

In this Issue

This issue of the *Journal of Origins and Developmental Disease* contains one review article focusing on the validity of recalled *v.* recorded birth weight, three brief reports and nine original articles, encompassing animal and human studies. Beginning with the next issue we will have an Associate Editor Editorial discussing an editor's choice manuscript.

Review

Validity of recalled *v.* recorded birth weight: a systematic review and meta-analysis. Birth weight measures are the most common measure utilized to associate developmental impact with offspring health and disease. As reviewed by Shenkin *et al.*, studies often utilize recalled birth weight if birth weight records are not available, though the reliability of this measure is uncertain. The authors performed a meta-analysis, including 40 eligible studies with over 78,000 births. There was a high degree of agreement between recalled and recorded birth weight with recall slightly (80 g) higher than recorded birth weight in low- and middle-income countries. The authors conclude that birth weight recall measures are suitable for use in epidemiologic studies, particularly in high-income countries.

Brief Reports

Placental 11 β -hydroxysteroid dehydrogenase type 2 (11 β -HSD2) expression very early during human pregnancy. The human fetus is protected, in part from elevated cortisol exposure by placental 11- β hydroxysteroid dehydrogenase, which converts active cortisol in inactive cortisone. Salvante *et al.* quantified early expression of placental 11 β -HSD2, noting its expression beginning 3 weeks post conception in syncytiotrophoblasts and columnar epithelial cells encircling uterine endometrial glands. These findings suggest that the fetus may be protected from maternal stress associated cortisol secretion early in embryogenesis.

Enhanced susceptibility of CA3 hippocampus to prenatal nicotine exposure. Kalejaiye and Gondré-Lewis examined the effect of prenatal nicotine exposure in a rat model on hippocampal development, a brain region is critical for learning and memory functions. The authors demonstrated that nicotine exposure reduced expression of select components of synaptic signaling, including glutamatergic transmission associated molecules. This study contributes important findings of adverse effects of prenatal nicotine exposure on hippocampal development.

Autism spectrum traits and visual processing in young adults with very low birth weight: the Helsinki Study of very low Birth Weight adults. Autism spectrum disorder (ASD)

includes important visual processing problems which may underlay cognitive impairments. Wolford *et al.* examined ASD traits and visual processing performance in young adults born preterm and very low birth weight (<1500 g) or term. ASD traits were more often associated with slower global visual processing within the preterm very low birth weight group but not among term offspring. These findings emphasize both social and neurocognitive problems in offspring born preterm and very low birth weight.

Original Articles

Childhood body mass index at 5.5 years mediate the effect of prenatal maternal stress on daughters' age at menarche: Project Ice Storm. As early puberty is associated with greater risk of adverse adult health outcomes, and stress experienced during childhood may advance age at menarche, this paper sought to determine if stress experienced by mothers immediately before or during pregnancy may be associated with puberty timing. Duchesne *et al.* examined 31 girls whose mothers were exposed to the Quebec Ice Storm during pregnancy. Results suggest that maternal stress during pregnancy reduces the incidence of advanced age at menarche in the offspring by effects on childhood body mass index. This paper provides further insight into the important developmental determinants of early puberty on women's health.

Green tea extract intake during lactation modified cardiac macrophage infiltration and AMP-activated protein kinase phosphorylation in weanling rats from undernourished mother during gestation and lactation. Matsumoto *et al.* examined the effects of green tea extract during lactation on weanling hearts exposed to maternal dietary protein restriction. The authors noted that low-protein diet weanlings had higher areas of fibrotic macrophage infiltration than controls, effects which were reduced by exposure to green tea extract. These finding suggest that maternal green tea extract during lactation specifically may ameliorate cardiovascular disease associated with maternal dietary protein restriction, potentially an intervention which may be utilized in both low and high socioeconomic countries.

Age at menarche in relation to prenatal rainy season exposure and altitude of residence: results from a nationally representative survey in a tropical country. Jansen *et al.* emphasized that rainy season in the tropics may be accompanied by both a risk of infection and nutritional deficiency. The authors evaluated the relation of prenatal exposure to the rainy season as well as the residence altitude with age at menarche. Girls in the highest quintile of gestation days exposed to the rainy season had an earlier age at menarche compared with those of lowest quintile. Girls living at altitude above 2000 m had a later age at menarche.

