

In This Issue

This issue of the *Journal of Developmental Origins of Health and Disease* contains three review articles, seven original articles, one rapid communication and an erratum/corrigendum. In contrast to many of our studies, which focus on developmental origins of offspring disease, the review by Dr Rosenfeld emphasizes parental behavioral modifications from pre-conception to the neonatal period, which can promote the health of offspring. Adams *et al.* provide a meta-analysis of the impact of sperm donation on offspring health, and Yamada and Chong examine methodologies of epigenetic studies. The original research papers examine development programming outcomes and mechanisms in both human and animal models.

Rapid Communication

Maternal undernutrition programs the apelinergic system of adipose tissue in adult male rat offspring. Lecoutre *et al.* utilized a model of maternal 70% food restriction in pregnant female rats to assess the role of apelin (member of the adipokine family) on white adipose tissue. Maternal undernutrition resulted in offspring with a significant increase in apelin receptor expression in adipose tissue, providing further evidence of a programmed dysregulation of adipogenesis and/or adipose function.

Reviews

Homage to the ‘H’ in developmental origins of health and disease. Rosenfeld explored the role of parental exercise, probiotic supplementation and maternal breastfeeding for the optimization of offspring health. In a comprehensive analysis of both human and animal studies Dr Rosenfeld emphasized that parental behavior can have critical impact on the life-long health of male and female offspring.

Epigenetic studies in developmental origins of health and disease: pitfalls and key considerations for study design and interpretation. Yamada and Chong reviewed the major processes of epigenetic regulation and controversies in the role of epigenetic studies. Among the important aspects reviewed are the stability of epigenetic modifications over time, the relationship between epigenetics and gene expression, and the cell and tissue specificity of epigenetic alterations. This review provides critical information to all investigators examining gene expression or epigenetic modifications as it relates to developmental origins.

A meta-analysis of sperm donation offspring health outcomes. Adams *et al.* reviewed eight eligible studies and performed a meta-analysis (three studies included), which demonstrate that donor sperm neonates do not appear to be at

increased risk of low birth weight, prematurity or birth defects as compared with spontaneously conceived neonates. This paper provides important information in relation to ART-induced conceptions. Additional studies are necessary to address issues of cryopreservation of sperm, oocytes and fertilized eggs, as well as outcomes resulting from donor egg ART processes.

Original Articles

Effect of maternal zinc supplementation on the cardiometabolic profile of Peruvian children: results from a randomized clinical trial. Mispireta *et al.* reported that zinc deficiency is common and zinc intake during pregnancy is insufficient throughout low- and middle-income countries. As zinc is importantly involved in a diversity of developmental functions, the authors examined the effect of maternal zinc supplementation during pregnancy on offspring cardiometabolic profile. At 4.5 years of age, there were no statistically significant differences in variables related to body composition, lipid profile or insulin resistance. These findings do not support a role for zinc supplementation in reducing the risk of offspring cardiometabolic disease in early childhood. Further studies in larger size populations and offspring at older ages may provide additional information regarding the role of zinc during gestation.

Effects of prenatal bisphenol-A exposure and postnatal overfeeding on cardiovascular function in female sheep. Mohankumar *et al.* assessed the effects of maternal bisphenol-A (BPA) exposure in pregnant sheep (days 30–90) on female offspring, which was subsequently overfed. Although prenatal BPA exposure had no effect on blood pressure or morphometric measures, there was increased ANP gene expression in the ventricles and reduced right ventricular collagen expression. When combined with overfeeding, prenatal BPA resulted in an increased interventricular septal thickness, though ameliorating the effect of overfeeding on offspring blood pressure and left ventricular area. These findings suggest that among female offspring, BPA may impact cardiac morphology, particularly in association with obesity.

Effects of a maternal high-fat diet on offspring behavioral and metabolic parameters in a rodent model. Johnson *et al.* examined the effects of a high-fat diet on offspring learning, physical activity and metabolic parameters. Male and female high-fat offspring demonstrated increased anxiogenic behaviors and decreased exploratory and voluntary physical activity. Reduced resting energy expenditure was associated with high-fat offspring obesity in adulthood. These findings emphasize the diversity of behavioral and metabolic effects of maternal dietary alternations in pregnancy.

Impact of long-term high-fat diet intake gestational protein-restricted offspring on kidney morphology and function. Rizzi *et al.* examined the effect of early high-fat diet intake among maternal protein-restricted offspring in rats. Maternal protein-restricted offspring demonstrated pronounced effacement of podocyte foot processes and increased urinary protein excretion, both of which were exacerbated by postnatal high-fat diets. These findings may contribute to the elevated blood pressure and reduced urinary sodium excretion observed in maternal protein-restricted offspring.

Maternal treatment with dexamethasone during gestation alters sexual development markers in the F1 and F2 male offspring of Wistar rats. Jeje and Raji examined the effects of maternal dexamethasone exposure at varying gestational days on male offspring reproductive function. The results indicate that maternal dexamethasone treatment during late gestation may significantly impact both F1 and F2 sexual development, including serum testosterone, luteinizing hormone and corticosterone. The authors speculate that dexamethasone may impact on sperm epigenetic mechanisms.

Relationships between childhood growth parameters in adult blood pressures: the Fels Longitudinal Study. Sabo *et al.* examined a cohort of the Fels study, which has enrolled patients since 1929, to assess associations between

childhood body size and adult blood pressure. The results demonstrate that the age of achievement of growth onset, as well as peak velocity, is negatively associated with adult blood pressure, suggesting that early height or body mass index growth leads to increased blood pressure in adults. These findings are consistent with previous studies suggesting that the timing of childhood growth and/or early childhood catchup growth may have deleterious effects on adult cardiovascular health.

Effects of *Ilex paraguariensis* (Yerba Mate) on the hypothalamic signaling of insulin and leptin and liver dysfunction in adult rats overfed during lactation. Conceicao *et al.* assessed the effect of Yerba Mate herbs on Wistar rats. Yerba Mate treatment impacted hypothalamic insulin signaling and normalized antioxidant enzyme activities and hepatic steatosis induced by postnatal early overfeeding. These findings suggest that components within Yerba Mate may be useful in preventing and treating obesity-related disorders.

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Journal of Developmental Origins of Health and Disease (J DOHaD)