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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 $10.00 each. We are no longer printing paper issues, except those we will send to subscribers who have paid in advance. Readers with access to electronic mail may receive a notice when a new issue is put on the Website by sending the message **subscribe LPN-WARN your-own-name** to **listserv@listserv.brown.edu**. (Send the message **subscribe LPN-PDF** to receive PDF files by e-mail; or the message **subscribe LPN-L** to receive the nongraphic contents of each issue.) 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. Latin names of primates should be indicated at least once in each note and article. In general, to avoid inconsistencies within the *Newsletter*, the Latin 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 Pictorial Guide to the Living Primates*, by N. Rowe, Pogonias Press, 1996.

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Cover photograph of a bonobo (*Pan paniscus*), three year old Vic,
visiting with his friend, a three year old boy in red.
Taken at the Cincinnati Zoo and Botanical Gardens by Marian Brickner, June 2, 2006.

Multiple Births in a Free-Ranging Hanuman Langur *(Semnopithecus entellus)* Population Around Jodhpur, India

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Introduction

Multiple births occur with varying frequency in primates (e.g. Schultz, 1956; Wildt & Dukelow, 1974). Catarrhine primates (Old World monkeys and apes) are considered to be monovulatory: single births are the rule (e.g., Hennrickx & Nelson, 1971; Schultz, 1972), but multiple births do occasionally occur. Among the Hanuman langurs of Jodhpur, some twin (Hrdy, 1976; Winkler 1989) and triplet (Sharma, 2007, personal observation) births have been observed. However, the distribution of the phenomenon and the frequency of its occurrence are still unknown. It has been suggested that multiple births may occur in many, if not all Old World monkeys and apes (Harms, 1956; Schultz, 1948; Yerkes, 1934). Schultz (1948) listed the known cases of multiple births in nonhuman catarrhine species and presented – subsequent only to the study of Abel (1933) – one of the earliest attempts at quantifying the incidence of multiple births in these primates. Since then, supplementary information on this topic has been compiled in several articles (e.g. Benirschke, 1986; Harms, 1956; Hendrickx & Nelson, 1971; Schultz, 1956, 1972; Wildt & Dukelow, 1974).

Only a few reports on the behavioral development of twins under free-ranging conditions are available: e.g., for the first 96 days of life of *Alouatta palliata* (Chapman & Chapman, 1986), for the first year of life of *Macaca fuscata* (Nakamichi, 1983), and for the first 3.5 months of life for *Presbytis melalophos* (Bennett, 1982, 1988). In chimpanzees, one of the twin sons (Gyre) observed by Goodall (1986) died at 10 months while the other (Gimble) was still alive at 8 years. Hrdy (1976) briefly mentioned three cases of twins in Hanuman langurs which survived between 4 and 24 months. Winkler (1989) observed twinning and described the development of twins in Hanuman langurs at Jodhpur.

The birth of triplets in a rhesus monkey (*Macaca mulatta*) was reported for the first time in the New York press. Hartman (1938) reviewed the evidence and concluded that the case was not one of multiple birth but rather of multiple kidnapping. However, since the same female delivered a double-headed monster one year later, Hartman (1943) subsequently wondered if the mother should not perhaps be credited at least with twins (though not with triplets). Apparently, only one case of a triple birth in an Old World monkey has been reliably recorded: in 1945, a black Celebes macaque (*Macaca nigra*) gave birth to triplets. All infants were stillborn and the mother died from exhaustion (Breitinger, 1951).

A 40-year-long study has been carried out on Hanuman langurs, *Semnopithecus entellus,* living around Jodhpur, India. The present report provides data, collected from late 2008 to 2010, on the behavior and development of five pairs of twins and one triplet birth.

Materials and Methods

The Hanuman langur *(Semnopithecus entellus* Dufresne, 1797*)* is the best studied and the most adaptable South Asian colobine. It lives in a wide range of habitats from the Himalayas and peninsular forests to semiarid lands, in villages and towns and on cultivated land (Roonwal & Mohnot, 1977).

Jodhpur is located in Rajasthan at the eastern edge of the Great Indian Desert. In and around this town, which is surrounded by semi-desert plateau, lives a geographically isolated population of about 2,007 langurs comprising 38 one-male bisexual troops and 15 unisexual, all male bands (Rajpurohit et al., 2010). The climate is dry, with maximum temperatures about 48° C in May/June and minimum around 0° C in December/January. Jodhpur receives 90% of its scanty rainfall (annual average: 360 mm) during the monsoon from July to September.

The langurs feed on about 190 wild and cultivated plant species. (For ecology, see Devilal, 2009; Mohnot, 1974; Srivastava, 1989; and Winkler, 1981.) For religious reasons local people provide most of the groups with vegetables, fruits, nuts, and cooked and uncooked food. In some groups the provisioning accounts for about two-thirds of total feeding time. The animals are easy to observe since they are not shy and spend most of the day on the ground. The reproductive units are bisexual troops with a single adult resident male. As a rule in this species, males never carry or feed infants (Sharma, 2007, and Sharma et al., 2011). Langur mothers readily allow extensive and sometimes prolonged infant carrying and handling by other females (allomothering), even on the first day of life; such allomothering does not include suckling.

Each troop occupies its own home range of about 0.5–1.5 km^2. Females remain for life in their natal troops with few exceptions (Swami, 2010). Males emigrate, usually as juveniles, to all-male bands, whose home ranges can be as large as 20 km^2.

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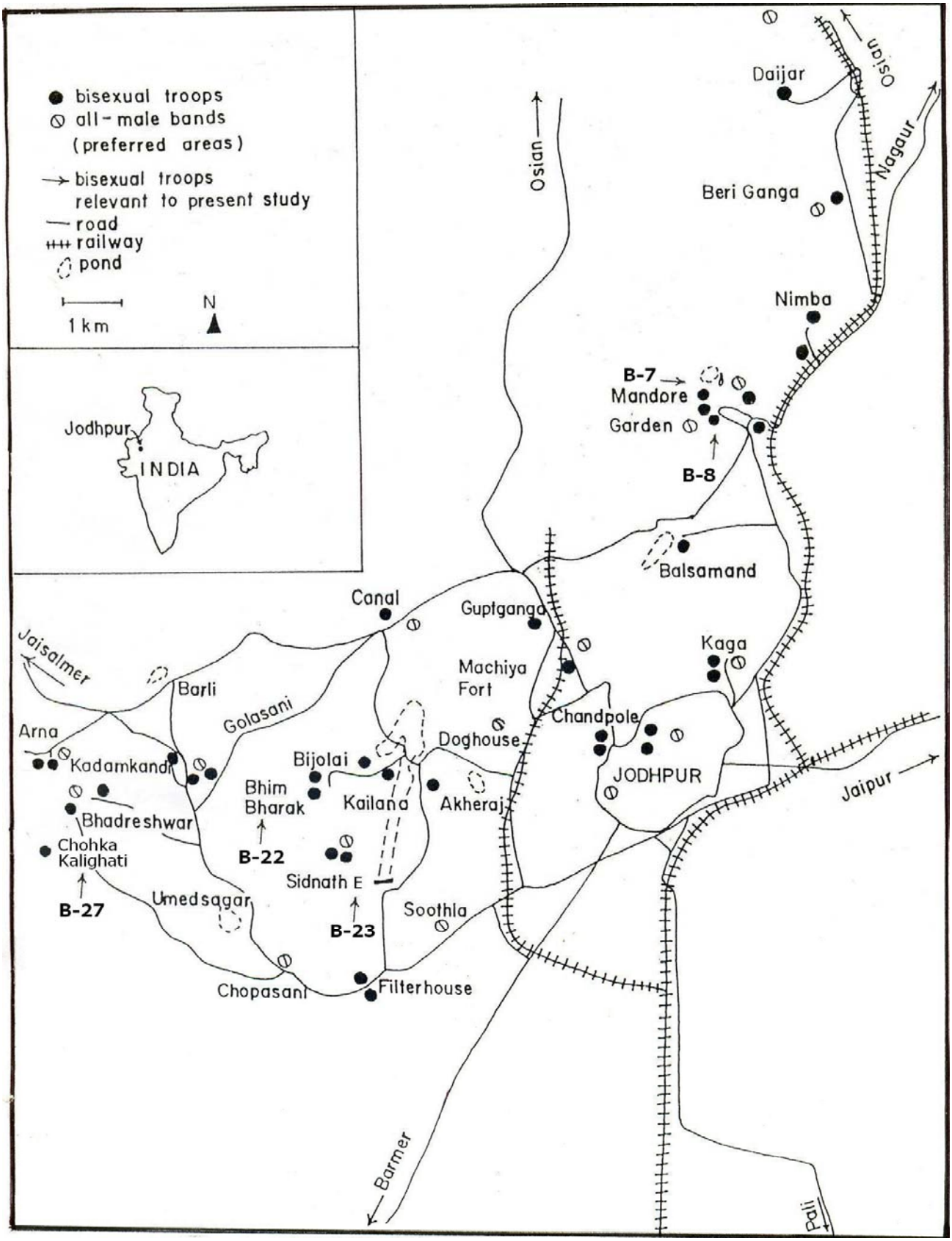

Figure 1: Locations of troops with multiple births.

Subject No.	Troop No.	Location	Date of First Observation	Birth	Approx. Age at First Obs.	Sex of Infants	Survival (as of Nov., 2010)
1	B-27	Chokha Kalighati	Jan. 06, 2010	Twin	11 days	Both male	Still alive
2	B-7	Mandore Fort	July 20, 2009	Twin	5 days	Both male	Still alive
3	B-23	Sidnath East	Feb. 24, 2010	Twin	3 days	Both female	Still alive
4	B-22	Bhim Bharak	Dec. 16, 2008	Twin	7 days	Both female	Still alive
5	B-7	Mandore Fort	Sept. 03, 2009	Twin	10 days	1M-1F	Male died after 16 days
6	B-8	Mandore Temple	Apr. 17, 2009	Triplet	2 days	All Female	Two infants died after 9 and 13 days

Table 1: Multiple births in the langur population around Jodhpur: December 2008 to February 2010.

Observations were done by focal animal and ad libitum sampling. During focal sampling sessions (30 min. each) behavior and spatial relationships of the twins and their mothers were recorded. In the following analysis only those samplings are considered in which both infants could be observed simultaneously. Data are presented as percent of total focal animal observation time.

Results

Six cases of multiple births were observed in free-ranging Hanuman langurs at Jodhpur. In these multiple births five females had twins and one female had triplets. Each infant had a preferred nipple for suckling, the preference for which developed during the first four weeks of life. The behavior of the twins was mostly synchronized. In more than 70% of all activity bouts, both twins showed the same behavior, with "nipple contact" and "playing" prevailing. But in the triplet birth it was difficult for the third baby to make nipple contact. Differences in physical strength and development were apparent within pairs. While the total amount of allomothering was almost the same, individual weekly scores differed considerably.

Figure 1: Triplets' mother with female infants.

In the Mandore Fort (B-7) troop two sets of twins were found, one set in July, 2009, and one set in September, 2009; and a triplet birth was found in the Mandore Temple (B-8) troop in September, 2009. One set of twins was found in the Bhim Bharak (B-22) troop in December, 2008. Similarly, in Chokha Kalighati (B-27) troop a set of twins was seen in January, 2010, and a set of twins was found in Sidnath East troop (B-23) in February, 2010. All sets were observed as often as routine field work allowed. *Table 1* summarizes the relevant information and observation periods. The Mandore troops live in a garden habitat about 8 km north of the city of Jodhpur.

Figure 2: Mother #1 with male twins.

Differences within each pair are very low compared to differences between pairs. All thirteen infants clearly demonstrated a preference for one nipple. In the triplet birth, it was observed that infant 6*c* got less nipple contact than 6*a* and 6*b*. Each infant defended its preferred nipple when a sibling tried to get access to it.

To test the degree of behavioral synchrony, the behavior of each pair of twins was analyzed according to the following method: The twins' activity at the beginning of a focal animal sample marked the start of the first activity bout. It ended when at least one of the twins stopped its current activity and started another, marking the beginning of the second bout, etc.

Two pairs of twins, 1 and 2, showed a high degree of coincident behavior. Twins of female 1 showed the same

behavior in many of the observations. The three predominant activities, which accounted for more than about 50% of synchronized behavior, were nipple contact, playing with each other, and clinging to the mother's belly.

Figure 3: Mother #2 with male twins.

