

collected in the homes of participants during 2005-2006. Both males and females reported a similar number of hours of sleep and similar rates of restless sleep. Sleep quality and hours of sleep were not associated with age in women, but older men reported longer sleep duration than younger men. Neither C-reactive protein levels nor blood pressure were associated with number of hours of sleep. Sleep quality was significantly associated ( $p < 0.05$ ) with C-reactive protein levels in males but not females. Sleep quality was not significantly associated with systolic or diastolic blood pressure for either males or females, when controlled for age. The results of this research suggest that there is no clear pathway for the relationship between sleep and cardiovascular disease through more traditional cardiovascular disease risk factors. The National Health, Social Life and Aging Project (NSHAP) is supported by NIH - the National Institute on Aging, Office of Women's Health Research, Office of AIDS Research, and the Office of Behavioral and Social Science Research (5R01AG021487).

#### Ancient Swahili origins: A mitochondrial study of ancient inhabitants of the Kenyan coast.

SLOAN R. WILLIAMS<sup>1</sup>, CHAPURUKHA M. KUSIMBA<sup>2</sup> and KEN BATAI<sup>1</sup>. <sup>1</sup>Department of Anthropology, University of Illinois at Chicago <sup>2</sup>Department of Anthropology, The Field Museum, Chicago.

Scholars have long assumed that the ancestors of Swahili peoples were protoBantu who immigrated into the region some three thousand years ago from West Africa. Despite recent studies of modern population genetics in East Africa, the population dynamics of the coastal region remains poorly known. We carried out a genetic study on human remains excavated at three

coastal sites Mtwapa (ca. 1732 BCE), Tuaca (ca. 800 AD), and Jumba (ca. 1000 ACE). MtDNA was extracted from the well-preserved teeth of five Swahili samples. Partial HVRI mtDNA sequences were obtained for each sample. The three Mtwapa mtDNA sequences are early African in origin and belong to haplogroups L2a, L0f and L1c. The first two haplogroups are found throughout East Africa in Bantu-, Nilotic- and Cushitic-speaking groups. Both haplogroups are present in modern Taita (L2a=6%, L0f=13%) and Mijikenda (L2a=14%, L0f=2%) who live in the area today. The L1c haplogroup is common in central African Bantu groups and is also found in the Taita and Mijikenda in low frequencies (4% and 7% respectively). The Jumba sequence contained transitions at nps 16223 and 16290, placing it in either the L0 or L2 haplogroup. The Tuaca sample was poorly preserved, but one sequence fragment contained anp 16189 substitution. The preliminary results show a diverse coastal population that likely included genetic input from nonBantu groups as well. This research was funded by the African Research Council.

#### The feeding experiments end-user database (FEED).

SUSAN H. WILLIAMS<sup>1</sup>, VLADIMIR GAPAYEV<sup>2</sup>, XIANHUA LIU<sup>2</sup>, REBECCA Z. GERMAN<sup>3</sup>, CHRISTOPHER J. VINYARD<sup>4</sup> and CHRISTINE E. WALL<sup>5</sup>. <sup>1</sup>Dept. of Biomedical Sciences, Ohio University, Athens, <sup>2</sup>NESCent, Durham, NC, <sup>3</sup>Dept. of Rehabilitation & Phys. Med., Johns Hopkins University, <sup>4</sup>Dept. of Anatomy and Neurobiology, NEOUOM, Rootstown, OH, <sup>5</sup>Dept. of Evolutionary Anthropology, Duke University.

Over the past 35 years, researchers have collected impressive datasets on motor patterns of muscles and associated movements and forces in

the jaws and oropharyngeal apparatus during feeding across a wide range of primates and other mammalian species. Individually, the datasets demonstrate the physiological and behavioral complexity of mammalian feeding. Further understanding of the evolutionary basis of this complexity depends on inter-specific comparisons which are not possible without bringing individual datasets together in a comprehensive database. The utility of a database for synthetic research, in turn, depends on aligning the data recordings, behaviors, morphologies, and data acquisition protocols with respect to a common ontological language. Here we report on a database that will serve as a repository for experimental physiological data on mammalian feeding and efforts to develop an ontology for behavioral, morphological and physiological feeding data. The Feeding Experiments End-user Database (FEED) will be a publicly available, web-based resource and the first major database of organism-level physiological data. The most common types of data within FEED are EMG, bone strain, and kinematic recordings made during chewing and swallowing. FEED will support easy upload and storage of raw data recordings and associated metadata. End-users will be able to search FEED using controlled attributes and keywords in free-text descriptions, and to download raw data recordings and associated metadata in formats suitable for post-processing and statistical analysis. We anticipate that the use of FEED will lead not only to new scientific findings but also to new studies on novel mammalian species. FEED is funded by the National Evolutionary Synthesis Center (NESCent), an NSF-funded center that facilitates synthetic research in the biological sciences.

