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EDITORIAL

# Cord Blood Adipocytokines Beyond Adiposity in Neonates?

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Adipose tissue is classically viewed as an energy depot in any standard biomedical textbook. In recent decades, however, adipose tissue has gradually been transformed into a bona fide endocrine tissue. The strongest evidence comes from the discovery of the first fat hormone or adipocytokine, leptin.<sup>1</sup> Leptin is the product of *ob* gene, and is mainly expressed in adipose tissue and secreted into systemic circulation. Leptin has been shown to be a major regulatory hormone of appetite by acting on the hypothalamus via a negative feedback loop. Humans with leptin deficiency that results from genetic mutations would rapidly develop early-onset severe obesity primarily due to un-suppressed appetite, although they have normal weight at birth.<sup>1,2</sup> However, this is a rare condition with few case reports world-wide.<sup>2</sup> In contrast to the absence of leptin in the previous condition, subjects with common obesity have elevated blood leptin levels, suggesting a leptin-resistant state.<sup>1</sup> In general, blood leptin levels reflect generalized body adiposity.<sup>1</sup> Leptin is also found to be related to other physiological or pathological conditions beyond appetite control and obesity. These include the roles of leptin in pregnancy and fetal growth, which are the most interesting for pediatricians and obstetricians.<sup>3</sup>

In this issue of the journal, Tung et al<sup>4</sup> explored the relationship between umbilical cord blood leptin levels and birth weight of full-term neonates. The

authors used a somewhat large sample size with the inclusion of only full-term babies and no pre-term neonates. Consistent with previous reports, they found that the cord blood leptin levels were higher in babies that are large and appropriate for gestational age than those that are small for gestational age. This may be explained by higher adiposity in babies with higher birth weight. Since fetal nutrient intake during pregnancy is not regulated by fetal appetite, and individuals with leptin deficiency have normal birth weight, the significance of higher cord blood leptin levels may not be extended beyond the simple reflection that babies large and appropriate for gestational age have higher adiposity when compared to those small for gestational age. Nevertheless, any proposed biological effects, subtle or prominent, on pregnancy and fetal growth in humans merit further investigation.<sup>3</sup>

In addition to leptin, another adipocytokine, adiponectin has also been reported to have significant biological and medical implications.<sup>5,6</sup> In adults, for instance, plasma adiponectin is inversely associated with adiposity.<sup>6</sup> It has been suggested that plasma adiponectin is not a regulator of body weight, but rather, a mediator of the metabolic effects of altered adiposity.<sup>5</sup> The umbilical cord blood adiponectin levels appear to be higher in fetus than the plasma levels in adults, and have been found to be positively associated with birth weight and fat

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mass.<sup>7,8</sup> Although Tung et al did not investigate cord blood adiponectin levels in this issue, a recent study<sup>7</sup> examined the levels of both cord blood leptin and adiponectin, and their relation to infant development in the initial 6 months and at 3 years of age. The study reported that lower cord blood levels of both leptin and adiponectin were significant positive predictors for weight gain in early childhood.<sup>7</sup> The differences in the relationships between leptin/adiponectin and body weight at different developmental stages highlight the importance of further investigation into the biological and clinical implications of leptin and adiponectin on fetal development. Beyond leptin and adiponectin, there are many more similar hormones on the waiting list (e.g., visfatin and omentin) whose function and clinical significance remain to be fully characterized. This uncharted territory in the relationship between adipocytokines in neonatal umbilical cord blood and fetal growth and development remains to be claimed by any interested and devoted pediatrician and obstetrician.

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