Prenatal phthalate exposure 8-isoprostane among Mexican-American children with high prevalence of obesity. Prenatal phthalate exposure has been associated with oxidative stress in pregnant women. Phthalates are endocrine disruptors associated with altered lipid metabolism and adverse birth outcomes. Tran *et al.* examined measures of oxidative stress in association with maternal urinary phthalate metabolites in children age 5–14 years of age. At age 14, isoprostane concentrations were positively associated with phthalate metabolites measured in early pregnancy. These findings provide further information suggesting that prenatal phthalate exposure and accompanying oxidative stress may contribute to offspring adverse health effects.

Effects of birth weight, sex and neonatal glucocorticoid overexposure on glucose–insulin dynamics in young adult horses. Valenzuela *et al.* assessed the effect of elevated cortisol level in newborn foals. Glucose-stimulated insulin secretion was less in males than females at both 1 and 2 years of age, whereas insulin sensitivity was greater in females than males at 1 year. Neonatal glucocorticoid overexposure had no effect on whole body glucose tolerance, insulin secretion or insulin sensitivity. The authors suggest that glucose/insulin dynamics in young adult horse are sexually dimorphic, and may be influenced by both genetic and environmental factors during early life periods.

Western diet in the perinatal period promotes dysautonomia in the offspring of adult rats. Vidal-Santos *et al.* examined the effect of a western diet during gestation and lactation on offspring male rats. In addition to altered metabolic effects of the western diet (glycemia, triglycerides, cholesterol) offspring demonstrated higher systolic arterial pressure, heart rate and sympathetic modulation of vessels. These findings suggest that a western diet during pregnancy and lactation may lead to adult overweight/obesity as well as autonomic imbalance and hypertension.

Indicators of fetal growth and adult liver enzymes: the Bogalusa Heart Study and the Cardiovascular Risk in Young Finns Study. Harville *et al.* examined programming effects relating fetal growth with offspring liver enzymes, as an indicator of adult fatty liver disease. Reduced prenatal growth was associated with higher liver enzymes in the Young Finns

study, suggesting a link between birth parameters and adult fatty liver in select populations.

Intrauterine growth restriction increases circulating mitochondrial DNA and Toll-like receptor 9 expression in adult offspring: could aerobic training counteract these adaptations? Intrauterine growth restriction (IUGR) resulting from pregnancy under-nutrition may be associated with low-grade inflammation and cardiometabolic co-morbidity. Oliveira *et al.* examined male offspring from food restricted and control dams and assessed the effect of aerobic training on measures of inflammation. The authors demonstrated that IUGR can program increased inflammatory markers which may be normalized by aerobic training in young adults. These findings may provide a strategy to reduce adverse effects of IUGR.

Sex differences in early-life programming of the hypothalamic–pituitary–adrenal axis in humans suggest increased vulnerability in females: a systematic review. Carpenter *et al.* examined the association of low birth weight, preterm birth and maternal stressors on offspring hypothalamic–pituitary–adrenal (HPA) axis function in early and latter life. Female offspring exposed to stressors had increased HPA axis reactivity compared with males and an increased placental permeability to maternal glucocorticoids following maternal stress. The authors conclude that the female HPA axis is vulnerable to pregnancy programming and suggest a gender-specific effect.

Relationship between copper and lipids and atherogenic indices soon after birth in Japanese preterm infants of 32–35 weeks. Both altered lipid levels and ratios and concentration of traced elements have been associated with adult cardiovascular disease. Shoji *et al.* assessed newborn blood samples from preterm infants for copper, zinc and lipid levels. The results demonstrated that intrauterine growth restriction and the triglyceride level at birth influence copper levels in preterm infants, whereas atherogenic indices do not affect this parameter. These results should prompt further research investigating the association of copper and other trace elements with both preterm birth and adult cardiovascular disease.