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The origin of elevated levels of circulating DNA in blood plasma of premature neonates

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Abstract

The relationship between the concentration of cell-free DNA (cfDNA) and the number of proliferating/apoptotic lymphocytes in peripheral blood of premature newborns of different gestation age and full-term newborns was determined. The experiments were performed using fluorescent spectrophotometry (with Hoechst 33342), flow cytometry, and microscopy (Feulgen staining of lymphocytes). It was determined that the lymphocyte population of premature newborns may consist of 4.6% of proliferating and 22.1% apoptotic cells. For full-term newborns, the percentage was 2.5% and 2.9%, respectively. A direct correlation between the concentration of extracellular DNA and the number of proliferating lymphocytes of full-term newborns was ascertained ($r = 0.400$; $P < 0.05$). For premature newborns, the concentration of extracellular DNA correlated both with proliferating lymphocytes and apoptotic cells. The results show that premature birth causes the induction in lymphocytes of both apoptosis and proliferation that are accompanied by an increased extracellular DNA concentration in the blood of newborn babies. © 2008 New York Academy of Sciences.

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Keywords

Apoptosis, Cell-free DNA, Lymphocytes, Premature neonates