biosciences, Cardiff University, P.O. Box 915, Cardiff CF10 3TL, U.K. [e-mail: *goossensbr@cardiff.ac.uk*]). *Primates,* 2003, *44,* 67-69.

"We report a case of successful reproduction in wild-released orphan chimpanzees. Using non-invasive genetic analysis, we determined the paternity of an infant born to a female chimpanzee released by Habitat Ecologique et Liberté des Primates Congo into the Conkouati-Douli National Park, Republic of Congo. The sire was a released male, thus demonstrating successful reproduction in both male and female released chimpanzees. These results provide evidence that release into the wild may be a viable response to the plight of orphan chimpanzees in Africa, and we discuss further applications of non-invasive genetic tagging to release programs."

• Habitat degradation of *Rhinopithecus bieti* in Yunnan, China. Xiao, W., Ding, W., Cui, L.-W., Zhou, R.-L. & Zhao, Q.-K. (Kunming Inst. of Zoology, Chinese Academy of Sciences, Kunming,Yunnan 650223, People's Republic of China [e-mail: *zhaoqk@mail.kiz.ac.cn*]. *International Journal of Primatology,* 2003, *24,* 389-398.

Black-and-white snub-nosed monkeys (*R. bieti*) are endemic to the Trans-Himalayas in Northwest Yunnan and Southeast Tibet between the upper Yangtze and Mekong Rivers. Based on field surveys and previous reports, we identified the dark-coniferous forest, the mixed coniferous and broadleaf forest, and oak patches as suitable habitats (SH) for the monkeys. Summer grazing lands (SGL), which were made by local people cutting and burning the dark-coniferous forest at the high altitude belt, replaced SH. To have a general view of the status of the SH in Yunnan, the areas of SH and SGL were estimated from satellite images in 1997, and compared with areas estimated from aerial photo-based maps (ca. 1958). Results show: 1) the area of SH was 4,169 km^2 and SGL was 1,923 km^2 in 1997; 2) during the past 40 years, the area of SH decreased by 31% (1,887 km^2), and SGL increased by 204% (1,291 km^2); and 3) the mean size of forest patches decreased from 15.6 to 5.4 km^2. In addition, the area of SGL is positively correlated to local human population ($R^2 \geq 0.53$), implying that the reduction and fragmentation of habitat for *R. bieti* is a result of population growth of humans, who mostly employ traditional modes of production. Only 11 monkey groups remained in the changing habitat. Considering that forests at lower elevation were also encroached upon by farmlands in a similar way, the forest ecosystem is highly threatened. The destruction will continue unless the mode of production in the region changes.

Development and Aging

• Demography, female life history, and reproductive profiles among the chimpanzees of Mahale. Nishida, T., Corp, N., Hamai, M., Hasegawa, T., Hiraiwa-Hasegawa, M., Hosaka, K., Hunt, K. D., Itoh, N., Kawanaka, K., Matsumoto-Oda, A., Mitani, J. C., Nakamura, M., Norikoshi, K., Sakamaki, T., Turner, L., Uehara, S., & Zamma, K. (T. N., Dept of Zoology, Grad. School of Science, Kyoto Univ., Kitashirakawa-Oiwakecho, Sakyo, Kyoto, Japan [e-mail: *nishida@jinrui.zool.kyoto-u.ac.jp*). *American Journal of Primatology*, 2003, *59*, 99-121.

Demography provides critical data to increase our understanding of the evolution, ecology, and conservation of primate populations. The chimpanzees of the Mahale Mountains National Park, Tanzania, have been studied for more than 34 years on the basis of individual identification and standardized attendance records. From this long-term study, we derived the following demographic data: The major cause of death was disease (48%), followed by senescence (24%) and within-species aggression (16%). Fifty percent of Mahale chimpanzees died before weaning. The median ages of female life history variables were: first

maximal swelling, 10.0 years (n=5); emigration, 11.0 years (n=11); and first birth, 13.1 years (n=5). The median period of adolescent infertility was 2.8 years (n=4) when calculated from the age at immigration to that at first birth. Female fecundity was highest between 20 and 35 years, with an annual birth rate of 0.2. Twenty-six females that were observed from a young age (10-13 years) to death at various ages (15-40 years) gave birth to an average of 3.9 and weaned an average of 1.4 offspring. Twenty-five females that were observed from middle age (18-33 years) to death in older age (31-48) gave birth to an average of 2.7 and weaned an average of 2.0 offspring. The postreproductive lifespan for female chimpanzees was defined as the number of years that passed from the year when the last offspring was born to the year when the female died, minus 5. Twenty-five percent of old females had a postreproductive lifespan. The interbirth interval after the birth of a son (≈72 mo) tended to be longer than that after the birth of a daughter (≈66 mo). The extent of female transfer, which is a rule in chimpanzees, is influenced by the size and composition of the unit group and size of the overall local community.

Disease

• Prevalence of antibodies to selected viruses in a long-term closed breeding colony of rhesus macaques (*Macaca mulatta*) in Brazil. Andrade, M. R., Yee, J., Barry, P., Spinner, A., Roberts, J. A., Cabello, P. H., Leite, J. P., & Lerche, N. W. (FIOCRUZ, Centro de Criação de Animais de Lab., Av. Brasil, 4365 Manguinhos, Rio de Janeiro/RJ, 21045-900, Brasil [e-mail: *andrade@cecal.fiocruz.br*]). *American Journal of Primatology*, 2003, *59*, 123-128.

