Objective: To investigate the role of placental cellular apoptosis through Bcl-2/Bax immunoreactive expression and ultrastructural alterations in placenta of tea garden workers.

Samples: Tissue specimens from 50 full term placentas of tea garden workers (TGW) and 35 normal term placentas appropriate for gestational age (AGA) of house wives were collected.

Method: Bcl-2/Bax expression was assessed by immunohistochemistry on paraffin-embedded sections; whereas, apoptosis was evaluated by terminal deoxynucleotidyl transferase-mediated deoxyuridine triphosphate nick end labeling (TUNEL) assay and transmission electron microscopy (TEM).

Results & Conclusions: Bcl-2 protein was abundantly immunolocalized in syncytiotrophoblasts of normal term placentas of house wives, while, least abundant in term placentas of TGW. Bax was over-expressed in placental tissue of TGW than those of house wives. In accordance with the change of ratio of these two molecules, the increase of apoptotic cells was observed in placenta of TGW. These data indicate that Bcl-2 and Bax are spatio-temporally regulated during placental development and the difference in their expression is at least in part responsible for the delicate balance between cell proliferation and programmed cell death in the human placenta. Apoptosis was indicated by the morphological features, such as, condensation and margination of chromatin along an intact nuclear envelop in syncytiotrophoblast nuclei; villous surface fibrin deposits; loss of microvilli with membrane blebbing; cytoplasmic condensation; autophagocytosis of cellular debris containing nuclear fragments. From these TEM observations, it could be concluded that human placental syncytiotrophoblast undergoes apoptosis, and this process is associated with breaks in the trophoblast covering of villi. In case of low birth weight (LBW) babies placenta, typical features of apoptosis were observed including internucleosomal DNA degradation, and both nuclear (nuclear condensation and fragmentation) and extranuclear (cell blebbing) morphological alterations. The placental cellular apoptosis was confirmed by TUNEL assay. Trophoblastic apoptosis of the placenta might play an important role in the pathogenesis of LBW babies in case of TGW, and thus may be related to lowered expression of Bcl-2 and higher expression of Bax.

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