

In this issue

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This issue of the Journal of Developmental Origins of Health and Disease has 13 original articles spanning from translational research to outstanding clinical studies. In addition, the editorial by Mohammed et al, describes the development of the Pakistan DOHaD Society and its efforts to endorse early screening and interventions to reduce the burden of non-communicable diseases.

Translational and Basic Studies

The transgenerational effect of maternal and paternal F1 low birth weight on bone health of second and third generation offspring. Anevska et al produced low birth weight offspring by utero-placental insufficiency surgery. The authors examined F2 offspring of restricted maternal and paternal lineages and subsequently produced F3 offspring. Although there were early life alterations in bone trabecular and cortical content, there was no transgenerational transmission of adverse bone health in F2 and F3 offspring.

Impact of prenatal and postnatal maternal environment on nephron endowment, renal function and blood pressure in the Lewis polycystic kidney (LPK) rat. Ding and coauthors utilized a rodent model of polycystic kidney disease to examine the effect of the postnatal environment (cross fostering to heterozygous LPK dams). Postnatal enhanced environment resulted in a modest improvement in growth and blood pressure with increased nephron number. These results demonstrate that both prenatal and postnatal environment may delay progression and severity of polycystic kidney disease.

Transgenerational effects in maternal bisphenol A exposure on offspring metabolic health. Bansal and colleagues explored the effect of BPA doses relevant to human exposure, having previously demonstrated both male and dose specific effects on pancreatic islets of the F1 and F2 offspring. In the present study the authors determined the transgenerational F3 effect, demonstrating increased body weight in male offspring and, at high BPA dose, a reduced beta cell mass. These findings demonstrate persistent, though fewer metabolic defects in F3 as compared to F1 and F2 offspring in response to maternal BPA exposure.

Perinatal exposures to phthalates and phthalate mixtures result in sex specific effects on body weight, organ weights, and intracisternal A-particle (IAP) DNA methylation in weanling mice. Neier et al, studied the effects of three phthalates during the perinatal period on the DNA methylome. Male and female mice perinatally exposed to phthalates had increased body weight, dependent upon the specific phthalate. The yellow agouti mouse strain together with DNA methylation confirmed evidence that developmental exposure to phthalate influences both DNA methylation and body weight and organ weight changes.

Early onset and progression of non-alcoholic fatty liver disease in young monosodium L-glutamate-induced obese mice. Coelho and coauthors utilized a model of MSG newborn exposure to create adult non-alcoholic fatty liver disease. The results demonstrated that the MSG exposure during the period of 60-120 days of life appears to be a critical metabolic window for the pathophysiology of non-alcoholic fatty liver disease progressing to non-alcoholic steatohepatitis.

Human Studies

Placental imprinted gene expression mediates the effects of maternal psychosocial stress during pregnancy on fetal growth. Lambertini et al examined mothers experiencing high maternal psychosocial stress during pregnancy, studying imprinted genes. The authors demonstrated that two genes showed a 22% mediation of maternal psychosocial stress on fetal growth. These findings demonstrate the potential to explain how maternal stress is associated with adverse birth outcomes via placental imprinted gene expression.

Breast feeding: A key modulator of gut microbiota characteristics in late infancy. Matsuyama and coauthors examined stool samples of healthy one-year old Australian children. Although the microbiota profiles of children could not be differentiated by delivery mode or antibiotic exposure, there were marked differences among breast fed and non-breast-fed

infants. Thus, breast feeding continues to influence gut microbial community through one-year-of-age.

The association between gestational age and otitis media during childhood: A population base cohort analysis. Imterat and colleagues examined rates of otitis media hospitalization up to age 18-years-of-age from a cohort of deliveries between 1991 and 2014. Otitis media related hospitalizations were significantly more common among infants born preterm and early term, emphasizing another important benefit of term delivery.

Maternal antenatal mood and child development: An exploratory study of treatment effects on child outcomes up to 5-years-of-age. Milgrom and coauthors examined a cohort of woman receiving treatment for antenatal depression. Maternal treatment during pregnancy showed significant benefits to children's development at age 2, but not at age 5. However, irrespective of treatment, higher depression, or anxiety during pregnancy was associated with lower Wechsler Preschool and Primary Scales of Intelligence. The authors emphasized that larger studies are warranted to explore the effect of intervention on maternal depression and child outcome.

Circulating maternal and umbilical cord steroid hormone and insulin-like growth factor concentrations in twin and singleton pregnancies. Houghton et al examined maternal concentration of androgens, estrogens, IGF-1, and prolactin during third trimester and at delivery as well as in the fetal ! circulation. Most maternal hormone concentrations were slightly higher in twin than singleton pregnancies in the third trimester and at delivery, though cord serum hormones were similar in twin and singleton pregnancies. IGFBP-3 was markedly

lower in twins than singletons, which the authors hypothesized may allow for sufficient concentrations of IGF-2 for growth in a shared environment.

Determinants of low birth weight in the context of maternal nutrition education in urban informal settlements, Kenya. Nyamasege et al assessed the effects of maternal prenatal nutrition counseling in two urban settlements of Nairobi. Monthly antenatal nutritional counseling was associated with a reduction in low birth weight and preterm birth. These findings provide opportunities for government and healthcare providers to focus on modifiable risk factors.

Associations of birth characteristics with perimenopausal disorders: A prospective cohort study. Gao and coauthors utilized Swedish archived birth records to examine predictors of perimenopausal disorders. Birth weight was linearly associated with the incidence rate of menopausal and climacteric states. These findings provide evidence regarding the developmental origins of perimenopausal disorders.

Do the adiponectin and leptin levels in preterm and term breast milk samples relate to infants' short-term growth? Kocooadam and colleagues evaluated breast milk adipokine levels and short-term growth of preterm and term infants. Their results demonstrate that adiponectin may affect short-term growth, though there was no effect of breast milk leptin. In addition, maternal age and pre-pregnancy BMI were highly correlated with infant growth. These findings support the continued investigation of both breast milk nutrient and hormonal content and its effects on newborn growth and development.