The rhesus macaque breeding colony of the Oswaldo Cruz Foundation (FIOCRUZ) was established in 1932 from a founding stock of 100 animals. This population has remained closed to new animal introductions for almost 70 years. A serologic survey was performed to determine the prevalence of antibodies to selected viruses as a first approach to identifying viral pathogens endemic in this population. Banked serum samples were tested for antibodies to simian immunodeficiency virus, simian T-lymphotropic virus, simian type D retrovirus, cercopithecine herpesvirus type-1 (B virus), rhesus cytomegalovirus (RhCMV), measles virus (MV), and hepatitis A virus (HAV). All samples were negative for antibodies against the simian retroviruses. The overall prevalence of antibodies was 95% for RhCMV, 45% for B virus, 35% for HAV, and 1% for MV. Prevalence was found to vary by age group.

• A randomized, double-blind, placebo-controlled, dose-ranging trial of tafenoquine for weekly prophylaxis against *Plasmodium falciparum*. Hale, B. R., Owusu-Agyei, S., Fryauff, D. J., Koram, K. A., Adjuik, M., Oduro, A. R., Prescott, W. R., Baird, J. K., Nkrumah, F., Ritchie, T. L., Franke, E. D., Binka, F. N., Horton, J., & Hoffman, S. L. (D. J. F., Malaria Program, NMRC, 503 Robert Grant Ave., Silver Spring, MD 20910-7500 [e-mail: *fryauffd@nmrc.navy.mil*]). *Clinical Infectious Diseases*, 2003, *36*, 541-549.

Tafenoquine is a promising new 8-aminoquinoline drug that may be useful for malaria prophylaxis in nonpregnant persons with normal glucose-6-phosphate dehydrogenase (G6PD) function. A randomized, double-blind, placebo-controlled chemoprophylaxis trial was conducted with adult residents of northern Ghana to determine the minimum effective weekly dose of tafenoquine for the prevention of infection by *P. falciparum*. The primary end point was a positive malaria blood smear result during the 13 weeks of study drug coverage. Relative to the placebo, all 4 tafenoquine dosages demonstrated significant protection against *P. falciparum* infection: for 25 mg/week, protective efficacy was 32% (95% confidence interval [CI], 20%-43%); for 50 mg/week, 84% (95% CI, 75%-91%); for 100 mg/week, 87% (95% CI, 8%-93%); and for 200 mg/week, 86% (95% CI, 76%-92%). The mefloquine dosage of 250 mg/week also demonstrated significant protection against *P. falciparum* infection (protective efficacy, 86%; 5% CI, 72%-93%). There was little difference between study groups in adverse events reported, and there was no evidence of a relationship between tafenoquine dosage and reports of physical complaints or the occurrence of abnormal laboratory parameters. Tafenoquine dosages of 50, 100, and 200 mg/week were safe, well tolerated, and effective against *P. falciparum* infection in this study population.

• B-virus (Cercopithecine herpesvirus 1) infection in humans and macaques: Potential for zoonotic disease. Huff, J. L., & Barry, P. A. (Dept of Vet. Med., Univ. of California, Davis, CA [e-mail: *jlmshuff@ucdavis.edu*]. *Emerging Infectious Diseases,* 2003, *9*, 246-250.

Nonhuman primates are widely used in biomedical research because of their genetic, anatomic, and physiologic similarities to humans. In this setting, human contact directly with macaques or with their tissues and fluids sometimes occurs. Cercopithecine herpesvirus 1 (B virus), an alphaherpesvirus endemic in Asian macaques, is closely related to herpes simplex virus (HSV). Most macaques carry B virus without overt signs of disease. However, zoonotic infection with B virus in humans usually results in fatal encephalomyelitis or severe neurologic impairment. Although the incidence of human infection with B virus is low, a death rate of >70% before the availability of antiviral therapy makes this virus a serious zoonotic threat. Knowledge of the clinical signs and risk factors for human B-virus disease allows early initiation of antiviral therapy and prevents severe disease or death.

• Tracing the origin and history of the HIV-2 epidemic. Lemey, P., Pybus, O. G., Wang, B., Saksena, N. K., Salemi, M., & Vandamme, A.-M. (Rega Institute for Medical Research, Minderbroedersstraat 10, B-3000 Leuven, Belgium [e-mail: *philippe.lemey@uz.kuleuven.ac.be*]). *Pro-*

ceedings of the National Academy of Sciences, USA, 2003, *100*, 6588-6592.

"In this study we date the introduction of HIV-2 into the human population and estimate the epidemic history of HIV-2 subtype A in Guinea-Bissau, the putative geographic origin of HIV-2. The evolutionary history of the simian immunodeficiency virus SOOTY MANGABEY/HIV-2 lineage was reconstructed by using available database sequences with known sampling dates, and a timescale for this history was calculated by using maximum likelihood methods. The date of the most recent common ancestor of HIV-2 subtype A strains was estimated to be 1940 ± 16 and that of B strains was estimated to be 1945 ± 14. In addition we used coalescent theory to estimate the past population dynamics of HIV-2 subtype A in a rural population of Guinea-Bissau. Parametric and nonparametric estimates of the effective number of infections through time were obtained for an equal sample of gag, pol, and env sequences. Our estimates of the epidemic history of HIV-2 subtype A in Guinea-Bissau show a transition from constant size to rapid exponential growth around 1955-1970. Our analysis provides evidence for a zoonotic transfer of HIV-2 during the first half of the 20th century and an epidemic initiation in Guinea-Bissau that coincides with the independence war (1963–1974), suggesting that war-related changes in sociocultural patterns had a major impact on the HIV-2 epidemic."