In two pairs, the individuals developed quite differently. From the beginning twin 2*a* was more developed than twin 2*b*. It started changing fur color earlier than 2*b*, was taller and more skillful than 2*b*, and started playing earlier than 2*b*. In other matters both twins were similar, but 2*a* left his mother earlier. Differences between the twins of mother 1 were less marked. However, twin *1b* was slightly more developed than 1*a*.

Twin 3*a* started to run, climb, and leave her mother earlier than 3*b*. In the triplets, the infants 6*a*, 6*b* and 6*c* managed their time for suckling. But 6*b* and 6*c* got less time than 6*a* for suckling milk. And in these triplets only few data could be collected.

Discussion

As in the studies by Nakamichi (1983) on Japanese monkeys and Chapman and Chapman (1986) on howling monkeys, langur twins spent most of their time close to each other. Behavior patterns were mostly synchronized, which points towards a similar set of experiences for each twin in the course of its development. The almost exclusive use of a preferred nipple starts around the fourth and fifth week of life when physical differences between the twins have become apparent. Hrdy (1976) and Swami (2010) speculated that suckling might be the decisive factor in twin survivorship. In the present study, females could well manage to nurse two infants at a time. But sometimes a triplet birth, which is very rare, is difficult for the mother. Another possible limiting factor, "predation", is also nearly negligible in Jodhpur. But one can imagine that a mother of more than one infant would have little chance of surviving in the presence of a predator. In summary: the absence of predators, a sufficient supply of food, and the colobine system of allomothering (parenting behaviors performed by conspecifics other than the biological mother) seem to be good preconditions for successful rearing of twins and triplets in Jodhpur langurs.

This study is of potential medical interest, as these monkeys have been proposed as models for comparative studies on multiple births in man (Wildt & Dukelow, 1974; see also Pasztor & Van horn, 1979). A model for human twinning would be advantageous in studies of the genetic expression of this characteristic or in certain physiological research problems such as maternal nutritive support of twins vs. singletons (Wildt & Dukelow, 1974). In addition, the occurrence of twin births may influence reproductive success in primate breeding colonies. As treatment with gonadotropins for induction of ovulation has been found to result frequently in multiple conceptions, the possibility has even been raised that treated females in macaque colonies could in future furnish litters of three or more infants (Van Wagenen, 1968a).

As is often the case in free-ranging primates, sometimes twins cannot be recognized as such with certainty (Goodall, 1983, 1986; Krishnan, 1971, and Yerkes, 1934). Also excluded from comparison was a presumed case of conceiving while pregnant in a patas monkey (*Erythrocebus patas*): a female gave birth to two young within an interval of three months (Leakey, 1969). The distribution of twinning throughout the various species supports the observation by Schultz (1948) that twins among monkeys and apes seem to be found particularly in species which are especially numerous both in the wild and in captivity and which breed most readily in collections, i.e., macaques (*Macaca mulatta*), baboons (*Papio hamadryas*), and chimpanzees (*Pan troglodytes*). It is therefore quite probable that, as more births are recorded, twins – and perhaps triplets? – will be found to occur in a wider variety of species.

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Meeting Announcements

Laboratory Animal Welfare Training Exchange (LAWTE) will have its **Biennial Conference** July 27–29 at the Hilton Palacio del Rio in San Antonio, Texas. For information and registration, see <www.lawte.org>.

The **Tenth International Conference on Environmental Enrichment** (ICEE) will be held August 14–19, 2011, in Portland, Oregon. ICEE is a meeting for the exchange of ideas about both theoretical and applied research on enrichment for animals in captivity. This conference is being co-hosted by the Oregon National Primate Research Center (ONPRC). This combination of the zoo and laboratory communities will bring together caretakers, researchers, and veterinarians of differing backgrounds, all with a similar goal: providing for the well-being of the animals in their care. Both the zoo and research communities have much to offer each other, and this conference offers a unique "meeting of the minds". Registration for the conference is $450, which includes continental breakfasts and coffee breaks for all conference days, as well as admission to the Ice Breaker, Closing Banquet, Zoo Day at the Oregon Zoo (including meals), and a social event at the ONPRC. The conference will be held at the Benson Hotel, in downtown Portland. The Benson is offering room rates of $149 per night for ICEE participants. For more information, or to register, go to <bit.ly/icee2011>; or contact the hosts at <*icee.2011@hotmail.com*>,

The **8th World Congress on Alternatives and Animal Use in the Life Sciences** will be held August 21–25 in Montréal, Canada. See <www.wc8.ccac.ca>.

The **Israeli Lab Animal Forum** (ILAF), The **European Society of Laboratory Animal Veterinarians** (ESLAV), and the **European College of Laboratory Animal Medicine** (ECLAM) will hold a joint scientific meeting entitled: **What's New? Animals Models, Housing, and Techniques**, September 5–6, 2011, in Jerusalem, Israel. The list of topics includes: environmental factors, welfare, intraspecies communication, immunology, genetics, cardiovascular questions, and metabolism. Applications for oral presentations and posters will be warmly welcomed! See <www.makom.info /jerusalem2011> for details on registration, abstract submission, and venue. Also see <www.ilaf.org.il>, <www.eslav.org>, and <www.eclam.org>.

The IV Congress of the European Federation for Primatology and the **III Iberian Primatological Conference** will be held September 14–17, in Almada, Portugal, sponsored by the APP-Associação Portuguesa de Primatologia. See <apprimatologia.com/Actividades/CEP2011.aspx>.

The **5th annual Innovative Environmental Enrichment Symposium** will be held October 2, 2011, at the San Diego, CA, Marriott Hotel and Marina. It is a satellite to the National AALAS meeting being held there, and it is hosted by Massachusetts General Hospital's Center for Comparative Medicine. The purpose of this symposium is to highlight innovative animal enrichment and conditioning programs and to identify interesting leads for further investigation that may improve enrichment strategies in the laboratory research environment. Prospective attendants should visit <www.virtualvivarium.com/about-us/upcoming-events/environmental_enrichment_symposium.asp> for registration and information. There is no cost for registration or attendance.

The Midwest Primate Interest Group will hold its **8th Annual Meeting** October 14–15, at Kent State University, Kent, Ohio. See <mpig.org/>.

A Walk on the Wild Side: a conference on IACUC oversight of wildlife research, with IACUC 101 Training, and a **workshop on Animal Welfare Act compliance for studies of wildlife in the field and in captivity**, will both be held October 26–28, in Albuquerque, New Mexico, organized by the **American Society of Mammalogists** and the **Ornithological Council**. For details, see <mysite.verizon.net/iacuc101>.

The **Academy of Surgical Research's 27th Annual Meeting** will be held October 27–29, 2011, at the Hyatt Regency, Austin, Texas. See <www.surgicalresearch.org>.

The **Society for Neuroscience** will hold **Neuroscience 2011** November 12–16 in Washington, DC. See <www.sfn.org/AM2011>.

The **Centers for Disease Control and Prevention (CDC)'s 12th International Symposium on Biosafety, "Sustainability: People, Practices, Planet"**, will be held February 11-15, 2012, at the Crowne Plaza Ravinia, Atlanta, Georgia. See <www.cdc.gov/biosafety>.

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Animal Science Meeting and Training Course

The 49th Annual Meeting of the Gesellschaft für Versuchstierkunde – Society of Laboratory Animal Science (GV-SOLAS) – will be held in Dresden, Germany, September 12–14, 2011. There will be both English and German sessions held in parallel. The meeting provides a platform for interaction and exchange between scientists from all disciplines. Moreover, it includes workshops and facilitates contacts between young and established researchers as well as experienced laboratory animal experts. The meeting is recognized as a major instrument to draw scientific and public attention to the importance of animal-based biomedical research.

The simultaneously held 13th Advanced Training Course of the Interessengemeinschaft der Tierpfleger und des technischen Personal (IgTp; Community of Interest of Animal Caretakers and Technicians) provides the opportunity for animal caretakers and technicians to get information about recent results and developments as well as to communicate within workshops and to gain practical skills.

The Organising Committee, as well as the Council of the GV-SOLAS, wishes to encourage all scientists involved in animal experimentation to attend the meeting. The schedule of the scientific program will allow for intense discussions. At the same time everyone is very welcome to actively participate in the Advanced Training Course of the IgTp, which offers plenty of communication possibilities. Should you have any questions please don't hesitate to contact the Organising Committee [e-mail: *gv-solas2011@mpi-cbg.de*], and see <www.gv-solas2011.de>.

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News Briefs

Panel Named to Evaluate U.S. Chimpanzee Research

Should the United States remain the only country apart from Gabon to fund chimpanzee research? The membership of an Institute of Medicine (IOM) committee recently asked to pronounce on that question has been made public.

The Committee on the Use of Chimpanzees in Biomedical and Behavioral Research will spend the next eight months studying whether the U.S., through the National Institutes of Health (NIH), should continue to fund the controversial research, which takes place at four primate centers supported by the agency. (NIH also supports a fifth center, the Alamogordo Primate Facility, which houses chimps but does not conduct research.)

The 15-member panel aims to issue a report by the end of December. Its first meeting took place in Washington, DC, on May 26–27.

The NIH in January asked the IOM, an arm of the independent National Academies, to conduct an "in-depth analysis to reassess the scientific need for the continued use of chimpanzees to accelerate biomedical discoveries." The agency was responding to protests sparked by its move to bring 186 aging chimps currently housed at the Alamogordo Primate Facility in New Mexico out of retirement and back into active research.

The panel's members include nine PhDs; five physicians; one bioethicist; and three doctors of veterinary medicine. Also, one member is a former college chaplain who is CEO of the Genetic Alliance, a Washington, DC-based health advocacy group.

The chief of one of the chimp research centers applauded the committee's composition, saying that he is "encouraged" by the panel's makeup. "There is good representation by individuals directly involved with both basic and applied research with very strong emphasis on human health. It is good to see industry and academia well represented. We should anticipate a thorough and objective review."

The Washington, DC-based Physicians Committee for Responsible Medicine (PCRM), which has been a leading critic of chimpanzee research and of the transfer of the Alamogordo chimps, disagreed, saying that the committee's membership and its task "raise serious concerns regarding the scope and validity of the committee's report. In particular, PCRM is very concerned that the IOM has specifically excluded any consideration of the standing of chimpanzees or the ethical aspects of chimpanzee experimentation. Throughout the world, where there are many prohibitions of chimpanzee and great ape experimentation, the balance between purported research benefits and the grievous harm suffered by chimpanzees in research has been a critical factor in implementing those prohibitions. To ignore this element of the debate is to assign chimpanzees nothing more than the status of laboratory equipment."

The committee's task, stated here, focuses on determining "if chimpanzees are or will be necessary for research discoveries and to determine the safety and efficacy of new prevention or treatment strategies." It does not mention ethics or animal welfare explicitly, and concludes by stating that: "The committee will base its findings and recommendations on currently available proto-

cols, published literature, and scientific evidence, as well as its expert judgment."

The panel will hold a session to collect public input in Washington, DC, in mid-August and a closed meeting in early October, before delivering its report by the end of the year. – *From* Nature*'s Blog Page,* <blogs.nature.com/news/2011/05/panel_to_evaluate_us_chimpanze.html>. *See also* <www.iom.edu/Activities/Research/Chimpanzees.aspx>.

Future Biomedical Research Workforce

A new working group at the National Institutes of Health will examine the future of the biomedical research workforce in the United States. The group will recommend actions to the Advisory Committee to the Director to ensure a diverse and sustainable biomedical and behavioral research workforce. The working group will consider questions such as:

- What is the right size of the workforce?
- What are the appropriate types of positions that should be supported to allow people to have successful careers and to continue to advance biomedical and behavioral sciences?
- What is the best way to support these various positions?
- What types of training should be provided?

To do this, the group will gather input from the extramural community, including students, postdoctoral fellows, investigators, scientific societies, and grantee institutions. In addition, the group will develop a model for a sustainable and diverse U.S. biomedical research workforce using appropriate expertise from NIH and external sources. The model can help inform decisions about how to train the optimal number of people for the appropriate types of positions that will advance science and promote health.

"The working group will help lay the foundation for ensuring that we have the biomedical workforce we will need to usher in the next generation of scientific discoveries," NIH Director Francis S. Collins, MD, PhD, said.

Results from the working group will be presented to the Advisory Committee to the Director (ACD). The ACD advises the NIH Director on policy matters important to the NIH mission of conducting and supporting biomedical and behavioral research, research training, and explaining research results for the public. Additional information is available at <www.nih.gov/about/director/acd/index.htm>.

