

adjusting for a range of potential confounding influences, a 1-kg change in mother's birth weight predicted a  $246 \pm 56$  g increase in offspring BW ( $p < 0.00001$ ). The corresponding effect size for father's BW was about half as strong ( $\beta = 124 \pm 54$  g,  $p < 0.023$ ). In contrast with expectations, father-offspring BW correlations were not stronger when the mother was taller. These relationships provide evidence for a maternal effect on offspring BW in Cebu, and underscore the importance of maternal genetic and/or environmental factors as an influence on offspring fetal growth rate.

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## P: 62

The Shuar Health and Life History Project: immunoglobulin E, C-reactive protein, and cardiovascular and metabolic health among the indigenous Shuar of Ecuador. MA Liebert<sup>1,2</sup>, JJ Snodgrass<sup>1,2</sup>, AD Blackwell<sup>1,2,3</sup>, FC Madimenos<sup>1,2</sup>, TJ Cepon<sup>1,2</sup>, LS Sugiyama<sup>1,2,4</sup>. <sup>1</sup>Department of Anthropology, <sup>2</sup>Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR; <sup>3</sup>Integrative Anthropological Sciences, <sup>4</sup>Center for Evolutionary Psychology, University of California, Santa Barbara, CA.

Recent studies suggest that pathogen exposure has significant effects on inflammatory responses that influence adult cardiovascular and metabolic health, although these links are complicated. Under some conditions, these effects may be predictive of future health risks, including diabetes, hypertension, and cardiovascular disease, which are further affected by dietary and lifestyle factors associated with subsistence populations transitioning to a market economy. The Shuar, an indigenous population from Ecuadorian Amazonia, experience a wide range of market integration, providing an important opportunity to examine the relationship between economic and cultural transitions, and individual health status. Here, we examine immunoglobulin E (IgE), a class of antibody closely related to helminth infection, C-reactive protein (CRP), a marker of general inflammatory response, and their relation to cardiovascular and metabolic health in a multi-community sample of 150 Shuar adults. We collected standard anthropometric measures (body mass index, waist circumference, percent body fat), and obtained information on fasting glucose levels and lipids (LDL, HDL, total cholesterol, triglycerides). Later laboratory analyses were used to measure IgE and CRP from whole dried blood spot samples. Measures of market integration were obtained using economic, lifestyle, and household food frequency interviews, which were reduced by factor analysis. Bivariate correlations and multiple regressions were used to test the association between immune responses, cardiovascular and metabolic health, and market integration factors. Results indicate that both IgE and CRP are negatively correlated with cholesterol, yet positively correlated with glucose levels, suggesting important trade-offs between immune responses and different aspects of cardiovascular and metabolic health.

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## PLENARY: 1:15 p.m.

Paleolithic diets as a model for prevention and treatment of Western disease. S Lindeberg. Dept of Clinical Science, Lund University, Sweden.

Food habits of prehistoric humans may provide important clues about healthy foods for modern humans. Observational studies suggest extremely low rates of some common Western diseases among modern hunter-gatherers. In the Kitava study among the horticulturalists of the Trobriand Islands, Papua New Guinea, we found a striking absence of stroke, ischemic heart disease, hypertension, diabetes type 2, overweight, and the metabolic syndrome. This may be related both to regular physical activity and to a food pattern based on starchy root vegetables, fruit and fish. More recently, we have applied an 'ancestral-like' dietary model in the prevention and treatment of Western disease, in particular health problems associated with increased waist circumference. In one clinical trial, we found marked improvement of glucose tolerance, independently of weight loss, among patients advised to consume a Paleolithic-like diet for 12 weeks, as compared with a traditional healthy, Mediterranean-style diet. In another trial among patients with established diabetes type 2 we found a Paleolithic-like diet to be helpful for the control of blood sugar, waist circumference, blood pressure, and serum triglycerides. In none of these trials, carbohydrate intake was low. In Kitava, carbohydrate intake is significantly higher than in Western populations. Therefore, we suggest that food choice is more important than counting fat, carbohydrate or calories for long-term health (Lindeberg S. Food and Western Disease. Wiley-Blackwell 2009). It is urgent for preventive medicine to have knowledge of the kind of edible foods that were available and/or consumed during human evolution.

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## B: 10:45 a.m.

Reproductive trade-offs and bone health among Shuar and Colonos females from Amazonian Ecuador. FC Madimenos<sup>1,2</sup>, JJ Snodgrass<sup>1,2</sup>, AD Blackwell<sup>1,2,3</sup>, MA Liebert<sup>1,2</sup>, LS Sugiyama<sup>1,2,3</sup>. <sup>1</sup>Department of Anthropology, <sup>2</sup>Institute of Cognitive and Decision Sciences, University of Oregon; <sup>3</sup>Center for Evolutionary Psychology, University of California, Santa Barbara.

Bone mineral density (BMD) is the primary diagnostic parameter of bone health and is a reliable predictor of future fracture risk. In addition to diet and physical activity, reproductive patterns (e.g., parity, breastfeeding, contraceptive use) affect female BMD throughout the lifespan. However, our understanding of how reproductive factors and life history trade-offs shape bone health is limited by lack of data from natural fertility, non-Western populations. Further, the movement away from subsistence lifestyles that occurs with the integration of Indigenous peoples into regional and global economies can affect patterns of diet, physical activity, and reproduction, which

almost certainly alters bone health. Unfortunately, almost no data exist to assess these effects. We present the first such data, using calcaneal ultrasonometry to measure and compare BMD among Indigenous Shuar Ecuadorean females experiencing greater and lesser market integration, with BMD among non-Shuar *colono* females from the same area. BMD is analyzed by age and reproductive history (age at first parturition, number of live births, inter-birth interval, reproductive status, lactation duration, age at menopause). Results show that multiparity provides a protective effect on bone health but this protection is lost with increased duration of lactation per child (>24 months). The most protective effect on bone health is realized when mothers breastfeed multiple children for shorter durations, but this entails trade-offs for offspring growth.