• Case report of a possible familial predisposition to metabolic bone disease in juvenile rhesus macaques. Wolfensohn, S. E. (University Laboratory of Physiology, Parks Rd, Oxford OX1 3PT, England). *Laboratory Animals,* 2003, *37*, 139-144.

Deficiencies of dietary calcium and/or vitamin D will cause hypocalcemia, leading to metabolic bone disease. The disease commonly affects young rapidly growing animals and this is a report of the condition in a colony of rhesus macaques (*Macaca mulatta*). A clinical problem of metabolic bone disease was seen in 1993, when it was treated and resolved satisfactorily. However it recurred in 1999 following changes in management and husbandry of the colony, at which time the clinical manifestations were more serious. The animals had bowed tibia, fibula, radius and ulna and enlarged epiphyses, were reluctant to climb and jump, had a "hopping" gait and poor growth. The syndrome had a multifactorial etiology involving a combination of staff and management changes, a borderline nutritional deficit, a lack of daylight for production of vitamin D, and a possible familial predisposition.

Evolution, Genetics, and Taxonomy

• A Middle Miocene hominoid from Thailand and orangutan origins. Chaimanee, Y., Jolly, D., Benammi, M., Tafforeau, P., Duzer, D., Moussa, I., & J.-J. Jaeger (J.-J. J., Paléontologie, I.S.E.M., cc 064, Univ, Montpellier II, Pl. Eugene Bataillon, 34095-Montpellier, France [e-mail: *jaeger@isem.univ-montp2.fr*]). *Nature*, 2003, *422*, 61-65.

The origin of orangutans has long been debated. *Sivapithecus* is considered to be the closest ancestor of orangutans because of its facial-palatal similarities, but its dental characteristics and postcranial skeleton do not confirm this phylogenetic position. Here a new Middle Miocene hominoid, cf. *Lufengpithecus chiangmuanensis* n. sp., is reported from northern Thailand. Its dental morphology relates it to the Pongo clade, which includes *Lufengpithecus, Sivapithecus, Gigantopithecus, Ankarapithecus* and possibly *Griphopithecus*. This new species displays striking dental resemblances with living orangutans and appears as a more likely candidate to represent an ancestor of this ape. In addition, it originates from the geographic area of Pleistocene orangutans. But surprisingly, the associated flora shows strong African affinities, demonstrating the existence of a temporary floral and faunal dispersal corridor between southeast Asia and Africa during the Middle Miocene, which may have played a critical role in hominoid dispersion.

• Human footprints in Pleistocene volcanic ash. Mietto, P., Avanzini, M., & Rolandi, G. (Dipart. di Geologie, Paleontologie e Geofisica, Univ. di Padova, 35137 Padova, Italy [e-mail: *paolo.mietto@unipd.it*]). *Nature*, 2003, *422,* 133.

"We have analysed three fossilized trackways of human footprints in a zeolite-rich pyroclastic flow dated to 385,000-325,000 years ago, discovered along the western margin of the Roccamonfina volcanic complex in southern Italy. We believe that these tracks are the oldest human footprints found so far and that they were made by hominids who had a fully bipedal, free-standing gait, using their hands only to steady themselves on the difficult descent."

• Fossil evidence for an ancient divergence of lorises and galagos. Seiffert, E. R., Simons, E. L., & Attia, Y. (Div. of Fossil Primates, Duke Primate Center, 1013 Broad St, Durham, NC 27705 [e-mail: *erik.seiffert@duke.edu*]). *Nature,* 2003, *422*, 421-424.

"Morphological, molecular, and biogeographic data bearing on early primate evolution suggest that the clade containing extant (or 'crown') strepsirrhine primates (lemurs, lorises, and galagos) arose in Afro-Arabia during the early Paleogene, but over a century of paleontological exploration on that landmass has failed to uncover any conclusive support for that hypothesis. Here we describe the first demonstrable crown strepsirrhines from the Afro-Arabian Paleogene – a galagid and a possible lorisid from the late middle Eocene of Egypt, the latter of which provides the earliest fossil evidence for the distinctive strepsirrhine toothcomb. These discoveries approximately double the previous temporal range of undoubted lorisiforms and lend the first strong paleontological support to the hypothesis of an ancient Afro-Arabian origin for crown Strepsirrhini and an Eocene divergence of extant lorisiform families."

• Digital analysis: Manual dexterity in Neanderthals. Niewoehner, W. A., Bergstrom, A., Eichele, D., Zuroff, M., & Clark, J. T. (Dept of Anthropology, California State University, San Bernardino, CA 92407 [e-mail: *wniewoeh@csusb.edu*]). *Nature,* 2003, *422*, 395.

"Despite their ability to make and use stone tools, Neanderthals were presumed to have had limited manual dexterity on the basis of the anatomy of their thumb and forefinger – a contention that has been called into question. Here we investigate the likely extent of Neanderthal thumb function by using a three-dimensional dynamic simulation that is based on the anatomical details and articular morphology of the thumb and index finger. We find that these digits could make tip-to-tip contact, and conclude that manual dexterity in Neanderthals was probably not significantly different from that of modern humans."