The Office of the Director, the central office at NIH, is responsible for setting policy for NIH, which includes 27 Institutes and Centers. This involves planning, managing, and coordinating the programs and activities of all NIH components. The Office of the Director also includes program offices which are responsible for stimulating specific areas of research throughout NIH. Additional information is available at <www.nih.gov/icd/od/>. – *NIH Press Release, April 27, 2011*

Monkey Fever Surfaces in Shimoga

Shimoga, Karnataka, India – Eleven cases of Kyasanur forest disease (KFD), also known as monkey fever, have been reported in Shimoga in 2011 so far. KFD is a tick-borne viral fever, the symptoms of which are high fever, headache, and bleeding. The virus is transmitted from monkeys to human beings by ticks. Seventeen suspected cases were reported in the Tirthahalli district this year. Blood samples of the patients were sent to the National Institute of Virology, Pune: 11 tested positive.

The death of monkeys in the forests of Mandagadde and Konandur regions was reported in March, followed by the outbreak of KFD. The outbreak of KFD and other forms of viral fever in the region has disrupted agricultural activities.

District Health Officer Dr. Channabasappa told *The Hindu* that of the 11 cases that tested positive, six were from Konandur region while five were from Mandagadde region. The patients were treated and have recovered. He clarified that so far none of the patients had died in any part of the district.

About 4,000 people in the area were vaccinated against KFD as a precautionary measure. In addition to this, people who went to the forest to collect firewood and those who worked on the agricultural fields on the periphery of the forest were asked to apply dimethyl phosphate, which is a repellent against the tick. – *from* The Hindu, *the online edition of India's national newspaper, May 23, 2011*

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Announcements from Publications

AJEST Seeks Manuscripts

The African Journal of Environmental Science and Technology (*AJEST*) is currently accepting manuscripts for publication. *AJEST* publishes high-quality solicited and unsolicited articles in English, in all areas of environmental science. All articles published in *AJEST* will be peer-reviewed.

The editors' objective is to inform authors of the decision on their manuscripts within five weeks of submission. Following acceptance, a paper will normally be published in the next available issue.

One key request of researchers across the world is open access to research publications. *AJEST* is fully committed to providing free access to all articles as soon as they are published. You are asked to support this initiative by publishing your papers in this journal.

Instructions for authors and other details are available at <www.academicjournals.org/AJEST>. Prospective authors should send their manuscript(s) to <*ajest@academicjournals.org*>, and to <*ajest.acadjourn@gmail.com*>.

Veterinary Clinical Digest

Veterinary Clinical Digest is an online publication that searches Wiley-Blackwell's veterinary journal collection, including *Veterinary Radiology & Ultrasound, Veterinary Surgery, Veterinary Ophthalmology, Journal of Veterinary Emergency and Critical Care, Veterinary Clinical Pathology*, and *Veterinary Anaesthesia and Analgesia*, among others, for papers that are pertinent to today's practice, bringing the research together in one convenient location.

Veterinary Clinical Digest's online platform has been completely redesigned to make the content more accessible and provide a more enjoyable experience for the reader. Features of the new site include:

- Links to the latest articles, which are available to read FREE,
- Summaries of each article that outline the key messages for practice,
- E-mail alerts to notify you when future issues are published, and
- Special issues that have been recently published by Wiley-Blackwell veterinary journals.

Read *Veterinary Clinical Digest*, including back issues, free, at <www.veterinaryclinicaldigest.com>.

Launch of *Journal of Animal Ethics*

A new journal covering the issue of animal ethics has been launched by a U.S. and U.K. academic partnership with the goal of widening international debate about the moral status of animals. This summer, the University of Illinois Press will begin publishing the *Journal of Animal Ethics* (*JAE*), the result of years of collaboration between the Oxford Centre for Animal Ethics and the University of Illinois Press.

The Journal of Animal Ethics, which is to be published twice a year, in the summer and winter, is jointly edited by the Reverend Professor Andrew Linzey, Director of the Oxford Centre for Animal Ethics, and Professor Priscilla Cohn, Emeritus Professor of Philosophy at Pennsylvania State University and Associate Director of the Centre.

"For far too long, academics have been slow to contribute to the burgeoning public debate about animal ethics. This is an opportunity for them to make their contribution in a multidisciplinary journal that aims to put animal ethics on the academic map," said Professor Linzey. "We want to ensure that animals receive the academic attention they deserve."

JAE comprises: full-length scholarly articles; argument pieces in which authors will advance a particular perspective (usually related to current affairs) or respond to a previous article, review, or research report; review articles; and book reviews.

JAE is devoted to the exploration of progressive thought about animals and is multidisciplinary in nature and international in scope. It covers theoretical and applied aspects of animal ethics that will be of interest to academics from both the humanities and the sciences, as well as to professionals working in the field of animal protection. It aims to publish groundbreaking work written by new and established academics from a wide range of disciplines including anthropology, ethics, history, law, literature, linguistics, political theory, religion, and science.

In the first issue of *JAE*: David M. Lavigne and William S. Lynn address Canada's commercial seal hunt; Joel Marks writes on how animal suffering is unrecognized in research; Andrew Fenton and Frederic Gilbert question the use of animals in spinal cord research; Judith Benz-Schwarzburg and Andrew Knight examine the cognitive abilities of animals and ask how long they can be denied similar rights to humans; Grace Clement asks whether animals can be classed as "pets or meat"; Barbro Frodding, Martin Peterson, and Mark J. Rowlands debate whether animal ethics should be based on friendship; and Jan Deckers and Jay B. McDaniel debate whether Whiteheadians should be vegetarians.

To subscribe to the *Journal*, please visit <www.press.uillinois.edu/journals/jane.html>.

Contributions to the *Journal* are welcomed; submission guidelines can be found on that Website.

For more press information please contact Sam Calvert, Samantha Calvert Marketing & PR, [+44 (0)1782-505430; +44 (0)7967-042050; e-mail: *sam@samcalvert.plus.com*]; or Jeff McArdle, Associate Journals Manager, University of Illinois Press [217-244-0381; e-mail*: jmcardle@uillinois.edu on*].

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Resources Available

Primate Enrichment and Social Housing Resources

The Office of Laboratory Animal Welfare (OLAW) has an online resource for information on nonhuman primate enrichment and social housing: <grants.nih.gov/grants/olaw/primate_enrichment-social_housing.htm>. This resource is provided to assist institutions in enhancing the care and well-being of nonhuman primates. On this site, you can find Frequently Asked Questions; a special online seminar; the OLAW report on site visits to chimpanzee facilities; a bibliographic guide developed by the U.S. Dept of Agriculture, the National Agriculture Library, and the Animal Welfare Information Center; and more. For questions, suggestions or comments, e-mail <*olaw@od.nih.gov*>.

Podcast: *Writing Your Vertebrate Animal Section*

A new *All About Grants* podcast produced by the NIH Office of Extramural Research features Dr. Pat Brown, Director, OLAW, who explains what must be included in your grant application if you use vertebrate animals in your research. Listen to *Writing Your Vertebrate Animal Section* (MP3) or read the transcript at <grants.nih.gov/podcasts/All_About_Grants/index.htm>.

PDF Books from National Academies Press

As of June 2, 2011, all PDF versions of books published by the National Academies Press (NAP) are downloadable free of charge to anyone. This includes the current catalog of more than 4,000 books plus future reports published by NAP.

For more information, visit <notes.nap.edu/2011/06/02/more-than-4000-national-academies-press-pdfs-now-available-to-download-for-free>.

Primate Scientific Posters

Primate Products, Inc., a provider of products and services designed specifically for nonhuman primates, is reaching out to members of the primatology and scientific communities. They publish Bio-Data posters and "Identifying Body Parts" posters in English and Spanish, and they are now making these posters available free. They say, "We are confident that you and your staff will find them useful."

You can request your complimentary copy by visiting their Website: <www.primateproducts.com>, or by telephoning 239-867-2020.

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Book Review: *Global Outlaws*

Global Outlaws: Crime, money and power in the contemporary world, by Carolyn Nordstrom. (*California Series in Public Anthropology*, vol. 16.) Berkeley: University of California Press, 2007.

This is an anthropological study of smugglers and smuggling, as well as of the larger topics of organized crime, transnational crime, and international economic relations. Although the author doesn't specifically discuss the traffic in animals and animal parts, she describes how smugglers operate and how they think. Most of her informants are based in Africa.

I recommend this book for everyone interested in threatened species (such as nonhuman primates) and their conservation. *– E. M., Assistant Editor*, LPN

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Call for Award Nominations

Animal Welfare Enhancement Awards

Attention lab technicians, animal technicians, and all who work with laboratory animals: the Johns Hopkins Center for Alternatives to Animal Testing (CAAT) is accepting proposals for the 2011 Animal Welfare Enhancement Awards. The focus of these awards is to refine the housing, handling and/or experimental situations for laboratory animals. Studies may, for example, examine:

- How physiological and behavioral stress responses to common husbandry (e.g., capture) and traditional treatment procedures (e.g., gavage, injection, blood collection) can be reduced or eliminated (e.g., by training the subjects to cooperate rather than resist);
- Whether animals caged at different tier levels show different physiological and behavioral stress responses when being approached by personnel, and how these responses can be minimized or avoided;
- Whether the presence of a compatible companion buffers physiological and behavioral stress responses to experimental situations (e.g., enforced restraint); and
- Whether animals kept in legally minimum-sized cages benefit from a moderate increase in space that is (a) empty versus (b) structured in species-appropriate ways (e.g., shelter, visual blind, perch, platform, PVC tube).

Any studies to be undertaken must be non-invasive, with the possible exception of obtaining blood for biochemical measurements (animals that have been trained to cooperate during venipuncture should be used, if possible). Each award will be for $6,000. The deadline for submission is October 1, 2011. For additional information and instructions, see <caat.jhsph.edu/programs/awards/AWE/2011/>.

NCAB/AALAS Technician Award

The Scientists Center for Animal Welfare (SCAW) is offering a 2011 NCAB/AALAS Technician Award to help defray the cost of attending the annual National Capital Area Branch of the American Association for Laboratory Animal Science (NCAB/AALAS) meeting. This event is on August 31–September 1, 2011, at the Gaylord National Resort & Convention Center at National Harbor, Washington, DC. SCAW will provide one two-day conference registration, one night's hotel reservation, and one banquet ticket. To apply for the award you must be currently working as an animal care technician.

Submit the following in Microsoft Word or plain text format by e-mail or regular mail no later than noon, August 1:

- Current resume or CV;
- Complete name, address, telephone number, and e-mail address;
- One paragraph explaining, "Why the animal care technician is an important part of the research team". The paragraph should not exceed 200 words and should be double-spaced.

A panel of experts will review all entries and the award will be announced on August 8, 2011. The recipient of the award will receive notification and be announced on the SCAW Website, <www.scaw.com>, and in the SCAW Newsletter.

Submit information to: SCAW, Attn: Lee Krulisch, Executive Director, 7833 Walker Dr., Suite 410, Greenbelt MD 20770 [301-345-3500; e-mail: *lee@scaw.com*].

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Volunteer Opportunities: South African Sanctuary

International Primate Rescue (IPR) is seeking a volunteer for a one-year commitment. This person will be responsible for Search Engine Optimization (SEO): updating the Website, Facebook, blogs, and Twitter; researching opportunities; and placing advertising throughout the Internet to attract short-term volunteers to our sanctuary. You must be familiar with SEO and cost-effective advertising through the Internet.

Your accommodations and three meals a day will be free for the year. This is a great opportunity to live in Africa among primate lovers and experience sanctuary life in South Africa. The application deadline is December 31, 2011.

In addition, IPR is offering short-term volunteering positions for primate caregivers. There is a charge for accommodation and meals, but it is a wonderful opportunity for work experience. The sanctuary currently houses marmosets, tamarins, squirrel monkeys, Capuchins (a baby was hanging off Sue's ear as she typed this letter to the *LPN*), Barbary macaques, and Mona monkeys. There is more information on the volunteer page of the Website, and Sue will answer any further questions you may have by e-mail.

Contact Sue Mousley, Plot No 20, Boundry Road, Kromdraai, Pretoria, P.O. Box 295, Pryamid 0210 South Africa [+27 73 169 6964 or +27 79 479 3712; e-mail: *s.a@iprescue.org*]; and see their Website: <www.iprescue.org>.

