

Effects of maternal undernutrition during late gestation on the pulmonary surfactant system and morphology in rats

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摘要.

Abstract

infancy and throughout adulthood. We investigated the effects of maternal undernutrition (50% rations of the control food intake) during the last week of gestation on the pulmonary surfactant system and lung morphometry in postnatal rats. IUGR rats exhibited a significantly lower body weight, lower lung weight, lower lung/body weight ratio, lower lung volume, and lower lung volume/body weight ratio on some postnatal days. IUGR rats had a significantly lower lung saturated phosphatidylcholine and lower plasma corticosterone levels on postnatal d 1 only, and values were comparable between control and IUGR rats in the ensuing weeks. Lung surfactant protein (SP)-A, SP-B, SP-C, and SP-D mRNA expressions were similar between control and IUGR rats. Volume fractions of the alveolar airspace were significantly lower in IUGR rats on postnatal d 7, 14, and 42. Alveolar surface areas were significantly lower in IUGR rats during the study period. The alveolar surface area/body weight ratio reached a peak on postnatal d 7, and values were significantly lower in IUGR rats on postnatal d 1, 14, 28, and 42. We conclude that maternal undernutrition during late gestation decreases lung surfactant lipid levels in the immediate postnatal period and alters the development of lung structure during the postnatal period. Alteration of lung surfactant and structure may be important in the pathogenesis of impaired pulmonary function in IUGR infants and children.