• Genetic parameters of captive New World primates and their meaningfulness for management in Argentinean zoos. Szapkievich, V. B., Martinez, R. A., & Mudry, M. D. (GIBE, Departmento de Ciencias Biológicas, Universidad de Buenos Aires, Pabellón 2, Ciudad Universitaria (1428), Buenos Aires, Argentina [e-mail: *valemigue@tutopia.com*]). *Zoocriaderos*, 2002*, 8*, 1-11.

"Zoos in Argentina are trying to revise their goals to meet today's needs in conservation and captive population management. The contribution of captive reproduction to the preservation of a reservoir of genetic variation for any given species is recognized as meager; however, we cannot underestimate the value of genetic characterization of captive populations for further use in conservation. Therefore, we have started a genetic variability analysis of *Cebus apella*, *Alouatta caraya,* and *Saimiri boliviensis*, the most abundant primates in Argentinean zoos, examining a total of 52 individuals from 5 institutions. Electrophoresis using 11 protein systems showed 4 polymorphic loci, with exclusive aleles for the three species. Two populations share several polymorphisms, between them and with free ranging populations. Cytogenetic analysis including modal number (2n), C and G bands and heterochromatin polymorphisms for *C. apella* and *A. caraya* confirmed the parameters of 2n=54 and 2n=52, respectively, and G-band patterns. Heterochromatic polymorphisms are reported for 10 chromosome pairs of *C. apella* and 2 pairs of *A. caraya*. It is feasible to use heterochromatin or protein polymorphisms as population parameters, due to their high degree of interindividual variation, associated with the possibility of interspecific identification. Zoo management in Argentina seldom employs genetic parameters as management tools. Captive groups are usually established without considering relationships or geographic origin, risking establishment of genetic mixtures not representative of natural populations. Our next goal is to determine, from a pool of known markers from wildlife populations, those useful as identifiers for captive individuals. We recommend that scientists work with captive populations, to improve zoo management by gaining more applicable information on aspects of animal biology, and increasing scientific knowledge of species otherwise difficult to sample."

• Comparative morphology of the hyo-laryngeal complex in anthropoids: Two steps in the evolution of the descent of the larynx. Nishimura, T. (PRI, Kyoto Univ., 41 Kanrin, Inuyama, Aichi 484-8506, Japan [e-mail: *nishimur@pri.kyoto-u.ac.jp*]). *Primates,* 2003, *44,* 41-49.

The descent of the larynx is a key phenomenon not only in postnatal development, but also in the evolution of human speech. The positional change of the larynx is affected by the descent of the hyoid bone in relation to the mandible and cranial base, and that of the laryngeal framework in relation to the hyoid bone. The phylogeny of the spatial configuration of the hyo-laryngeal complex is one of the most important sources of information for elucidating the evolution of laryngeal descent. Here the anatomy of the complex was examined in various species of anthropoids to compare the configuration, the shape of the basihyal and thyroid cartilage, and the length of the lateral thyrohyoid ligaments. Nonhuman hominoids share most features with humans, while cercopithecoids and ceboids have anatomical features that sharply contrast to humans, except for the form of the thyroid cartilage in ceboids. The laryngeal framework in hominoids is well separated from and assured of mobility independent of the hyoid. In cercopithecoids and ceboids, it is, by contrast, locked into and tied tightly with the hyoid so that the hyo-laryngeal complex acts as a functional unit. This spatial configuration is considered to be significantly related to the mechanism that prevents aspiration, including epiglottic movement and vestibular closure. Nonhuman hominoids are inferred to share the mechanism with human adults, not with cercopithecoids and ceboids, although their larynx is located as high as the latter. Consequently, it is hypothesized that the descent of the larynx evolved in two steps. First, descent of the thyroid in relation to the hyoid for the evolution of the mechanism preventing aspiration, which occurred in the common ancestor of hominoids. Then, descent of the hyoid within the neck, which occurred during hominid evolution for human speech.

• Neotropical primate family-group names replaced by Groves (2001) in contravention of Article 40 of the *International Code of Zoological Nomenclature*. Brandon-Jones, D., & Groves, C. P. (32a Back Lane, Richmond TW10 7LF, U.K. [e-mail: *Douglas@quadrumania.net*]). *Neotropical Primates,* 2002, *10,* 113-115.

"This paper contends that, under the provisions of Article 40.2.1, Alouattinae Trouessart, 1897 (1825) and Aotidae Poche, 1908 (1865) are the correct family-group names for their type genera, *Alouatta* Lacépède, 1799 and *Aotus* Illiger, 1811. We urge the retention of Saimiridae Miller, 1912 (1900) to maintain its prevailing usage as the family-group name for its type genus *Saimiri* Voigt, 1831 but note that, in this instance, the provisions of Article 40.2.1 do not

automatically ensure this preferred outcome. We reason that Callitrichidae Gray, 1821 is the correct family-group name for its type genus *Callithrix* Erxleben, 1777."

• Genetics and the making of *Homo sapiens*. Carroll, S. B. (Laboratory of Molecular Biology, Univ. of Wisconsin, 1525 Linden Dr., Madison, WI 53706 [e-mail: *sbcarrol@facstaff.wisc.edu*]). *Nature*, 2003, *422*, 849-857.