Recent Books and Articles

(Addresses are those of first authors unless otherwise indicated)

Books

• *Animal Models of Drug Addiction*. M. C. Olmstead (Ed.). *Neuromethods,* Vol. 53. (W. Walz, Series Ed.). New York, NY: Humana Press, 2011. 496 pp. [Price: $239]

Contents: Part I, Behavioral Paradigms. Intracranial self-stimulation, by S. Vlachou & A. Markou; Stimulant self-administration, by L. V. Panlilio; Opiate self-administration, by F. Leri; Nicotine self-administration, by R. E. Sorge & P. B. S. Clarke; Alcohol self-administration, by F. Weiss; Place conditioning, by C. L. Cunningham, P. A. Groblewski, & C. M. Voorhees; Sensitization, by J. A. Loweth & P. Vezina; and Animal models of eating disorders, by S. D. Hancock & M. C. Olmstead. Part II, Modeling Stages of Drug Addiction in Animals. Acquisition of drug self-administration, by M. E. Carroll & R. A. Meisch; Escalation of drug use, by S. H. Ahmed; Environmental modulation of drug-taking, by A. Badiani, D. Caprioli, A. Testa, M. T. De Luca, & M. Celentano; Craving, by J. W. Grimm; Habit formation and compulsion, by D. Belin, D. Economidou, Y. Pelloux, & B. J. Everitt; Impulsivity, by A. Bari, T. W. Robbins, & J. W. Dalley; Binge drug-taking, by H. E. Covington, III, & K. A. Miczek; Withdrawal, by A. M. Barr, H. N. Boyda, & R. M. Procyshyn; and Relapse, by S. Erb & F. Placenza.

• *Field and Laboratory Methods in Primatology: A Practical Guide* (2nd ed.). J. M. Setchell & D. J. Curtis (Eds.). Cambridge, U.K.: Cambridge University Press, 2011.

Contents: Foreword, by R. D. Martin; Introduction, by D. J. Curtis, J. M. Setchell, & M. Talebi; An ethnoprimatological approach to interactions between human and non-human primates, by L. Jones-Engel, G. A. Engel, & A. Fuentes; Habituating primates: Processes, techniques, variables and ethics, by E. A. Williamson & A. T. C. Feistner; Habitat description and phenology, by J. U. Ganzhorn, S. J. Rakotondranary, & Y. R. Ratovonamana; Geographical information systems and remote sensing, by P. E. Osborne & L. Glew; Monitoring local weather and climate, by J. C. Mayes & N. Pepin; Survey and census methods: Population distribution and density, by C. Ross & N. Reeve; Trapping primates, by C. J. Jolly, J. E. Phillips-Conroy, & A. E. Müller; Handling, anaesthesia, health evaluation and biological sampling, by S. Unwin, M. Ancrenaz, & W. Bailey; Morphology, morphometrics and taxonomy, by C. Groves & J. Harding; Marking and radio-tracking primates, by P. E. Honess & D. W. Macdonald; Field experiments with non-human primates: A tutorial, by K. Zuberbühler & R. M. Wittig; Feeding ecology, frugivory and seed dispersal, by J. L. Dew; Dietary analysis I: Food physics, by P. W. Lucas, D. Osorio, N. Yamashita, J. F. Prinz, N. J. Dominy, & B. W. Darvell; Dietary analysis II: Food chemistry, by P. W. Lucas, R. T. Corlett, N. J. Dominy, H. C. Essackjee, P. Riba-Hernandez, L. Ramsden, K. E. Stoner, & N. Yamashita; Collecting arthropods and arthropod remains for primate studies, by C. M. P. Ozanne, J. R. Bell, & D. G. Weaver; Recording primate vocalizations, by T. Geissmann & S. Parsons; Photography and video for field researchers, by N. Rowe & M. Myers; Chronobiological aspects of primate research, by H. G. Erkert; Thermoregulation and energetics, by J. Schmid; Field endocrinology: Monitoring hormonal changes in free-ranging primates, by J. K. Hodges & M. Heistermann; Collection, storage and analysis of non-invasive genetic material in primate biology, by B. Goossens, N. Anthony, K. Jeffery, M. Johnson-Bawe, & M. W. Bruford; and Tips from the bush: An A–Z of suggestions for successful fieldwork, by S. K. Bearder & K. A. I. Nekaris.

• *Tropical Ecology*. J. Kricher. Princeton, NJ: Princeton University Press, 2011. 640 pp. [Price: $85]

Children's Books

• *Me ... Jane*. P. McDonnell. New York: Little Brown and Company, 2011. 40 pp. [Price: $15.99].

A children's biography of Jane Goodall, with drawings by the author – and by Jane when she was a child!

Magazines and Newsletters

• *American Journal of Physical Anthropology*, 2011, *144*[1], <onlinelibrary.wiley.com/doi/10.1002/ajpa.v144.1/issuetoc>.

Contents include: Age and individual foraging behavior predict tooth wear in Amboseli baboons, by J. Galbany, J. Altmann, A. Pérez-Pérez, & S. C. Alberts; Intentional cut-marks on an early mesolithic human calvaria from Margaux Cave (Dinant, Belgium), by M. Toussaint; News from the west: Ancient DNA from a French megalithic burial chamber, by M.-F. Deguilloux, L. Soler, M.-H. Pemonge, C. Scarre, R. Joussaume,, & L. Laporte; Species co-occurrence patterns and dietary resource competition in primates, by J. M. Kamilar & J. A. Ledogar; Sex and age differences in the diet and ingestive behaviors of sooty mangabeys (*Cercocebus atys*) in the Tai forest, Ivory Coast, by W. S. McGraw, A. E. Vick, & D. J. Daegling; Subvertical grooves on interproximal wear facets from the El Sidrón (Asturias, Spain) Neandertal dental sample, by A. Estalrrich, A. Rosas, S. García-Vargas, A. García-Tabernero, D. Santamaría, & M. de la Rasilla; and Testing the usefulness of the basilar suture as a means to determine age in great ape skeletons, by D. J. Poe.

• *American Journal of Physical Anthropology*, 2011, *144*[2], <onlinelibrary.wiley.com/doi/10.1002/ajpa.v144.2/issuetoc>.

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

Contents include: Endocrinology of year-round reproduction in a highly seasonal habitat: Environmental variability in testosterone and glucocorticoids in baboon males, by L. R. Gesquiere, P. O. Onyango, S. C. Alberts, & J. Altmann; Metacarpal trabecular architecture variation in the chimpanzee (*Pan troglodytes*): Evidence for locomotion and tool-use? by R. A. Lazenby, M. M. Skinner, J.-J. Hublin, & C. Boesch; Primate life histories and dietary adaptations: A comparison of Asian colobines and macaques, by C. Borries, A. Lu, K. Ossi-Lupo, E. Larney, & A. Koenig; and Two girls for every boy: The effects of group size and composition on the reproductive success of male and female white-faced capuchins, by L. M. Fedigan & K. M. Jack.

• *American Journal of Physical Anthropology*, 2011, *144*[3], <onlinelibrary.wiley.com/doi/10.1002/ajpa.v144.3/issuetoc>.

Contents include: Behavioral thermoregulation in a gregarious lemur, *Eulemur collaris*: Effects of climatic and dietary-related factors, by G. Donati, E. Ricci, N. Baldi, V. Morelli, & S. M. Borgognini-Tarli; A partial hominoid humerus from the middle miocene of Castell de Barberà (Vallès-Penedès Basin, Catalonia, Spain), by D. M. Alba, S. Moyà-Solà, & S. Almécija; Comparative microcomputed tomography and histological study of maxillary pneumatization in four species of New World monkeys: The perinatal period, by T. D. Smith, J. B. Rossie, G. M. Cooper, R. M. Schmieg, C. J. Bonar, M. P. Mooney, & M. I. Siegel; and Reduced stiffness of alveolar bone in the colobine mandible, by D. J. Daegling, M. C. Granatosky, W. S. McGraw, & A. J. Rapoff.

• *American Journal of Physical Anthropology*, 2011, *144*[4], <onlinelibrary.wiley.com/doi/10.1002/ajpa.v144.4/issuetoc>.

Contents include: Neandertal postcranial remains from the Sima de las Palomas del Cabezo Gordo, Murcia, southeastern Spain, by M. J. Walker, J. Ortega, M. V. López, K. Parmová, & E. Trinkaus; Are *Homo sapiens* nonsupranuchal fossa and neanderthal suprainiac fossa convergent traits? by W. Nowaczewska; Mitochondrial phylogeny of tamarins (*Saguinus*, Hoffmannsegg 1807) with taxonomic and biogeographic implications for the *S. nigricollis* species group, by C. Matauschek, C. Roos, & E. W. Heymann; Relationship between canine dimorphism and mandibular morphology in the hamadryas baboon and the Japanese monkey, by H. Fukase; The Narrow Niche hypothesis: Gray squirrels shed new light on primate origins, by J. D. Orkin & H. Pontzer; Weight support distribution during quadrupedal walking in Ateles and Cebus, by S. G. Larson & B. Demes; and Energetics during reproduction: A doubly labeled water study of lactating baboons, by L. Rosetta, P. C. Lee, & C. Garcia.

• *American Journal of Physical Anthropology*, 2011, *145*[1], <onlinelibrary.wiley.com/doi/10.1002/ajpa.v145.1/issuetoc>.

Contents include: Insectivory of savanna chimpanzees (*Pan troglodytes verus*) at Fongoli, Senegal, by S. L. Bogart & J. D. Pruetz; Morphological characterization of a brown lemur hybrid zone (*Eulemur rufifrons* × *E. cinereiceps*), by K. E. Delmore, E. E. Louis, Jr., & S. E. Johnson; Effects of lactation on the time-budgets and foraging patterns of female black howlers (*Alouatta pigra*), by P. A. D. Dias, A. Rangel-Negrín, & D. Canales-Espinosa; Three-dimensional kinematics of capuchin monkey bipedalism, by B. Demes; and Different competitive potential in two coexisting mouse lemur species in northwestern Madagascar, by S. Thorén, M. Linnenbrink, & U. Radespiel.

• *American Journal of Primatology*, 2011, *73*[5], <onlinelibrary.wiley.com/doi/10.1002/ajp.v73.5/issuetoc>.

Death among geladas (*Theropithecus gelada*): A broader perspective on mummified infants and primate thanatology, by P. J. Fashing, N. Nguyen, T. S. Barry, C. B. Goodale, R. J. Burke, S. C .Z. Jones, J. T. Kerby, L. M. Lee, N. O. Nurmi, & V. V. Venkataraman; Behavioral response of a chimpanzee mother toward her dead infant, by K. A. Cronin, E. J. C. van Leeuwen, I. Chitalu Mulenga, & M. D. Bodamer; Female philopatry and dominance patterns in wild geladas, by A. le Roux, J. C. Beehner, & T. J. Bergman; Individuality in male songs of wild black crested gibbons (*Nomascus concolor*), by G.-Z. Sun, B. Huang, Z.-H. Guan, T. Geissmann, & X.-L. Jiang; The effects of provisioning and crop-raiding on the diet and foraging activities of human-commensal white-faced Capuchins (*Cebus capucinus*), by T. McKinney; Morphological and physiological aspects of digestive processes in the graminivorous primate *Theropithecus gelada*—A preliminary study, by M. Mau, A. Johann, A. Sliwa, J. Hummel, & K.-H. Südekum; The enigmatic Arunachal macaque: Its biogeography, biology and taxonomy in Northeastern India, by J. Biswas, D. K. Borah, A. Das, J. Das, P. C. Bhattacharjee, S. M. Mohnot, & R. H. Horwich; Life history traits, maternal behavior and infant development of blue-eyed black lemurs (*Eulemur flavifrons*), by M. Sylviane, N. Volampeno, J. C. Masters, & C. T. Downs; Chimpanzee oil-palm use in southern Cantanhez National Park, Guinea-Bissau, by J. Sousa, A. V. Barata, C. Sousa, C. C. N. Casanova, & L. Vicente; and A comprehensive guide to chimpanzee behavior, by R. M. Wittig.

• *Animal Behaviour*, 2011, *81*[5], <www.sciencedirect.com/science/journal/00033472>.

