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Title: Effect of maternal low protein diet during pregnancy on the fetal liver of rats

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Abstract: Maternal protein restriction plays a critical role in the developmental programming of later disease susceptibility of the fetus. Developmental insults could exert permanent effects on health through alteration of tissue morphology. As the liver has the greatest number of functions among other body organs, this study aimed at evaluating the effects of maternal dietary protein insufficiency on the structure and the proliferative capacity of the liver in rat fetuses. Morphometric histological studies and biochemical analysis were performed. Twenty adult Albino female Wistar rats were divided into two groups after confirmation of pregnancy. Group I (ST), serving as control, was fed a standard diet (20% protein) and group II (LP) a low protein diet (5% protein). Fetuses were extracted on the day 21.5 of pregnancy. Group II morphometric results revealed a significant decrease in the mothers' weight gain, number and weight of fetuses and weight of fetal livers, but there was also an increase in the mean area of hepatocytes. Histological results showed apoptosis, vacuolization of the hepatocytes, increased positivity of the Oil Red O stained fat droplets and the PAS-positive stained glycogen granules. Liver TUNEL showed increased apoptotic nuclei. Ki-67 immunostaining showed decreased proliferation of the hepatocytes. Ultrastructurally, the nucleus showed peripheral masses of heterochromatin besides irregular nuclear and cell membranes. Mitochondria varied in shape with loss of crista. Biochemically, there was a significant decrease in the protein concentration and a significant increase in the glycogen concentration in livers of group II. It thus appears that the maternal metabolic condition not only reduced fetal growth in response to protein restriction, but also altered the structure of the liver. (C) 2012 Elsevier GmbH. All rights reserved.

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