Understanding the genetic basis of the physical and behavioral traits that distinguish humans from other primates is one of the great new challenges in biology. Of the millions of base-pair differences between humans and chimpanzees, which particular changes contributed to the evolution of human features after the separation of the *Pan* and *Homo* lineages 5-7 million years ago? How can the "smoking guns" of human genetic evolution be identified from neutral ticks of the molecular evolutionary clock? The magnitude and rate of morphological evolution in hominids suggests that many independent and incremental developmental changes have occurred that, on the basis of recent findings in model animals, are expected to be polygenic and regulatory in nature. Comparative genomics, population genetics, gene-expression analyses and medical genetics have begun to make complementary inroads into the complex genetic architecture of human evolution.

• Adaptive evolution of cytochrome c oxidase subunit VIII in anthropoid primates. Goldberg, A., Wildman, D. E., Schmidt, T. R., Hüttemann, M., Goodman, M., Weiss, M. L., & Grossman, L. I. (L. I. G., Center for Molecular Medicine & Genetics, Wayne State Univ. School of Med., Detroit, MI 48201 [e-mail: *l.grossman@wayne.edu*]). *Proceedings of the National Academy of Sciences, USA,* 2003, *100,* 5873-5878.

"Cytochrome *c* oxidase (COX) is a 13-subunit protein complex that catalyzes the last step in mitochondrial electron transfer in mammals. Of the 10 subunits encoded by nuclear DNA (three are mtDNA products), some are expressed as tissue- and/or development-specific isoforms. For COX subunit VIII, previous work showed that expression of the contractile muscle-specific isoform gene, *COX8H*, is absent in humans and Old World monkeys, and the other isoform gene, *COX8L*, is expressed ubiquitously. Here, we show that *COX8H* is transcribed in most primate clades, but its expression is absent in catarrhines, that is, in Old World monkeys and hominids (apes, including humans), having become a pseudogene in the stem of the catarrhines. The ubiquitously expressed isoform, *COX8L*, underwent nonsynonymous rate acceleration and elevation in the ratio of nonsynonymous/synonymous changes in the stem of anthropoid primates (New World monkeys and catarrhines), possibly setting the stage for loss of the heart-type (H) isoform. The most rapidly evolving region of VIII-L is one that interacts with COX I, suggesting that the changes are functionally coadaptive. Because accelerated rates of nonsynonymous substitutions in anthropoids such as observed for *COX8L* are also shown by genes for at least 13 other electron transport chain components, these encoded amino acid replacements may be viewed as part of a series of coadaptive changes that optimized the anthropoid biochemical machinery for aerobic energy metabolism. We argue that these changes were linked to the evolution of an expanded neocortex in anthropoid primates."

• A molecular approach to comparative phylogeography of extant Malagasy lemurs. Pastorini, J., Thalmann, U., & Martin, R. D. (Anthropologisches Inst, Univ. Zürich, Winterthurerstr. 190, 8057 Zürich, Switzerland [e-mail: *jenny@aim.unizh.ch*]). *Proceedings of the National Academy of Sciences, USA,* 2003, *100,* 5879-5884.

The lemurs of Madagascar provide an excellent model for exploring evolutionary diversification. This study investigates genetic divergence among most extant lemur taxa in relation to potential geographical boundaries to gene flow. For this purpose, 2,400 bp of mitochondrial DNA (part of the COIII gene; ND3, ND4L, and ND4 genes; and five tRNAs) were sequenced in a total of 131 lemurs from 5 families, 12 genera, 25 species, and 18 subspecies to reconstruct phylogenetic relationships among them. The comprehensive range of taxa makes this a particularly suitable molecular data set to examine lemur evolution. Those data clearly reveal that the Betsiboka River acts as an isolating barrier between populations of lemurs in northwestern Madagascar. The Tsiribihina River similarly serves as a barrier to gene flow between northern and southern populations of lemurs in central western Madagascar, whereas the Mahavavy River does not seem to lead to genetic isolation of lemur populations. Several discrepancies among molecular data, current taxonomy, and geographic distribution along the western coast emerged. Examination of geographical distribution of the taxa concerned in comparison with distribution boundaries of other lemur taxa in that region yielded explanations for these inconsistencies. *Eulemur fulvus* and *Eulemur mongoz* are the only lemur taxa that also occur outside Madagascar, on the Comoro Islands. Genetic data show no significant differentiation between Malagasy and Comorian populations of these species, supporting the interpretation that both were introduced only recently to the Comoro Islands.

Field Studies

• Gastrointestinal parasites in free-ranging Kenyan baboons (*Papio cynocephalus* and *P. anubis*). Hahn, N. E., Proulx, D., Muruthi, P. M., Alberts, S., & Altmann, J. (Rm 203, Northwest Animal Fac., Univ, of California, Berkeley, CA 94720-7150 [e-mail: *nhahn@olac.berkeley.edu*]). *International Journal of Primatology*, 2003, *24*, 271-279.

