

## In this issue

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## In This Issue

This issue of *Journal of Developmental Origins of Health and Disease* contains 15 original articles, one Review article, and three Brief Reports. The topics span studies of developmental programming in animal models and human epidemiologic investigations, as well as three articles focused specifically on programming of male reproductive development.

### Review Article

**Maternal protein malnutrition: effects on prostate development and adult disease.** Rinaldi *et al.* examined mechanisms whereby maternal low-protein diet results in low birth weight, androgen deficiency and an increase in male prostate disease. This review emphasizes both the scientific mechanisms and the epidemiologic data supporting a role of maternal under-nutrition in prostate aging and prostate diseases including prostatitis, as well as important aspects of male infertility.

### Brief Reports

**Taro flour (*Colocasia esculenta*) increases testosterone levels and gametogenic epithelium of Wistar rats.** Ribeiro *et al.* evaluated the effects of a diet containing taro flour (widely consumed in Asia, Africa and South America) on hormonal levels and seminiferous tubules. Taro feeding to newly weaned male rats increased testicular weight and diameter and serum testosterone levels. Together with the review article within this issue, these findings indicate important effects of maternal diets and newborn diets on male reproductive development.

**Amygdala – and serum – neurotrophic factor levels depend on rearing condition in male rats.** Babri *et al.* altered the weaning of Wistar rats from postnatal days 21–119 in standard, isolated or enriched conditions. Environmental enrichment alterations resulted in altered amygdala and serum BDNF levels and body weight. These findings emphasize the potential molecular mechanisms contributing to the lifelong effects of early life experiences.

**Newborn electroencephalographic correlates of maternal prenatal depressive symptoms.** Gustafsson *et al.* examined newborn EEG patterns of control mothers and those who demonstrated perinatal depression. Infants of mothers with depressive symptomatology had greater right-frontal alpha asymmetry during quiet sleep, indicating that maternal prenatal depression may influence infant neurologic development.

### Original Articles

**Birth weight influences the kidney size and function of Bangladeshi children.** Ferdous *et al.* examined kidney volume of children age 4.5 years and GFR at 9 years in relation to low birth weight. The results demonstrated that low birth weight is associated with reduced kidney volume and reduced GFR, which may have a long-term impact on adult health.

**Placental mitochondrial biogenesis and function were slightly changed by gestational hypercholesterolemia in full-term pregnant women.** Le *et al.* examined placentas of pregnant women with elevated serum cholesterol levels in the third trimester. High cholesterol was associated with decreased placental mitochondrial DNA copy number and messenger RNA ATP6ase, though there were no other significant differences in measures of mitochondrial factors. The authors conclude that gestational hypercholesterolemia is unlikely to induce serious placental dysfunction.

**Adipose tissue uncoupling protein 1 levels and function are increased in a mouse model with developmental obesity induced by maternal exposure to high-fat diet.** Prewit *et al.* examined levels of uncoupling protein 1 (UCP1) and UCP1-mediated thermogenesis in offspring exposed to prenatal obesity. UCP1 protein levels, total mitochondrial respiration and UCP1-dependent respirations were significantly higher in brownout adipose tissue from males of high-fat fed dams and females. Effects were limited to brown adipose tissue with little impact of UCP levels on subcutaneous and visceral adipose tissue.

**Maternal low-quality protein diet exerts sex-specific effects on plasma amino acid profile and alters hepatic expression of methyltransferases in adult rat offspring.** Akyol *et al.* compared the effects of dams fed a normal chow diet to a low-quality protein diet (wheat gluten). At weaning, all offspring were fed controlled chow till 20 weeks. Male offspring of the wheat gluten diet had lower body weight and energy intake, whereas female offspring had higher body weight and energy intake compared to controls. There were significant changes in plasma amino acids and insulin regulation. These results confirm sex-specific changes of maternal poor-quality protein diet on adult offspring metabolism.

**Postnatal undernutrition in mice causes cardiac arrhythmogenesis, which is exacerbated when pharmacologically stressed.** Visker and Ferguson examined the effects of low-protein diet during pregnancy and/or nursing. Maternal undernutrition reduced offspring body weight and heart weight. Dependent upon the period of undernutrition, offspring demonstrated a propensity to cardiac arrhythmias, including atrial fibrillation, AV block and ventricular depolarization.

**Associations between maternal prenatal cortisol and fetal growth are specific to infant sex: findings from the Wirral Child Health and Development study.** Braithwaite *et al.* utilized the Wirral study cohort to assess salivary cortisol levels at 32 weeks gestation. Maternal cortisol predicted infant birth weight in a sex-dependent manner with significant associations dependent upon waking or post-waking periods. The authors emphasized that these findings may explain early origins of sex differences in developmental psychopathology.

**Maternal intake of omega-3 and omega-6 polyunsaturated fatty acids during mid-pregnancy is inversely associated with linear growth.** Al-Hinai *et al.* assess the relation of maternal n3 and n-6 polyunsaturated fatty acid (PUFA) intake during pregnancy with offspring BMI and metabolic risk at age 8–14 years. Higher PUFA intake during mid-pregnancy was associated with lower attained height in offspring during peri-puberty. The authors postulate that PUFA may interfere with bone mineralization and growth during gestation or may be associated with toxicants within PUFA-containing foods.

**Pregnancy risk factors related to autism: an Italian case-controlled study in mothers of children with autism spectrum disorders (ASD), their siblings and of typically developing children.** Grossi *et al.* assess the frequency of potential autism risk factors related to pregnancy and postnatal periods by interviewing mothers of children with autism. The results suggest that environmental and stressful life events can influence pregnancy outcome in predisposed subjects.

**Liver metabolism in adult male mice offspring: consequences of maternal, paternal or both maternal and paternal high-fructose diet.** Carapeto *et al.* examined the effect of a high-fructose diet by maternal or paternal mice. Consumption of a high-fructose diet by mother and/or father was associated with adverse effects on liver metabolism in adult male offspring and the effects were exacerbated when both mother and father are fed a high-fructose diet. The authors propose a mechanism by which a parental high-fructose diet may program male adult offspring, mediated by cytokine production. The findings of a programming effect of paternal high-fructose diet are relevant to human nutrition during pregnancy.

**Isolating the direct effects of adverse developmental conditions on *in vivo* cardiovascular function in adulthood: the avian model.** Skeffington *et al.* developed an avian model of surgical instrumentation to study young chicken cardiometabolic function. The described techniques may permit investigation of environmental effects on physiology, independent of maternal and/or placental effects.

**Prenatal lead exposure in relation to age at menarche: results from a longitudinal study in Mexico City.** Jansen *et al.* analyzed the association of prenatal lead exposure with age at menarche. Increased maternal blood lead levels during the second trimester were associated with a later age at menarche, suggesting an impact of perinatal lead exposure on sexual maturation.

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