

Analysis of the Proliferative Potential of Trophoblasts throughout Pregnancy

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Abstract : Trophoblasts play a pivotal role in the development and maintenance of the fetoplacental environment during pregnancy. As some trophoblasts proliferate and the others differentiate in the three trimesters of gestation, trophoblasts contribute to a variety of biological processes including nutrition, circulation, and protection. The aim of this study was to investigate the proliferative potential of trophoblasts in the three trimesters of gestation, using flow cytometry and immunohistochemical staining for proliferating cell nuclear antigen (PCNA) and silver staining of nuclear organizer regions (AgNORs). Flow cytometric analysis revealed a significant decrease in the proliferative index as the gestational period progressed, suggesting that the number of proliferating cytotrophoblasts may gradually decrease in pregnancy. During pregnancy, villous cytotrophoblasts as well as anchoring villous cytotrophoblasts were positively stained with antibody against PCNA, whereas villous syncytiotrophoblasts and intermediate trophoblasts displayed negative staining. No significant difference in the number of positively-stained trophoblasts was found between the first and third trimester. In silver staining for NORs, the number of dots per cytotrophoblast nucleus was significantly increased, compared to that of syncytiotrophoblasts, both in the first and the third trimesters. In addition, the area per dot of AgNORs in the cytotrophoblasts was significantly reduced, compared to that in syncytiotrophoblasts, both in the first and third trimesters. However, temporally there were no significant differences throughout pregnancy in the number of dots per nucleus or area per dot of AgNORs in either cytotrophoblasts or syncytiotrophoblasts. Taken together, these results suggest that trophoblasts may restore proliferative properties throughout pregnancy.

Key words : Pregnancy, Trophoblast, Proliferation, Intrauterine growth restriction (IUGR)