Contents include: Animal play and animal welfare, by S. D. E. Held & M. Špinka; Active males, reactive females: Stereotypic sex roles in sexual conflict research? by K. K. Green & J. A. Madjidian; Anthropogenic influences on natural animal mating systems, by J. E. Lane, M. N. K. Forrest, & C. K. R. Willis; The language void: The need for multimodality in primate communication research, by

K. E. Slocombe, B. M. Waller, & K. Liebal; Evidence from four lemur species that ringtailed lemur social cognition converges with that of haplorhine primates, by A. A. Sandel, E. L. MacLean, & B. Hare; Swarm intelligence in humans: Diversity can trump ability, by S. Krause, R. James, J. J. Faria, G. D. Ruxton, & J. Krause; The energetics of male–male endurance rivalry in free-ranging rhesus macaques, *Macaca mulatta*, by J. P. Higham, M. Heistermann, & D. Maestripieri; and Know your enemy: Accessibility and danger modulate the use of conciliatory patterns in mandrills, by G. Schino & C. Marini.

• *Animal Behaviour*, 2011, *81*[6], <www.sciencedirect.com/science/journal/00033472>.

Contents include: Social bonds predict future cooperation in male Barbary macaques, *Macaca sylvanus*, by A. Berghänel, J. Ostner, U. Schröder, & O. Schülke; Chimpanzees' socially maintained food preferences indicate both conservatism and conformity, by L. M. Hopper, S. J. Schapiro, S. P. Lambeth, & S. F. Brosnan; 'Eavesdropping' and perceived male dominance rank in humans, by B. C. Jones, L. M. DeBruine, A. C. Little, C. D. Watkins, & D. R. Feinberg; and When females trade grooming for grooming: Testing partner control and partner choice models of cooperation in two primate species, by C. Fruteau, S. Lemoine, E. Hellard, E. van Damme, & R. Noë

• *Comparative Medicine,* 2011, *61*[2], <tinyurl.com/3bhz53p>.

Contents include: New policy regarding use of unpublished information in the AALAS journals, by L. A. Toth, S. Compton, R. Tolwani, & M. H. Bagaglio; Association of brain-type natriuretic protein and cardiac troponin I with incipient cardiovascular disease in chimpanzees (*Pan troglodytes*), by J. J. Ely, T. Zavaskis, M. L. Lammey, M. M. Sleeper, & D. R. Lee; Risk factors for dystocia in pigtailed macaques (*Macaca nemestrina*), by D. E. Stockinger, A. E. Torrence, R. R. Hukkanen, K. W. Vogel, C. E. Hotchkiss, & J. C. Ha; and Intracardiac thrombosis and aortic dissecting aneurysms in mustached tamarins (*Saguinus mystax*) with cardiomyopathy, by A. S. Gozalo, D. R. Ragland, M. C. StClaire, W. R. Elkins, & C. R. Michaud.

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Contents: Deactivation of snares by wild chimpanzees, by G. Ohashi & T. Matsuzawa; Coping with low-quality diets: A first account of the feeding ecology of the southern gentle lemur, *Hapalemur meridionalis*, in the Mandena littoral forest, southeast Madagascar, by T. M. Eppley, E. Verjans, & G. Donati; Healthy baboon with no upper jaw or nose: An extreme case of adaptability in the Kibale National Park, Uganda, by T. T. Struhsaker, C. A. Chapman, T. R. Pope, & J. R. Marcus; Twinning frequency of Japanese macaques (*Macaca fuscata*) at Takasakiyama, by Y. Sugiyama, H. Kurita, T. Matsui, & T. Shimomura; The range of the golden-mantle tamarin, *Saguinus tripartitus* (Milne Edwards, 1878): Distributions and sympatry of four tamarin species in Colombia, Ecuador, and northern Peru, by A. B. Rylands, C. Matauschek, R. Aquino, F. Encarnación, E. W. Heymann, S. de la Torre, & R. A. Mittermeier; Erratum to: The range of the golden-mantle tamarin, *Saguinus tripartitus* (Milne-Edwards, 1878): Distributions and sympatry of four tamarins in Colombia, Ecuador, and northern Peru, by A. B. Rylands, C. Matauschek, R. Aquino, F. Encarnación, E. W. Heymann, S. de la Torre, & R. A. Mittermeier; Development of infant common marmosets' (*Callithrix jacchus*) preference for their parents over adults from another group, by A. Saito, A. Izumi, & K. Nakamura; Sleeping site selection of Francois's langur (*Trachypithecus francoisi*) in two habitats in Mayanghe National Nature Reserve, Guizhou, China, by S. Wang, Y. Luo, & G. Cui; Three-dimensional orientations of talar articular surfaces in humans and great apes, by S. Kanamoto, N. Ogihara, & M. Nakatsukasa; Non-lactating versus lactating females: A comparison of sex steroids, sexual coloration, and sexual behavior in Japanese macaques, by B. Wallner, D. Aspernig, E. Millesi, & I. H. Machatschke; and Coalescent analysis of mtDNA indicates Pleistocene divergence among three species of howler monkey (*Alouatta* spp.) and population subdivision within the Atlantic Coastal Forest species, *A. guariba*, by F. de Mello Martins, C. Gifalli-Iughetti, C. Priszkulnik Koiffman, & E. E. Harris.

• *Primates,* 2011, *52*[2], <www.springerlink.com/content/0032-8332/52/2>.

Contents: When play is a family business: Adult play, hierarchy, and possible stress reduction in common marmosets, by I. Norscia & E. Palagi; *Spizaetus* hawk-eagles as predators of arboreal colobines, by S. D. Fam & V. Nijman; Bonobo but not chimpanzee infants use socio-sexual contact with peers, by V. Woods & B. Hare; The anthropogenic environment lessens the intensity and prevalence of gastrointestinal parasites in Balinese long-tailed macaques (*Macaca fascicularis*), by K. E. Lane, C. Holley, H. Hollocher, & A. Fuentes; The effect of SNP discovery method and sample size on estimation of population genetic data for Chinese and Indian rhesus macaques (*Macaca mulatta*), by J. A. Satkoski Trask, R. S. Malhi, S. Kanthaswamy, J. Johnson, W. T. Garnica, V. S. Malladi, & D. G. Smith; Influence of the landscape matrix on the abundance of arboreal primates in fragmented landscapes, by G. Pozo-Montuy, J. C. Serio-Silva, & Y. M. Bonilla-Sánchez; Drastic population decline and conservation prospects of roadside dark-bellied bonnet macaques (*Macaca radiata radiata*) of southern India, by M. Singh, J. J. Erinjery, T. S. Kavana, K. Roy, & M. Singh; Use of sleeping sites by a titi group (*Callicebus coimbrai*) in the Brazilian Atlantic Forest, by J. P. Souza-Alves, I. P. Fontes, & S. F. Ferrari; Lead levels in long-tailed macaque (*Macaca fascicularis*) hair from Singapore, by M. A. Schillaci, B. P. Y.-H. Lee, J. M. Castellini, M. J. C. Reid, & T. M. O'Hara; The positional behavior of pygmy marmosets (*Cebuella pygmaea*) in northwestern Bolivia, by C. P. Jackson; Reproductive failure, possible maternal infanticide, and cannibalism in wild moustached tamarins, *Saguinus mystax*, by L. Culot, Y. Lledo-Ferrer, O. Hoelscher, F. J. J. Muñoz Lazo, M.-C. Huynen, & E. W. Heymann; and Dietary adaptations of temperate primates: Comparisons of Japanese and Barbary macaques, by G. Hanya, N. Ménard, M. Qarro, M. Ibn Tattou, M. Fuse, D. Vallet, A. Yamada, M. Go, H. Takafumi, R. Tsujino, N. Agetsuma, & K. Wada.

Proceedings

• Program of the 80th Annual Meeting of the American Association of Physical Anthropologists. *American Journal of Physical Anthropology*, 2011, *144*[S52], <onlinelibrary.wiley.com/doi/10.1002/ajpa.v144.52s/issuetoc>.

Anatomy and Physiology

• Pyramidal cells in prefrontal cortex: Comparative observations reveal unparalleled specializations in neuronal structure among primate species. Elston, G., Benavides-

Piccione, R., Elston, A., Manger. P., & Defelipe, J. (Centre for Cognitive Neurosci., 60 Duke Rd, Doonan, Sunshine Coast, QLD 4562, Australia [e-mail: *guyelston @yahoo.com*]). *Frontiers in Neuroanatomy*, 2011, <www.frontiersin.org/neuroanatomy/10.3389/fnana.2011.00002/full>.

"The most ubiquitous neuron in the cerebral cortex, the pyramidal cell, is characterized by markedly different dendritic structure among different cortical areas. The complex pyramidal cell phenotype in granular prefrontal cortex (gPFC) of higher primates endows specific biophysical properties and patterns of connectivity, which differ from those in other cortical regions. However, within the gPFC, data have been sampled from only a select few cortical areas. The gPFC of species such as human and macaque monkey includes more than 10 cortical areas. It remains unknown as to what degree pyramidal cell structure may vary among these cortical areas. Here we undertook a survey of pyramidal cells in the dorsolateral, medial, and orbital gPFC of cercopithecid primates. We found marked heterogeneity in pyramidal cell structure within and between these regions. Moreover, trends for gradients in neuronal complexity varied among species. As the structure of neurons determines their computational abilities, memory storage capacity and connectivity, we propose that these specializations in the pyramidal cell phenotype are an important determinant of species-specific executive cortical functions in primates."

• Neuron densities vary across and within cortical areas in primates. Collins, C. E., Airey, D. C., Young, N. A., Leitch, D. B., & Kaas, J. H. (Dept of Psych., Vanderbilt Univ., Nashville, TN 37240 [e-mail: *christine.collins @vanderbilt.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2010, *107*, 15927-15932, <www.pnas.org/content/107/36/15927.full>.

The numbers and proportion of neurons in areas and regions of cortex were determined for a single cortical hemisphere from two prosimian galagos, one New World owl monkey, one Old World macaque monkey, and one baboon. The results suggest that there is a common plan of cortical organization across the species examined here and also differences that suggest greater specializations in the Old World monkeys. In all primates examined, primary visual cortex (V1) was the most neuron-dense cortical area and the secondary visual areas had higher-than-average densities. Primary auditory and somatosensory areas tended to have high densities in the Old World macaque and baboon. Neuronal density varies less across cortical areas in prosimian galagos than in the Old World monkeys. Thus, cortical architecture varies greatly within and across primate species, but cell density is greater in cortex devoted to the early stages of sensory processing.

Animal Models

• Aging in the natural world: Comparative data reveal similar mortality patterns across primates. Bronikowski, A. M., Altmann, J., Brockman, D. K., Cords, M., Fedigan, L. M., Pusey, A., Stoinski, T., Morris, W. F., Strier, K. B., & Alberts, S. C. (S. C. A., Dept of Biology, Duke Univ., Durham, NC 27708 [e-mail: *alberts@duke.edu*]). *Science*, 2011, *331*[6022], 1325-1328, <www.sciencemag.org/content/331/6022/1325.full>.

"Human senescence patterns—late onset of mortality increase, slow mortality acceleration, and exceptional longevity—are often described as unique in the animal world. Using an individual-based data set from longitudinal studies of wild populations of seven primate species, we show that contrary to assumptions of human uniqueness, human senescence falls within the primate continuum of aging; the tendency for males to have shorter life spans and higher age-specific mortality than females throughout much of adulthood is a common feature in many, but not all, primates; and the aging profiles of primate species do not reflect phylogenetic position. These findings suggest that mortality patterns in primates are shaped by local selective forces rather than phylogenetic history."

• Strength of response suppression to distracter stimuli determines attentional-filtering performance in primate prefrontal neurons. Lennert, T., Martinez-Trujillo, J. (J. M.-T., Cog. Neurophysiology Lab., Dept of Physiol., McGill Univ., Montréal, QC H3G 1Y6, Canada [e-mail: *julio.martinez@mcgill.ca*]). *Neuron*, 2011, *70*, 141-152.

"Neurons in the primate dorsolateral prefrontal cortex (dlPFC) filter attend targets distinctly from distracters through their response rates. The extent to which this ability correlates with the organism's performance, and the neural processes underlying it, remain unclear. We trained monkeys to attend to a visual target that differed in rank along a color-ordinal scale from that of a distracter. The animals' performance at focusing attention on the target and filtering out the distracter improved as ordinal distance between the stimuli increased. Importantly, dlPFC neurons also improved their filtering performance with increasing ordinal target-distracter distance; they built up their response rate in anticipation of the target-distracter onset, and then units encoding target representations increased their firing rate by similar amounts, whereas units encoding distracter representations gradually suppressed their rates as the interstimulus ordinal distance increased. These results suggest that attentional-filtering performance in primates relies upon dlPFC neurons' ability to suppress distracter representations."