#### 85. Secondary osteon cross-sectional size and morphotype score are

### independent in limb bones subject to habitual bending or torsion.

TYLER J. WILLIAMS, CHASE N. JARDINE, KENDRA E. KEENAN, JOHN G. SKEDROS and CASEY J. KISER. Dept. of Orthopaedics, Univ. of Utah School of Medicine, Salt Lake City.

Secondary osteons enhance mechanical toughness (energy absorption) in cortical bone. Osteon-related characteristics that enhance toughness include: 1) interfaces provided by cement lines, and 2) osteon cross-sectional size (diameter). An additional, less studied, characteristic involves variations in osteon collagen/lamellar organization known as 'morphotypes' (Skedros et al., 2009 BONE). In view of data showing that differences in osteon diameters can differentially influence tissue mechanical properties by influencing osteon pullout (Hiller et al., 2003 J. Orthopaedic Research), a relationship may exist between osteon diameter and morphotype score. As we and others (van Oers et al., 2008 BONE) have suggested, when osteon diameter optimizes pullout as a means for absorbing energy in tension environments, deleterious shear stresses increase toward the cement-line interface. Consequently, morphotypes that influence pullout (e.g., peripherally "hooped" morphotypes) would be expected when a beneficial influence of osteon diameter occurs; e.g., in large osteons in "tension" locations. We tested this hypothesis by correlating osteon diameters with morphotype scores using five osteons from each image from our previous study. This diameter/morphotype relationship was also examined in: 1) "tension" vs. "compression" cortices, and 2) between smaller/larger osteons (150 micron diameter cutoff). In addition to using bones previously studied (horse radii and calcanei, and deer calcanei), we examined the proximal (80%) diaphysis sections from eight adult chimpanzee femora. Results reject the

hypothesis that larger osteons are associated with "hooped" morphotypes; this was consistent whether the data were evaluated in correlation analyses, in comparisons considering tension vs. compression regions, or with the 150-micron diameter cutoff.

### Status and health at the King Site revisited: Results and conclusions from recent burial and DNA analysis.

MATTHEW A. WILLIAMSON<sup>1</sup> and DAVID J. HALLY<sup>2</sup>.

<sup>1</sup>Department of Health and Kinesiology, Georgia Southern University, <sup>2</sup>Department of Anthropology, University of Georgia.

Located on the Coosa River in northwest Georgia, the King Site (9FL5) was occupied during the middle decades of the sixteenth century. Extensive excavation, detailed documentation, good preservation, and collection of 249 burials make it an ideal location for using mortuary analysis to look for status differences in health and lifeways. Since the topic was first addressed by Blakely and colleagues (1988), more detailed artifact and structure analyses have been performed, additional burials have been excavated and analyzed, and more detailed pathological analysis has been done. Both ascribed and achieved statuses have been identified at King. Burial of several adults and children north of a public plaza suggests membership in the town chief's matriline. Artifact assemblages found in burials indicate several achieved statuses including warrior, ritual specialist, and craft specialist. Results indicate that intentional cranial modification is absent among individuals of high status. Indeed, only two individuals with cranial modification had any burial artifacts at all. Periostitis is also absent among high status individuals while lesions are present on 25 percent of low status

individuals. There is a very low frequency of carious lesions among those of high status but the frequency of enamel hypoplasias was about the same between the two groups. The lack of periostitis and carious lesions suggest that the high status individuals enjoyed better overall health and perhaps a more varied diet. Finally, special attention will be given to an apparent female warrior who was interred with artifacts found almost exclusively with males.

### Southeast Asian leaf monkeys.

MARY S. WILLIS<sup>1</sup> and BARTH W. WRIGHT<sup>2</sup>. <sup>1</sup>Department of Anthropology, University of Nebraska Lincoln, <sup>2</sup>Department of Anatomy, Kansas City University of Medicine and Biosciences.

Colobine primates are united in their exploitation of a high percentage of leaf matter and have been described as 'quite homogeneous' in terms of dental morphology. However, these observations obfuscate substantive differences in morphological, developmental, physiological, and behavioral traits, which may reflect the degree to which Asian colobines rely on mastication, versus gut volume and retention time, when ingesting and digesting leaves. In this study, we integrate data related to food acquisition, ingestion, and digestion, e.g., dental, craniofacial, physiological, developmental, and behavioral data, with data on the mechanical and nutritional properties of colobine foods to examine ecomorphological relationships among Southeast Asian taxa. We identify variation in dental and craniofacial patterns among species and genera, many of which extend the life of the dental occlusal surface and hence minimize gut passage time. Furthermore, we uncover a variety of specializations in one or more areas of the food acquisition and processing complex which contextualize a given dental pattern.