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### P: 11

Environmental effects on salivary cortisol levels among Bangladeshi migrants to the UK. KS Magid<sup>1</sup>, HR Johnston<sup>2</sup>, RT Chatterton<sup>3</sup>, GR Bentley<sup>2</sup>. <sup>1</sup>Department of Anthropology, University College London, UK; <sup>2</sup>Dept Anthropology, Durham University, UK; <sup>3</sup>Dept of Obstetrics and Gynecology, Northwestern University, USA.

Bangladeshi migrants to the UK undergo a socioeconomic shift from a middle-income group in one of the world's poorest nations to a position of relative economic deprivation within an affluent Western urban environment. We compared diurnal cortisol profiles, correcting for age and BMI, between: 1) sedentees in Sylhet, Bangladesh (SYL, n=100); 2) adult migrants who came to London aged >16 (ADU, n=65); 3) adults who migrated as children (≤16) (CHI, n=30); 4) second-generation British-Bangladeshis (2ndGEN, n=32); and 5) socioeconomically-matched white Londoners (EUR, n=52). We predicted that: a) acculturation would be negatively associated with cortisol levels, and b) the developmental environment to which migrants are exposed in early life influences adult cortisol profiles, as previously observed for reproductive steroids in this population. From highest to lowest, mean daily cortisol concentrations were: 2ndGEN (3870 pg/ml), CHI (3140 pg/ml), EUR (2612 pg/ml), ADU (2459 pg/ml) and SYL (2260 pg/ml). There was no significant difference (p>0.05) in cortisol levels between SYL and ADU despite the shift to a lower relative socioeconomic status and assumed psychosocial stresses of migration. Acculturation was associated with elevated waking cortisol, as 2ndGEN and CHI were significantly greater than ADU or EUR, while EUR had the most blunted morning profile, characteristic of chronic stress. Number of years living in the UK had a significant positive relationship with waking cortisol levels for CHI (ANCOVA, p<0.05), suggesting developmental influences on adult cortisol profiles.

Supported by: Economic and Social Research Council UK.

### P: 14

Feasibility of integrating biomarkers into research with Latino immigrant families: Findings from the Stress and Acculturation project. HH McClure<sup>1,2</sup>, CR Martínez, Jr.<sup>1</sup>, JJ Snodgrass<sup>1,2</sup>, JM Eddy<sup>1</sup>, EC Squires<sup>2</sup>, JG Ridgeway-Díaz<sup>2</sup>. <sup>1</sup>Oregon Social Learning Center, Eugene; <sup>2</sup>Department of Anthropology, University of Oregon, Eugene.

Despite extensive research into the toll of psychosocial stress on individual physiology and health, little is known about the effects of chronic biosocial stress for immigrant populations. For the past several years, the Oregon Social Learning Center's Latino Research Team (LRT) and our collaborators have conducted pilot projects to better "map" the pathways through which social environmental stressors (e.g., related to adaptation to life in the U.S., perceived discrimination) influence self-report and biological measures of adult Latino immigrant stress. The current Stress and Acculturation Project (SAP) took this work one step further by investigating links among stressors, maternal stress, parenting, and child stress. In the present study, we review SAP findings, and discuss the feasibility of integrating biomarkers into studies with Latino immigrant families. The SAP pilot study involved 44 Latina immigrant mothers and children (6-9 years old) in Oregon. This project integrates self-report items as well as stress biomarkers (e.g., Epstein Barr Virus antibodies, C-reactive protein, and salivary cortisol) and blood pressure, as well as metabolic (glucose, lipids), and anthropometric measures (waist circumference and body mass index). Findings provide partial support for hypotheses that social stressors correlate with mothers' higher self-reported and biological stress. These, in turn, negatively associate with mothers' effective parenting with related effects for child stress. Lessons learned in relation to supporting Latino families' participation in stress research include methods that are sensitive to participants' unfamiliarity with biomarkers, low literacy, and enthusiasm to receive health information due to barriers to accessing care, among other factors.

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### B: 11:30 a.m.

Assessment of menstrual cycle function and reproductive endocrine status in Samoan women. ST McGarvey<sup>1</sup>, MB Roberts<sup>1</sup>, S Urlacher<sup>1</sup>, J Ah-Ching<sup>2</sup>, S Viali<sup>3</sup>, M Urbanek<sup>4</sup>, G Lambert-Messerlian<sup>1</sup>. <sup>1</sup>Brown University, Providence, RI; <sup>2</sup>LBJ Tropical Medical Center, American Samoa; <sup>3</sup>Ministry of Health, Government of Samoa, Apia; <sup>4</sup>Northwestern University, Evanston, IL.

Adiposity in women has been associated with menstrual irregularity and risk of polycystic ovarian syndrome (PCOS). We investigated patterns of menstrual cyclicity reported by Samoan women, examined the relationship to adiposity and reproductive hormone levels and made preliminary estimates of PCOS. A cross-sectional analysis was performed among Samoan women from Samoa and American Samoa, aged 18-39 years (n=336), with anthropometric and biomarker measures of adiposity and repro-