Fecal samples from 3 groups of wild-living baboons, involved in longitudinal behavioral studies, were screened for evidence of gastrointestinal parasites. The objectives were: • to compare parasites from two of the groups with different foraging behavior from the same area; and • to obtain fecal parasitic data to provide baseline reference

data. Individual baboons were sampled opportunistically from Lodge and Hook's groups, Amboseli National Park, and from Mpala Group, Mpala Wildlife Research Centre. Lodge Group baboons supplemented foraging on wild foods by daily foraging in human-source refuse, whereas Hook's and Mpala groups did not. Fecal samples were collected from 55, 30, and 42 individuals in Hook's, Lodge and Mpala groups, respectively, and processed via ether sedimentation. Strongylids, *Streptopharagus* sp., *Physaloptera* sp., *Trichuris* sp., *Enterobius* sp., and *Strongyloides* sp., were identified in the feces, but no parasite directly attributable to exposure to people. Garbage- and wild-feeding Amboseli baboons differed in the prevalence of *Streptopharagus* sp., *Physaloptera* sp. and *Trichuris* sp.

• Naïve encounters with chimpanzees in the Goualougo Triangle, Republic of Congo. Morgan, D., & Sanz, C. (Wildlife Conservation Society, Republic of Congo [e-mail: *goualougo@uuplus.com*]. *International Journal of Primatology,* 2003, *24*, 369-381.

"We describe the behavior of an unhabituated population of chimpanzees in the Goualougo Triangle, Republic of Congo. We encountered chimpanzee parties on 218 occasions during two field seasons (February, 1999, to December, 1999; June, 2000, to June, 2001). Overall contact rate was 0.63 contacts per day in the field (n = 347). During the first 5 min of observation, we recorded individual responses as curious, ignore, hide, or depart. In contrast to other unhabituated chimpanzees, curiosity was the most common response (84%) of individuals in the Goualougo Triangle. However, the responses were deeply integrated in the group's reaction to our arrival and behavior throughout an encounter. Based on the behavior of the majority of individuals in a group, we categorized entire contact events as naïve, ignore, nervous, or depart. Naïve contacts accounted for 69% of all encounters. Other contact types occurred much less frequently: nervous (12%), depart (11%), ignore (8%). Naïve contacts were characterized by chimpanzees that continued to exhibit curiosity throughout the encounter, the arrival of other individuals at the contact location, and relatively prolonged contact with observers (average duration: 136 min). It is likely that the high frequency of curious responses and naïve contacts are due to the remote location of the Goualougo Triangle and the chimpanzees' lack of experience with humans. Documentation of this naïve phenomenon has been successfully used to lobby for the protection of the chimpanzees and their habitat."

• Nonhuman primates in the Namdapha National Park, Arunachal Pradesh, India. Chetry, D., Medhi, R., Biswas, J., Das, D., & Bhattacharjee, P. D. (Dept of Zoology, Gauhati Univ., Guwahati 781014, Assam, India [e-mail: *chetryd@rediffmail.com*]). *International Journal of Primatology*, 2003, *24*, 383-388.

"Namdapha National Park and Tiger Reserve in the Changlang District of Arunachal Pradesh in northeastern India are rich in biodiversity. The dense evergreen forest of the park with high canopy coverage supports a variety of fauna including primates. In February, 2002, we surveyed the primates in Namdapha National Park to assess their status. We directly sighted 5 species of diurnal primates, and secondary information shows the presence of stump-tailed macaques and slow loris. We encountered 10 groups of hoolock gibbons (33 individuals), 9 troops of capped langurs (61 individuals), 15 groups of Assam macaques (209 individuals), 6 groups of rhesus macaques (74 individuals) and one unidentified group of macaques (~15 individuals). Hunting, rather than habitat destruction, is the chief potential threat for primates in the park."

Instruments and Techniques

• Fecal testosterone immunoreactivity as a non-invasive index of functional testosterone dynamics in male Japanese macaques (*Macaca fuscata*). Barrett, G. M., Shimizu, K., Bardi, M., & Mori, A. (Primate Research Institute, Kyoto Univ., Kanrin, Inuyama, Aichi 484-8506, Japan [e-mail: *barrett@pri.kyoto-u.ac.jp*]). *Primates,* 2002, *43,* 29-39.

Radioimmunoassay of paired fecal and serum samples collected from four intact sexually mature males during the breeding season provided profiles that were significantly correlated when samples were offset by approximately 48 hr. No significant differences were observed in the pattern of temporal variation of testosterone (T) levels in serum and feces. Two castrated males were injected with radioinert T, and the patterns of excretion were observed by analysis of serial fecal and urine samples. Approximately 48 hr after the steroid was administered, a significant peak in the average fecal T levels was apparent. The injection event was also registered in the urine of both males, although qualitative differences were observed. These data suggest that measures of fecal T provide a reliable and non-invasive means of assessing gonadal function in this species. As the analysis of hormone levels in feces allows for frequent, stress-free sampling with minimal disruption, this method should be preferred in long-term or in situ applications requiring endocrine monitoring.

• Safe and efficient methods of autologous hematopoietic stem cell transplantation for biomedical research in cynomolgus monkeys. Ageyama, N., Hanazono, Y., Shibata, H., Ohto, K., Ono, F., Nagashima, T., Ueda, Y., Donahue, R. E., Hasegawa, M., Ozawa, K., Yoshikawa, Y., & Terao, K. (Y. H., Div. of Genetic Therapeutics, Center for Mol. Med., Jichi Med. School, Tochigi 329-0498, Japan). *Comparative Medicine*, 2002, *52*, 445-451.

