

In This Issue

This issue of the Journal of Developmental Origins of Health and Disease contains two excellent reviews. Denver and Middlemis-Mayer discuss developmental plasticity while Gilman reviews the critical aspects of early infancy. Our original articles focus on human cohorts, examining prenatal environmental exposures, interleukins, size at birth, prematurity and postnatal growth, on outcomes including pancreatic function, adult phenotype, offspring intelligence and blood pressure.

Reviews

Lessons from evolution: developmental plasticity in vertebrates with complex life cycles. In this review, Denver and Middlemis-Mayer review the fascinating topic of developmental plasticity by introducing the comparison of animals with indirect life cycle development, generally beginning with a larval stage followed by a metamorphosis to adult phenotype, to those with a simpler direct development life style. Utilizing the amphibian model, the authors reviewed how larval history can significantly impact post-metamorphic adult phenotype, including physical form, behavior and metabolism. The comparison between amphibian developmental environments and the aquatic mammalian fetus (bathed in amniotic fluid) is illustrated. The commonality of the neuroendocrine stress axis between accelerated metamorphosis in amphibians and human fetal organ development confirms that amphibians may be appropriate models for investigating environmental effects on development.

Early infancy – a critical period for development of obesity. Human reviews – the critical period of infancy in regard to weight gain and offspring obesity. Utilizing epidemiologic studies, primarily from the developing world, the author provides convincing data that early infancy weight gain predicts both obesity and increased metabolic risks. Consistent with animal experiments, studies suggest that appropriate levels of leptin during critical hypothalamic developmental periods may have long-term beneficial effects on infancy and adult appetite regulation and thus obesity.

Original Articles

Prenatal environmental exposures that may influence β -cell function or insulin sensitivity in middle age. Kahn *et al.* utilized a previously determined unique dermatoglyphic marker of fingerprints, which are established by the end of the first half of gestation, to predict pancreatic β -cell development and function in offspring of the Dutch famine. Their results demonstrated that fingerprint Md15 was associated with decreased measures of β -cell function, but not insulin sensitivity. These findings suggest that fingerprint variability may help to identify and predict adult glucose metabolism.

The interleukins IL-6 and IL-1Ra: a mediating role in the associations between BMI and birth weight? Friis *et al.* used a cohort from the STORK study of healthy Scandinavian women receiving obstetric care from 2002 to 2008 in order to examine the

effects of maternal cytokines and BMI on infant birth weight. The results suggest that approximately 20% of the effect of maternal BMI on birth weight is mediated through IL-1Ra, an important adipose tissue derived inflammatory factor.

Impact of size at birth in prematurity on adult anthropometry in 4744 in middle-aged Danes – The Inter99 study. Pilgaard *et al.* utilized a population-based study comprising over 60,000 Danish individuals born between 1939 and 1970 to examine the correlation between size at birth/prematurity and adult obesity. Mother's age, parity and diabetes status were associated with offspring birth weight, and size at birth was positively associated with adult height and weight, but weakly associated with BMI. Infants born preterm were less growth restricted at birth and displayed greater height and weight compared with term infants born small for gestational age. Despite these findings, the authors did not demonstrate that birth weight was related to the adult waist/hip ratio.

The relationship of birthweight, muscle size at birth and post-natal growth to grip strength in 9-year-old Indian children: findings from the Mysore Parthenon study. Barr *et al.* utilized a prospective birth cohort study from the Mysore region of India to examine the consequences of pregnancies from 1998 to 1999 period. Infant weight, length and arm muscle area at birth were positively related to 9-year grip strength, as mediated through greater postnatal size. Thus, poor muscle development *in utero* is associated with reduced childhood muscle strength.

Weight gain in infancy and early childhood is associated with school age body mass index but not intelligence and blood pressure in very low birth weight children. Washburn *et al.* examine offspring born with very low birth weight (<1501 g) in 1992–1995. Among these infants, more rapid weight gain during infancy and early childhood was associated with a higher BMI at school age, though there were no effects on verbal or performance I.Q., in early childhood.

Relation of maternal hypertension with infant growth in a prospective birth cohort: the ABCD study. De Beer *et al.* utilized Amsterdam born children from women delivering between 2003 and 2004 to examine the correlation between maternal hypertension, infant birth weight and infant growth acceleration in weight or length during the first 14 months of life. Pre-existent maternal hypertension was related to growth acceleration in weight, after correction of birth weight and pregnancy duration. These findings suggest that growth of the offspring of hypertensive mothers should be monitored more closely, and provide an opportunity for future studies to examine mechanisms related to maternal hypertension and influences on offspring anthropometry.

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