• Immunization with HIV-1 gp41 subunit virosomes induces mucosal antibodies protecting nonhuman primates against vaginal SHIV challenges. Bomsel, M., Tudor, D., Drillet, A.-S., Alfsen, A., Ganor, Y., Roger, M.-G., Mouz, N., Amacker, M., Chalifour, A., Diomede, L., Devillier, G., Cong, Z., Wei, Q., Gao, H., Qin, C., Yang, G.-B., Zurbriggen, R., Lopalco, L., & Fleury, S. (INSERM U1016, 75014 Paris, France [e-mail: *morgane.bomsel@inserm.fr*]).

Immunity, 2011, *34*, 269-280, <www.sciencedirect.com/science/journal/10747613>.

"Human immunodeficiency virus (HIV)-1 is mainly transmitted mucosally during sexual intercourse. We therefore evaluated the protective efficacy of a vaccine active at mucosal sites. *Macaca mulatta* monkeys were immunized via both the intramuscular and intranasal routes with an HIV-1 vaccine made of gp41-subunit antigens grafted on virosomes, a safe delivery carrier approved in humans with selfadjuvant properties. Six months after 13 vaginal challenges with simian-HIV (SHIV)-SF162P3, four out of five vaccinated animals remained virus-negative, and the fifth was only transiently infected. None of the five animals seroconverted to p27*gag*-SIV. In contrast, all 6 placebo-vaccinated animals became infected and seroconverted. All protected animals showed gp41-specific vaginal IgAs with HIV-1 transcytosis-blocking properties and vaginal IgGs with neutralizing and/or antibody-dependent cellular-cytotoxicity activities. In contrast, plasma IgGs totally lacked virus-neutralizing activity. The protection observed challenges the paradigm whereby circulating antiviral antibodies are required for protection against HIV-1 infection and may serve in designing a human vaccine against HIV-1-AIDS."

• A non-human primate model for urinary bladder regeneration utilizing autologous sources of bone marrow derived mesenchymal stem cells. Sharma, A. K., Bury, M. I., Marks, A. J., Fuller, N. J., Meisner, J. W., Tapaskar, N., Halliday, L. C., Matoka, D. J., & Cheng, E. Y. (Children's Memorial Hospital of Chicago, Div. of Pediatric Urology, Chicago, IL 60614). *Stem Cells*, 2010, *20*, 241-250, <onlinelibrary.wiley.com/doi/10.1002/stem.568/pdf>.

"Animal models that have been utilized to examine the regenerative capacity of cell seeded scaffolds in a urinary bladder augmentation model have ultimately translated poorly in the clinical setting. This may be due to a number of factors including cell types utilized for regeneration and anatomical/physiological differences between lower primate species and their human counterparts. We postulated that mesenchymal stem cells (MSCs) could provide a cell source for partial bladder regeneration in a newly described non-human primate bladder (baboon) augmentation model. Cell sorted $CD105^+/CD73^+/CD34^-/CD45^-$ baboon MSCs transduced with GFP were seeded onto small intestinal submucosa (SIS) scaffolds. Baboons underwent an approximate 40–50% cystectomy followed by augmentation cystoplasty with the aforementioned scaffolds or controls and finally enveloped with omentum. Bladders from sham, unseeded SIS, and MSC/SIS scaffolds were subjected to Trichrome, Hematoxylin and Eosin (H&E), and immunofluorescent staining 10 weeks post augmentation. Immunofluorescence staining for muscle markers combined with an anti-GFP antibody revealed >90% of the cells were GFP+/muscle marker+ and >70% were $GFP^+/Ki\text{-}67^+$ demonstrating grafted cells were present and actively proliferating within the grafted region. Trichrome staining of MSC/SIS augmented bladders exhibited typical bladder architecture and quantitative morphometry analyses revealed an approximate 32% and 52% muscle to collagen ratio in unseeded versus seeded animals, respectively. H&E staining revealed a lack of infiltration of inflammatory cells in grafted animals, and in corresponding kidneys, and ureters. Simple cystometry indicated recovery between 28–40% of native bladder capacity. Data demonstrate MSC/SIS composites support regeneration of bladder tissue and validate this new bladder augmentation model."

• Successful respiratory immunization with dry powder live-attenuated measles virus vaccine in rhesus macaques. Lin, W.-H., Griffin, D. E., Rota, P. A., Papania, M., Cape, S. P., Bennett, D., Quinn, B., Sievers, R. E., Shermer, C., Powell, K., Adams, R. J., Godin, S., & Winston, S. (D. E. G., Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205 [e-mail: *dgriffin@jhsph.edu*]). *Proceedings of the National Academy of Sciences*, *U.S.A.*, 2011, *108*, 2987-2992, <www.pnas.org/content/108/7/2987.full>.

"Measles remains an important cause of childhood mortality worldwide. Sustained high vaccination coverage is the key to preventing measles deaths. Because measles vaccine is delivered by injection, hurdles to high coverage include the need for trained medical personnel and a cold chain, waste of vaccine in multidose vials and risks associated with needle use and disposal. Respiratory vaccine delivery could lower these barriers and facilitate sustained high coverage. We developed a novel single unit dose, dry powder live-attenuated measles vaccine (MVDP) for respiratory delivery without reconstitution. We tested the immunogenicity and protective efficacy in rhesus macaques of one dose of MVDP delivered either with a mask or directly intranasal with two dry powder inhalers, PuffHaler and BD Solovent. MVDP induced robust measles virus (MeV)-specific humoral and T-cell responses, without adverse effects, which completely protected the macaques from infection with wild-type MeV more than one year later. Respiratory delivery of MVDP was safe and effective and could aid in measles control."

• A high-light sensitivity optical neural silencer: Development, and application to optogenetic control of nonhuman primate cortex. Han, X., Chow, B. Y., Zhou, H., Klapoetke, N. C., Chuong, A., Rajimehr, R., Yang, A., Baratta, M. V., Winkle, J., Desimone, R., & Boyden, E. S. (E. S. B., MIT, Media Lab, BCS, and BE, Cambridge, MA [e-mail: *esb@media.mit.edu*]). *Frontiers in Systems Neuroscience*, 2011, *5*[18], <94.236.98.240/systems_neuroscience/10.3389/fnsys.2011.00018/full>.

"Technologies for silencing the electrical activity of genetically-targeted neurons in the brain are important for

assessing the contribution of specific cell types and pathways towards behaviors and pathologies. Recently we found that archaerhodopsin-3 from *Halorubrum sodomense* (Arch), a light-driven outward proton pump, when genetically expressed in neurons, enables them to be powerfully, transiently, and repeatedly silenced in response to pulses of light. Because of the impressive characteristics of Arch, we explored the optogenetic utility of opsins with high sequence homology to Arch, from archaea of the *Halorubrum* genus. We found that the archaerhodopsin from *Halorubrum* strain TP009, which we named ArchT, could mediate photocurrents of similar maximum amplitude to those of Arch (~900 pA), but with a >3-fold improvement in light sensitivity over Arch, equating to >2x increase in brain tissue volume addressed by a typical single optical fiber (notably, in the typical optogenetic range of 1-10 mW/mm^2). Upon expression in mouse or rhesus macaque cortical neurons, ArchT expressed well on neuronal membranes, including excellent trafficking for long distances down neuronal axons. The high light sensitivity prompted us to explore ArchT function in the cortex of the rhesus macaque. Optical perturbation of ArchT-expressing neurons in the brain of an awake rhesus macaque resulted in a rapid and complete (~100%) silencing of most recorded cells, with suppressed cells achieving a median firing rate of o spikes/sec upon illumination. A small population of neurons showed increased firing rates at long latencies following light stimulation, suggesting the existence of a mechanism of network-level neural activity balancing. The powerful net suppression of activity suggests that ArchT silencing technology might be of great use not only in the causal analysis of neural circuits, but may have therapeutic applications."

• Immunization with HIV Gag targeted to dendritic cells followed by recombinant New York vaccinia virus induces robust T-cell immunity in nonhuman primates. Flynn, B. J., Kastenmüller, K., Wille-Reece, U., Tomaras, G. D., Alam, M., Lindsay, R. W., Salazar, A. M., Perdiguero, B., Gomez, C. E., Wagner, R., Esteban, M., Park, C. G., Trumpfheller, C., Keler, T., Pantaleo, G., Steinman, R. M., & Seder, R. (R. M. S., Lab. of Cellular Physiology & Immunology, Rockefeller Univ., New York, NY 10065 [e-mail: *steinma@mail.rockefeller.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.,* 2011, *108*, 7131-7136, <www.pnas.org/content/108/17/7131.full>.

"Protein vaccines, if rendered immunogenic, would facilitate vaccine development against HIV and other pathogens. We compared in nonhuman primates (NHPs) immune responses to HIV Gag p24 within 3G9 antibody to DEC205 ('DEC-HIV Gag p24'), an uptake receptor on dendritic cells, to nontargeted protein, with or without poly ICLC, a synthetic double stranded RNA, as adjuvant. Priming s.c. with 60 μg of both HIV Gag p24 vaccines elicited potent CD4$^+$ T cells secreting IL-2, IFN-γ, and TNF-α, which also proliferated. The responses increased with each of three immunizations and recognized multiple Gag peptides. DEC-HIV Gag p24 showed better cross-priming for CD8$^+$ T cells, whereas the avidity of anti-Gag antibodies was ~10-fold higher with nontargeted Gag 24 protein. For both protein vaccines, poly ICLC was essential for T- and B-cell immunity. To determine whether adaptive responses could be further enhanced, animals were boosted with New York vaccinia virus (NYVAC)-HIV Gag/Pol/Nef. Gag-specific CD4$^+$ and CD8$^+$ T-cell responses increased markedly after priming with both protein vaccines and poly ICLC. These data reveal qualitative differences in antibody and T-cell responses to DEC-HIV Gag p24 and Gag p24 protein and show that prime boost with protein and adjuvant followed by NYVAC elicits potent cellular immunity."

Behavior

• Vicarious reinforcement in rhesus macaques (*Macaca mulatta*). Chang, S., Winecoff, A., & Platt, M. (Ctr for Cog. Neurosci., B203 Levine Sci. Res. Ctr, Duke Univ., Box 90999, Durham, NC 27708 [e-mail: *steve.chang@duke.edu*]). *Frontiers in Decision Neuroscience*, 2011, *5*[27], <www.frontiersin.org/decision_neuroscience/10.3389/fnins.2011.00027/full>.

"What happens to others profoundly influences our own behavior. Such other-regarding outcomes can drive observational learning, as well as motivate cooperation, charity, empathy, and even spite. Vicarious reinforcement may serve as one of the critical mechanisms mediating the influence of other-regarding outcomes on behavior and decision-making in groups. Here we show that rhesus macaques spontaneously derive vicarious reinforcement from observing rewards given to another monkey, and that this reinforcement can motivate them to subsequently deliver or withhold rewards from the other animal. We exploited Pavlovian and instrumental conditioning to associate rewards to self (M1) and/or rewards to another monkey (M2) with visual cues. M1s made more errors in the instrumental trials when cues predicted reward to M2 compared to when cues predicted reward to M1, but made even more errors when cues predicted reward to no one. In subsequent preference tests between pairs of conditioned cues, M1s preferred cues paired with reward to M2 over cues paired with reward to no one. By contrast, M1s preferred cues paired with reward to self over cues paired with reward to both monkeys simultaneously. Rates of attention to M2 strongly predicted the strength and valence of vicarious reinforcement. These patterns of behavior, which were absent in non-social control trials, are consistent with vicarious reinforcement based upon sensitivity to observed, or counterfactual, outcomes with respect to another individual. Vicarious reward may play a critical role in shaping cooperation and competition, as well as motivating observational learning and group coordination in rhesus macaques, much as it does in humans. We propose that vicarious reinforcement signals mediate these behaviors

via homologous neural circuits involved in reinforcement learning and decision-making."

• The evolution of intergroup bias: Perceptions and attitudes in rhesus macaques. Mahajan, N., Martinez, M. A., Gutierrez, N. L., Diesendruck, G., Banaji, M. R., & Santos, L. R. (L. R. S., 2 Hillhouse Ave, Dept of Psychology, Yale Univ., New Haven, CT 06520 [e-mail: *laurie.santos@yale.edu*]). *Journal of Personality and Social Psychology*, 2011, *100*, 387-405, <psycnet.apa.org/journals/psp/100/3/387>.