A description of safe and efficient methods for autologous hematopoietic stem cell (HSC) transplantation in cynomolgus monkeys *(Macaca fascicularis*) that include regimens of supportive care to ensure survival during hematopoietic reconstitution following otherwise lethal total body irradiation. Eleven young adult cynomolgus monkeys were studied. Bone marrow was aspirated from the ilium and/or tuber ischiae after administration of recombi-

nant human stem cell factor (SCF) and granulocyte colony-stimulating factor (G-CSF). Using the immunomagnetic selection method, $CD34^+$ cells were then isolated (90 to 95% pure) as a fraction containing HSCs. Just prior to transplantation, the animals received myeloablative total body irradiation—500 to 550 cGy daily for two days. The monkeys re-infused with $CD34^+$ cells developed moderate to severe myelosuppression, with some animals requiring intravenous hyperalimentation, antibiotic administration, and blood transfusion. Hematopoiesis was restored in all animals after transplantation. It took 12 days, on average, until the peripheral white blood cell count reached more than 1,000 cells/μl. Up to two years after transplantation, signs of radiation-induced pneumonitis or other radiation-related disorders were not evident at the aforementioned dose of irradiation. This transplantation model will be useful for testing new approaches using HSCs for therapy of many diseases and will offer unique insights into the biology of these cells.

• Effect of amino acids on cryopreservation of cynomolgus monkey (*Macaca fascicularis*) sperm. Li, Y., Si, W., Zhang, X., Dinnyes, A., & Ji, W. (W. Ji, Kunming Inst. of Zoology, Chinese Acad. of Sciences, 32 Eastern Jiaochang Rd, Kunming, Yunnan 650223, People's Republic of China [e-mail: *wji@mail.kiz.ac.cn*]). *American Journal of Primatology*, 2003, *59*, 159-165.

The effects of three amino acids (proline, glutamine, and glycine) added to the freezing medium Tes-Tris-egg yolk (TTE) for cryopreservation of cynomolgus monkey spermatozoa were studied. The addition of 5mM proline, 10mM glutamine, and 10 or 20mM glycine each significantly improved post-thaw sperm motility and membrane and acrosome integrity compared with TTE alone. However, a significant decrease in motility and membrane/acrosome integrity was observed when amino acid concentrations increased to 60mM for proline and glutamine, and 80mM for glycine. The results suggest that adding a *limited* amount of amino acids to the freezing medium is beneficial for freezing cynomolgus monkey sperm.

• New type of puzzle-task finger maze learning in *Macaca fascicularis*. Tsuchida, J., Kawasaki, K., Sankai, T., Kubo, N., Terao, K., Koyama, T., Makino, J., & Yoshikawa, Y. (Primate Research Institute, Kyoto University, Kanrin, Inuyama, Aichi 484-8506, Japan [e-mail: *tsuchida@pri.kyoto-u.ac.jp*]). *International Journal of Primatology*, 2003, *24*, 261-270.

"In order to easily estimate the global cognitive ability of nonhuman primates, we developed a 4-step noncorrection-method-type finger maze (4FM) based on the standard puzzle feeder. We tested 7 experimentally naïve long-tailed macaques to assess the validity of the apparatus and the testing procedure. The most notable difference between the 4FM and the standard puzzle feeder is the presence of an error box. There is a hole at both ends of each step. One hole of each step is connected to the lower step or feeding box. The other hole of each step is connected to an error box. The monkey had to move the reward into the feeding box without dropping it into the error box and to retrieve the reward from the feeding box. Task difficulties could be controlled by deciding on which step to place the food reward at the beginning of the trial. All the monkeys could complete the tasks without food/water deprivation and pretraining. The results suggest that the 4FM is a suitable device to assess the cognitive ability of the monkeys simply, easily, and objectively."

Nutrition

• Increase in tannin consumption by sifaka (*Propithecus verreauxi verreauxi*) females during the birth season: A case for self-medication in prosimians? Carrai, V., Borgognini-Tarli, S. M., Huffman, M. A., & Bardi, M. (M. A. H., Section of Ecology, PRC, Kyoto Univ., Kanrin 2-41, Inuyama, 484-8506, Japan [e-mail: *huffman@pri.kyoto-u.ac.jp*]). *Primates,* 2003, *44,* 61-66.

This study reports preliminary data on the consumption of tannin-rich plants by sifakas living in the Kirindy Forest, western Madagascar. Sifakas spent most of their time feeding on only a few plant species. The tannin intake during the period between the pregnancy and birth season was significantly higher in pregnant females or females with lactating infants than in non-reproductive females and males. These periparturient females secured a larger proportion of condensed tannins by short feeding bouts on plants not included in the group's limited preferred food species. The measured increase in tannin intake is puzzling in light of the fact that tannins are commonly known for their protein-binding properties. Since protein demands are highest in pregnant and lactating females, possible medicinal benefits of tannin ingestion are considered. Tannin consumption is associated with an increase in body weight and stimulation of milk secretion. Veterinarians administer tannins as an astringent, anti-hemorrhagic and anti-abortive. Their high potential as an alternative anthelminthic has also recently been recognized. Thus, when viewed as self-medicating behavior, controlled increase in tannin intake could have multiple prophylactic advantages for females during the periparturient period. The high selectivity in their plant choice, and the presence of unusual feeding habits by a particular group of individuals (females with infants) limited in time (birth season), suggests that an increase in tannin ingestion may be a self-medicating behavior with multiple directly adaptive benefits to female reproduction.

