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Immune regulation in the human decidua

Despite the intensive research on the maternal immune system during pregnancy, the knowledge about local cellular and molecular mechanisms at the maternal-fetal interface has remained incomplete. Therefore, we have studied the important regulatory factors of the immune system from the maternal-fetal interface. CD14+ monocytes and macrophages were characterized from the human decidua. The cell surface phenotype of these cells was analyzed as well as their capacity to differentiate into dendritic cells (DCs). The cytokine production of human decidual macrophages was studied and the mRNA expression of tryptophan catabolizing enzyme, indoleamine 2,3-dioxygenase (IDO) was determined. The results imply that the decidual CD14+ cells share characteristics of immunoregulatory DCs, including cell surface phenotype, constitutive IL-10 production and the expression of IDO. Regulatory T (Treg) cells have been established as crucial players in the peripheral tolerance. In the present study a population of Treg cells, expressing CD4+CD25+ and intracellular CTLA-4 was shown to be present in the human decidua. Decidual Treg cells also expressed GITR and OX40, markers that are associated with Treg cells. Furthermore, the cytokine profiles from the second trimester amniotic fluid (AF) from normal pregnancy and patients with subsequent pre-eclampsia and preterm birth were analyzed. Cytokine levels in the AF samples did not significantly differ between women with subsequent pregnancy complications and those with normal pregnancy. CD14+ macrophages and Treg cells represent important immunoregulators in the human decidua and they are proposed to be the key factors in the maintenance of tolerance and immunosuppression at the maternal-fetal interface.

Keywords: decidua, macrophages, indoleamine 2,3-dioxygenase, regulatory T cells, peripheral tolerance

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