"Social psychologists have learned a great deal about the nature of intergroup conflict and the attitudinal and cognitive processes that enable it. Less is known about where these processes come from in the first place. In particular, do our strategies for dealing with other groups emerge in the absence of human-specific experiences? One profitable way to answer this question has involved administering tests that are conceptual equivalents of those used with adult humans in other species, thereby exploring the continuity or discontinuity of psychological processes. We examined intergroup preferences in a nonhuman species, the rhesus macaque (*Macaca mulatta*). We found the first evidence that a nonhuman species automatically distinguishes the faces of members of its own social group from those in other groups and displays greater vigilance toward outgroup members. In addition, we observed that macaques spontaneously associate novel objects with specific social groups and display greater vigilance to objects associated with outgroup members. Finally, we developed a looking time procedure—the Looking Time Implicit Association Test, which resembles the Implicit Association Test—and we discovered that macaques, like humans, automatically evaluate ingroup members positively and outgroup members negatively. These field studies represent the first controlled experiments to examine the presence of intergroup attitudes in a nonhuman species. As such, these studies suggest that the architecture of the mind that enables the formation of these biases may be rooted in phylogenetically ancient mechanisms."

• Ingroup–outgroup bias in contagious yawning by chimpanzees supports link to empathy. Campbell, M. W., & de Waal, F. B. M. (Living Links Ctr, Yerkes NPRC, Emory Univ., Atlanta, GA 30322 [e-mail: *matthew.campbell@emory.edu*]). *PLoS ONE*, 2011, *6*(4): e18283, <www.plosone.org/article/info:doi/10.1371/journal.pone.0018283>.

"Humans favor others seen as similar to themselves (ingroup) over people seen as different (outgroup), even without explicitly stated bias. Ingroup–outgroup bias extends to involuntary responses, such as empathy for pain. However, empathy biases have not been tested in our close primate relatives. Contagious yawning has been theoretically and empirically linked to empathy. If empathy underlies contagious yawning, we predict that subjects should show an ingroup–outgroup bias by yawning more in response to watching ingroup members yawn than outgroup. Twenty-three chimpanzees (*Pan troglodytes*) from two separate groups watched videos of familiar and unfamiliar individuals yawning or at rest (control). The chimpanzees yawned more when watching the familiar yawns than the familiar control or the unfamiliar yawns, demonstrating an ingroup–outgroup bias in contagious yawning. These results provide further empirical support that contagious yawning is a measure of empathy, which may be useful for evolutionary biology and mental health."

• Monkeys recall and reproduce simple shapes from memory. Basile, B. M., & Hampton, R. R. (Dept of Psych. & Yerkes NPRC, Emory Univ., Atlanta, GA 30322 [dmail: b*basile@emory.edu*]). *Current Biology*, 2011, *21*, 774–778, <www.cell.com/current-biology/fulltext/S0960-9822(11)00348-4>.

"If you draw from memory a picture of the front of your childhood home, you will have demonstrated recall. You could also recognize this house upon seeing it. Unlike recognition, recall demonstrates memory for things that are not present. Recall is necessary for planning and imagining, and it can increase the flexibility of navigation, social behavior, and other cognitive skills. Without recall, memory is more limited to recognition of the immediate environment. Amnesic patients are impaired on recall tests, and recall performance often declines with aging. Despite its importance, we know relatively little about nonhuman animals' ability to recall information; we lack suitable recall tests for them and depend instead on recognition tests to measure nonhuman memory. Here we report that rhesus monkeys can recall simple shapes from memory and reproduce them on a touchscreen. As in humans, monkeys remembered less in recall than recognition tests, and their recall performance deteriorated more slowly. Transfer tests showed that monkeys used a flexible memory mechanism rather than memorizing specific actions for each shape. Observation of recall in Old World monkeys suggests that it has been adaptive for over 30 million years and does not depend on language."

Conservation

• Effect of human feeding on the road mortality of rhesus macaques on National Highway-7 routed along Pench Tiger Reserve, Madhya Pradesh, India. Pragatheesh, A. (Wildlife Inst. of India, Chandrabani, Dehradun, Uttarakhand 248001, India [e-mail: *pragatheesh@gmail.com*]). *Journal of Threatened Taxa,* 2011, *3*, 1656-1662, <www.threatenedtaxa.org>.

"In Hindu mythology, Hanuman is worshipped as the monkey god and therefore there is a great reverence for macaques all across the country. Hindu devotees consider it their sacred duty to feed macaques along roads, temples, parks and other public areas. Unfortunately, such food provisioning alters the habitat, food choice and behavior of

macaques. We studied the impact of feeding by humans on rhesus macaque (*Macaca mulatta*) feeding behavior and distribution, and also assessed the increased risk of accidents in the 11km road stretch of National Highway passing through Kanha-Pench corridor, from August 2009 to July 2010. Seasonal changes in macaque distribution and group sizes were assessed based on foot and vehicle transects. The numbers of road kills were monitored in early morning and late evening hours for different seasons. Five groups of macaques were each occupying a minimum of 1.1 to a maximum of 1.7km stretch, together covering about 7.3km of road. Group size varied significantly in relation to the availability of food on the road. During the study, 54 macaques succumbed to road accidents. Maximum roadkill occurred during summer because of the greater inflow of tourists. Unless concerted efforts are made to increase awareness among people of the hazards of road-side feeding, incidences of macaque mortality are likely to increase."

Disease

• Probable non-vector-borne transmission of Zika virus, Colorado, USA. Foy, B. D., Kobylinski, K. C., Foy, J. L. C., Blitvich, B. J., Travassos da Rosa, A., Haddow, A. D., Lanciotti, R. S., & Tesh, R. B. (Brian D. Foy, Dept of Microbiol., Immunol. & Pathol., Colorado State Univ., Fort Collins, CO, 80523-1692 [e-mail: *brian.foy@colostate.edu*]). *Emerging Infectious Disease*, 2011, *17*[1], <www.cdc.gov/eid/content/17/5/880.htm>.

Clinical and serologic evidence indicates that two American scientists contracted Zika virus infections while working in Senegal in 2008. One of the scientists transmitted this arbovirus to his wife after his return home. Direct contact is implicated as the transmission route, most likely as a sexually transmitted infection. Zika virus (ZIKV), a mosquito-transmitted flavivirus, has been isolated from sentinel monkeys, mosquitoes, and sick persons in Africa and Southeast Asia. Serologic surveys indicate that ZIKV infections can be relatively common among persons in southeastern Senegal and other areas of Africa, but that ZIKV-associated disease may be underreported or misdiagnosed. In 2007, a large outbreak of ZIKV infection occurred on Yap Island in the southwestern Pacific that infected ~70% of the island's inhabitants, which highlighted this virus as an emerging pathogen.

• Gastric hypomotility in chronic upper gastrointestinal disease of Japanese macaques (*Macaca fuscata*). Yamaoka, A., Koie, H., Iwaki, S., Sato, T., Kanayama, K., Taira, M., & Sakai, T. (H. K., Dept of Vet. Med., College of Bioresource Sci., Nihon Univ., 1866 Kameino, Fujisawa, Kanegawa 252-0880, Japan). *Experimental Animals*, 2011, *60*, 177-180, <www.jstage.jst.go.jp/article/expanim/60/2/177/_pdf>.

"Japanese macaques bred indoors for laboratory use often show chronic anorexia and intermittent vomiting. In some of our macaques gastric air was observed on physical examination, and we suspected abnormality of gastric motility. We therefore performed contrast radiographic examinations of the gastrointestinal tract without anesthesia of 8 macaques with gastrointestinal symptoms and 9 asymptomatic controls from the same laboratory. Changes of abdominal radiography over time were observed following oral administration of contrast medium. In all control animals, contrast medium had completely passed from the stomach within 150 min after administration. However, all animals with gastrointestinal symptoms retained some contrast medium in the stomach. Gastric emptying time of contrast medium was associated with excessive gastric air in Japanese macaques; therefore, gastric emptying time seems to be associated with decreased gastric motility."

Evolution, Genetics, and Taxonomy

• Co-residence patterns in hunter-gatherer societies show unique human social structure. Hill, K. R., Walker, R. S., Božičevì, M., Eder, J., Headland, T., Hewlett, B., Hurtado, A. M., Marlowe, F., Wiessner, P., & Wood, B. (Sch. of Human Evolution & Social Change, Arizona State Univ., Tempe, AZ 85287, [e-mail: *kim.hill@asu.edu*]). *Science*, 2011, *331*[6022], 1286-1289, <www.sciencemag.org/content/331/6022/1286.full>.

"Contemporary humans exhibit spectacular biological success derived from cumulative culture and cooperation. The origins of these traits may be related to our ancestral group structure. Because humans lived as foragers for 95% of our species' history, we analyzed co-residence patterns among 32 present-day foraging societies (total n = 5067 individuals, mean experienced band size = 28.2 adults). We found that hunter-gatherers display a unique social structure where (i) either sex may disperse or remain in their natal group, (ii) adult brothers and sisters often coreside, and (iii) most individuals in residential groups are genetically unrelated. These patterns produce large interaction networks of unrelated adults and suggest that inclusive fitness cannot explain extensive cooperation in hunter-gatherer bands. However, large social networks may help to explain why humans evolved capacities for social learning that resulted in cumulative culture."

• Hunter-gatherer genomic diversity suggests a southern African origin for modern humans. Henn, B. M., Gignoux, C. R., Jobin, M., Granka, J. M., Macpherson, J. M., Kidd, J. M., Laura Rodríguez-Botigué, L., Ramachandran, S., Hon, L., Brisbin, A., Lin, A. A., Underhill, P. A., Comas, D., Kidd, K. K., Norman, P. J., Parham, P., Bustamante, C. D., Mountain, J. L., & Feldman, M. W. (Dept of Genetics, Stanford Univ., Stanford, CA 94305 [e-mail: *bmhenn@stanford.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.,* 2011, *108*, 2987-2992, <www.pnas.org/content/108/13/5154.full>.

"Africa is inferred to be the continent of origin for all modern human populations, but the details of human pre-

history and evolution in Africa remain largely obscure owing to the complex histories of hundreds of distinct populations. We present data for more than 580,000 SNPs for several hunter-gatherer populations: the Hadza and Sandawe of Tanzania, and the ≠Khomani Bushmen of South Africa, including speakers of the nearly extinct N|u language. We find that African hunter-gatherer populations today remain highly differentiated, encompassing major components of variation that are not found in other African populations. Hunter-gatherer populations also tend to have the lowest levels of genome-wide linkage disequilibrium among 27 African populations. We analyzed geographic patterns of linkage disequilibrium and population differentiation, as measured by *F*–statistics, in Africa. The observed patterns are consistent with an origin of modern humans in southern Africa rather than eastern Africa, as is generally assumed. Additionally, genetic variation in African hunter-gatherer populations has been significantly affected by interaction with farmers and herders over the past 5,000 y, through both severe population bottlenecks and sex-biased migration. However, African hunter-gatherer populations continue to maintain the highest levels of genetic diversity in the world."

• Evidence from Cameroon reveals differences in the genetic structure and histories of chimpanzee populations. Gonder, M. K., Locatelli, S., Ghobrial, L., Mitchell, M. W., Kujawski, J. T., Lankester, F. J., Stewart, C.-B., & Tishkoff, S. A. (Dept of Bio. Sciences, Univ. at Albany—S.U.N.Y., Albany, NY 12222 [e-mail: *gonder@albany.edu*]). *Proceedings of the National Academy of Sciences, U.S.A.,* 2011, *108*, 4766-4771, <www.pnas.org/content/108/12/4766.full>.

"The history of the genus *Pan* is a topic of enduring interest. Chimpanzees (*Pan troglodytes*) are often divided into subspecies, but the population structure and genetic history of chimpanzees across Africa remain unclear. Some population genetics studies have led to speculation that, until recently, this species constituted a single population with ongoing gene flow across its range, which resulted in a continuous gradient of allele frequencies. Chimpanzees, designated here as *P. t. ellioti*, occupy the Gulf of Guinea region that spans southern Nigeria and western Cameroon at the center of the distribution of this species. Remarkably, few studies have included individuals from this region, hindering the examination of chimpanzee population structure across Africa. Here, we analyzed microsatellite genotypes of 94 chimpanzees, including 32 designated as *P. t. ellioti*. We find that chimpanzees fall into three major populations: (i) Upper Guinea in western Africa (*P. t. verus*); (ii) the Gulf of Guinea region (*P. t. ellioti*); and (iii) equatorial Africa (*P. t. troglodytes* and *P. t. schweinfurthii*). Importantly, the Gulf of Guinea population is significantly different genetically from the others, sharing a last common ancestor with the populations in Upper Guinea ~0.46 million years ago (mya) and equatorial Africa ~0.32 mya. Equatorial chimpanzees are subdivided into up to three populations occupying southern Cameroon, central Africa, and eastern Africa, which may have constituted a single population until ~0.10–0.11 mya. Finally, occasional hybridization may be occurring between the Gulf of Guinea and southern Cameroon populations."