• Responses to novel foods in captive chimpanzees. Visalberghi, E., Yamakoshi, M. M., Hirata, S., & Matsuzawa, T. (Ist. di Scienze e Tecnologie della Cognizione, Consiglio Naz. delle Ricerche, Via Ulisse Aldrovandi, 16/b, 00197 Roma, Italy [e-mail: *elisa@pml.it*]). *Zoo Biology,* 2002, *21*, 539-548.

"Hesitancy to eat novel foods hampers the immediate enlargement of the diet but serves to limit the risk of in-

gesting toxic foods. Neophobia has been systematically investigated in only a few primate species, in which it appears to be affected by social influences. We studied the response of eight adult captive chimpanzees to 16 foods (foods commonly eaten by humans and never tasted before by chimpanzees). Each novel food was presented twice to the chimpanzee by a familiar or an unfamiliar human. Between the two trials the human ate the food face to face with the chimpanzee (demonstration). Some foods were almost unanimously accepted, while others were not. Moreover, there were marked individual differences in food acceptance and consumption; chimpanzees ranged from being almost completely neophobic to accepting almost all foods. Familiarity with the human and the human's demonstration did not affect responses to the foods. The finding that most captive chimpanzees are initially cautious toward novel foods supports the little information there is regarding this subject in wild chimpanzees. However, the lack of influence of the humans' familiarity and demonstration on the response to food by the chimpanzees calls for more naturalistic studies, in which social influences are provided by group members. Since novel stimuli provide sensory stimulation and elicit exploration and social interest, occasional presentation of novel foods could be a promising device for feeding enrichment."

Reproduction

• Molecular correlates of primate nuclear transfer failures. Simerly, C., Dominko, T., Navara, C., Payne, C., Capuano, S., Gosman, G., Chong, K.-Y., Takahashi, D., Chace, C., Compton, D., Hewitson, L., & Schatten, G. (G. S., Univ. of Pittsburgh School of Med., Pittsburgh, PA 15213 [e-mail: *gschatten@magee.edu*]). *Science,* 2003, *300,* 297.

Somatic cell nuclear transfer (SCNT) in nonhuman primates could accelerate medical research by contributing identical animals for research and clarifying embryonic stem cell potentials. Although rhesus embryos begin development after embryonic cell nuclear transfer (ECNT), there has only been one report of rhesus births after ECNT, and that report has not been replicated. Here, molecular obstacles were identified using 716 rhesus oocytes in four experimental studies. Primate nuclear transfer (NT) appears to be challenged by stricter molecular requirements for mitotic spindle assembly than in other mammals. With current approaches, NT to produce embryonic stem cells in nonhuman primates may prove difficult – and reproductive cloning unachievable.

• Four-year study of controlled timed breeding of rhesus monkeys (*Macaca mulatta*). Phillippi-Falkenstein, K., & Harrison, R. M. (Div. of Veterinary Med., Tulane NPRC, 18703 Three Rivers Rd, Covington, LA 70433 [e-mail: *shelley@tpc.tulane.edu*]). *American Journal of Primatology*, 2003, *60,* 23-28.

In the timed breeding colony at Tulane National Primate Research Center, exogenous progesterone administration (5 mg/day for 10 days) has been used to select conception dates by inducing artificial luteal phases in female rhesus monkeys. Retrospective analysis of data from four breeding seasons (1998-2001) revealed that conceptions occurred an average of 18 days after the last administration of progesterone. Age of the female to be bred, previous pregnancy history, and timing of breeding during the breeding season were critical factors in the success of the procedure. The benefit of this method of timed breeding is that it does not require tracking of menstrual cycles, which can be labor-intensive and requires that animals be monitored several months in advance of breeding to determine each female's individual cycle length. It also provided an efficient use of breeding-age males.

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Pomegranates for Enrichment

In February, 2002, Katie Eckert asked the *Primate Enrichment Forum* e-list: "Does anyone know of any deleterious effects from giving pomegranates to macaques or other nonhuman primates as enrichment? Do any of you use these from time to time?"

Responses were positive: "We've given a few to our elderly female rhesus, with no problems. They thought the poms were neat!" – Janet Rodgers, University of Kentucky <*rodgers@pop.uky.edu*>

"We have given pomegranates to emperor tamarins, Bolivian gray titis, white-cheeked gibbons, ruffed lemurs, mandrills, and DeBrazza's, Diana, and Allen's swamp monkeys with no problems. They are great enrichment items!" – Bonnie Jacobs, Lincoln Park Zoo <*bjacobs@interaccess.com*>

"I use pomegranates as often as I can when they are in season for geleda baboon enrichment. Their hands were made for picking at the seeds. And the baboons that I work with actually spend a *lot* of time picking each seed out one by one...I love giving pomegranates to them. I also work with siamangs and orangutans. They enjoy this tasty treat but without a very useful thumb, siamangs just bite off mouthfuls of the seeds. Orangutans don't mess around either. So, while they enjoy them, it doesn't keep them busy very long." – Tricia Kokoszka, Enrichment Volunteer, Los Angeles Zoo <*congogirl@hotmail.com*>

"I've never heard of anyone doing it, but it sounds like a great idea. It always takes *me* at least an hour to eat a pomegranate, and I get lots of psychological well-being from them." – Judith E. Schrier, Editor, *Laboratory Primate Newsletter*

And Katie herself now adds that she has been giving pomegranates to rhesus and cynomolgus macaques "very successfully since getting this feedback from you all."

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