• Updated chronology for the Miocene hominoid radiation in Western Eurasia. Casanovas-Vilar, I., Alba, D. M., Garcés, M., Robles, J. M., & Moyà-Solà, S. (Inst. Català de Paleontologia, Univ. Autònoma de Barcelona, 08193 Cerdanyola del Vallès, Barcelona, Spain [e-mail: *isaac.casanovas@icp.cat*]). *Proceedings of the National Academy of Sciences, U.S.A.,* 2011, *108*, 5554-5559, <www.pnas.org/content/108/14/5554.full>.

"Extant apes (Primates: Hominoidea) are the relics of a group that was much more diverse in the past. They originated in Africa around the Oligocene/Miocene boundary, but by the beginning of the Middle Miocene they expanded their range into Eurasia, where they experienced a far-reaching evolutionary radiation. A Eurasian origin of the great ape and human clade (Hominidae) has been favored by several authors, but the assessment of this hypothesis has been hampered by the lack of accurate datings for many Western Eurasian hominoids. Here we provide an updated chronology that incorporates recently discovered Iberian taxa and further reevaluates the age of many previously known sites on the basis of local biostratigraphic scales and magnetostratigraphic data. Our results show that identifiable Eurasian kenyapithecins (*Griphopithecus* and *Kenyapithecus*) are much younger than previously thought (ca. 14 Ma instead of 16 Ma), which casts serious doubts on the attribution of the hominoid tooth from Engelswies (16.3–16.5 Ma) to cf. *Griphopithecus*. This evidence is further consistent with an alternative scenario, according to which the Eurasian pongines and African hominines might have independently evolved in their respective continents from similar kenyapithecin ancestors, resulting from an early Middle Miocene intercontinental range extension followed by vicariance. This hypothesis, which would imply an independent origin of orthogrady in pongines and hominines, deserves further testing by accurately inferring the phylogenetic position of European dryopithecins, which might be stem pongines rather than stem hominines."

• Rapid metabolic evolution in human prefrontal cortex. Fu, X., Giavalisco, P., Liu, X., Catchpole, G., Fu, N., Ning, Z.-B., Guo, S., Yan, Z., Somel, M., Pääbo, S., Zeng, R., Willmitzer, L., & Khaitovich, P. (R. Z., Key Lab. for Systems Biology, Chinese Acad. of Sciences, 200031 Shanghai, China [e-mail: *zr@sibs.ac.cn*]). *Proceedings of the National Academy of Sciences, U.S.A.,* 2011, *108*, 6181-6186, <www.pnas.org/content/108/15/6181.full>.

"Human evolution is characterized by the rapid expansion of brain size and drastic increase in cognitive capabili-

ties. It has long been suggested that these changes were accompanied by modifications of brain metabolism. Indeed, human-specific changes on gene expression or amino acid sequence were reported for a number of metabolic genes, but actual metabolite measurements in humans and apes have remained scarce. Here, we investigate concentrations of more than 100 metabolites in the prefrontal and cerebellar cortex in 49 humans, 11 chimpanzees, and 45 rhesus macaques of different ages using gas chromatography–mass spectrometry (GC–MS). We show that the brain metabolome undergoes substantial changes, both ontogenetically and evolutionarily: 88% of detected metabolites show significant concentration changes with age, whereas 77% of these metabolic changes differ significantly among species. Although overall metabolic divergence reflects phylogenetic relationships among species, we found a fourfold acceleration of metabolic changes in prefrontal cortex compared with cerebellum in the human lineage. These human-specific metabolic changes are paralleled by changes in expression patterns of the corresponding enzymes, and affect pathways involved in synaptic transmission, memory, and learning."

•. An evolutionary genomic approach to identify genes involved in human birth timing. Plunkett, J., Doniger, S., Orabona, G., Morgan, T., Haataja, R., Hallman, M., Puttonen, H., Menon, R., Kuczynski, E., Norwitz, E., Snegovskikh, V., Palotie, A., Peltonen, L., Fellman, V., DeFranco, E. A., Chaudhari, B. P., McGregor, T. L., McElroy, J. J., Oetjens, M. T., Teramo, K., Borecki, I., Fay, J., & Muglia, L. (L. M., Vanderbilt Univ. School of Med., Nashville, TN, 37232 [e-mail: *louis.muglia @vanderbilt.edu*]). *PloS Genetics*, 2011, *7*(4): <dx.doi.org/10.1371/journal.pgen.101365>.

"Coordination of fetal maturation with birth timing is essential for mammalian reproduction. In humans, preterm birth is a disorder of profound global health significance. The signals initiating parturition in humans have remained elusive, due to divergence in physiological mechanisms between humans and model organisms typically studied. Because of relatively large human head size and narrow birth canal cross-sectional area compared to other primates, we hypothesized that genes involved in parturition would display accelerated evolution along the human and/or higher primate phylogenetic lineages to decrease the length of gestation and promote delivery of a smaller fetus that transits the birth canal more readily. Further, we tested whether current variation in such accelerated genes contributes to preterm birth risk. Evidence from allometric scaling of gestational age suggests human gestation has been shortened relative to other primates. Consistent with our hypothesis, many genes involved in reproduction show human acceleration in their coding or adjacent noncoding regions. We screened >8,400 SNPs in 150 human accelerated genes in 165 Finnish preterm and 163 control mothers for association with preterm birth. In this cohort, the most significant association was in *FSHR*, and 8 of the 10 most significant SNPs were in this gene. Further evidence for association of a linkage disequilibrium block of SNPs in *FSHR*, rs11686474, rs11680730, rs12473870, and rs1247381 was found in African Americans. By considering human acceleration, we identified a novel gene that may be associated with preterm birth, *FSHR*. We anticipate other human accelerated genes will similarly be associated with preterm birth risk and elucidate essential pathways for human parturition."

• Mechanism of birth in chimpanzees: Humans are not unique among primates. Hirata, S., Fuwa, K., Sugama, K., Kusunoki, K., & Takeshita, H. (Great Ape Res. Inst. of Hayashibara Biochem. Labs, Inc., 952-2 Nu, Tamano, 706-0316 Okayama, Japan [e-mail: *hirata@gari.be.to*]). *Biology Letters*, 2011, <dx.doi.org/10.1098/rsbl.2011.0214>.

"Researchers have argued that the process of human birth is unique among primates and mammals in that the infant emerges with its face oriented in the opposite direction from its mother (occiput anterior) and head rotation occurs in the birth canal. However, this notion of human uniqueness has not been substantiated, because there are few comparative studies of birth in nonhuman primates. This paper reports the mechanism of birth in chimpanzees (*Pan troglodytes*) based on the first clear, close-up video recordings of three chimpanzee births in captivity. In all three cases, the fetus emerged with an occiput anterior orientation, and the head and body rotated after the head had emerged. Therefore, these characteristics are not uniquely human. Furthermore, in two of the three cases, the chimpanzee newborns landed on the ground without being guided from the birth canal by the mother. The fact that the human newborn emerges with an occiput anterior orientation has thus far been taken as evidence for the necessity of midwifery in modern humans, but this view also needs revision. Our observations raise the need to reconsider the evolutionary scenario of human birth."

• Primate prefrontal cortex evolution: Human brains are the extreme of a lateralized ape trend. Smaers, J. B., Steele, J., Case, C. R., Cowper, A., Amunts, K., & Zilles, K. (AHRC Centre for the Evolution of Cultural Diversity, 31–34 Gordon Square, London WC1H 0PY, U.K. [e-mail *j.smaers@ucl.ac.uk*]). *Brain, Behavior, and Evolution*, 2011, *77*, 67-78, <www.ncbi.nlm.nih.gov/pubmed/21335939>.

"The prefrontal cortex is commonly associated with cognitive capacities related to human uniqueness: purposeful actions towards higher-level goals, complex social information processing, introspection, and language. Comparative investigations of the prefrontal cortex may thus shed more light on the neural underpinnings of what makes us human. Using histological data from 19 anthropoid primate species (6 apes including humans and 13 mon-

keys), we investigate cross-species relative size changes along the anterior (prefrontal) and posterior (motor) axes of the cytoarchitectonically defined frontal lobe in both hemispheres. Results reveal different scaling coefficients in the left versus right prefrontal hemisphere, suggest that the primary factor underlying the evolution of primate brain architecture is left hemispheric prefrontal hyperscaling, and indicate that humans are the extreme of a left prefrontal ape specialization in relative white to grey matter volume. These results demonstrate a neural adaptive shift distinguishing the ape from the monkey radiation possibly related to a cognitive grade shift between (great) apes and other primates."

- Retinogeniculostriate pathway components scale with orbit convergence only in primates and not in other mammals. Heesy, C. P., Kamilar, J. M., & Willms, J. (Dept of Anatomy, Arizona Coll. of Osteopath. Med., Midwestern Univ., 19555 N. 59 Ave., Glendale, AZ 85308 [e-mail: *cheesy@midwestern.edu*]). *Brain, Behavior, and Evolution*, 2011, *77*, 105-115, <www.ncbi.nlm.nih.gov/pubmed/21525747>.

"Studies of the relative sizes of brain components in mammals suggest that areas responsible for sensory processing, including visual processing, are correlated with aspects of ecology, especially activity pattern. Some studies suggest that primate orbit convergence and binocular vision are correlated with the overall size of the brain as well as components of the visual pathway, such as the lateral geniculate nucleus. However, the question remains whether components of the visual pathway are correlated with orbit convergence and binocular visual field overlap in nonprimate mammals. Here, we examine the relationship between orbit convergence and the volumes of components of the visual pathway (optic tract, dorsal lateral geniculate nucleus and primary visual cortex). Data on orbit orientation are combined with those on overall brain volume as well as brain component volumes in a taxonomically diverse sample of mammals. Our results demonstrate that nonprimate mammals scale isometrically for component volumes along the visual pathway, whereas primates display negatively allometric relationships. However, only among primates is higher orbit convergence correlated with volumetrically larger lateral geniculate nuclei and visual cortices. Diurnal primates exhibit statistically larger visual pathway components when compared to nocturnal primates. Nonprimate mammals do not display activity pattern differences with the single exception of optic tract sizes. We conclude that binocular vision was a much stronger factor in the evolution of the visual system in primates than in other mammals."

- Revised age of late Neanderthal occupation and the end of the Middle Paleolithic in the northern Caucasus. Pinhasi, R., Higham, T. F. G., Golovanova, L. V., & Doronichev, V. B. (Dept of Archaeology, Univ. College Cork, Cork, Ireland [e-mail: *r.pinhasi@ucc.ie*]). *Proceedings of the National Academy of Sciences, U.S.A.*, 2011, *108*, 8611-8616, <www.pnas.org/content/108/21/8611.full>.

"Advances in direct radiocarbon dating of Neanderthal and anatomically modern human (AMH) fossils and the development of archaeostratigraphic chronologies now allow refined regional models for Neanderthal–AMH coexistence. In addition, they allow us to explore the issue of late Neanderthal survival in regions of Western Eurasia located within early routes of AMH expansion such as the Caucasus. Here we report the direct radiocarbon (^{14}C) dating of a late Neanderthal specimen from a Late Middle Paleolithic (LMP) layer in Mezmaiskaya Cave, northern Caucasus. Additionally, we provide a more accurate chronology for the timing of Neanderthal extinction in the region through a robust series of 16 ultrafiltered bone collagen radiocarbon dates from LMP layers and using Bayesian modeling to produce a boundary probability distribution function corresponding to the end of the LMP at Mezmaiskaya. The direct date of the fossil (39,700 ± 1,100 ^{14}C BP) is in good agreement with the probability distribution function, indicating at a high level of probability that Neanderthals did not survive at Mezmaiskaya Cave after 39 ka cal BP ("calendrical" age in kiloannum before present, based on IntCal09 calibration curve). This challenges previous claims for late Neanderthal survival in the northern Caucasus. We see striking and largely synchronous chronometric similarities between the Bayesian age modeling for the end of the LMP at Mezmaiskaya and chronometric data from Ortvale Klde for the end of the LMP in the southern Caucasus. Our results confirm the lack of reliably dated Neanderthal fossils younger than ~40 ka cal BP in any other region of Western Eurasia, including the Caucasus."

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