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T helper 1 and T helper 2 immune response and pregnancy

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OBJECTIVE

T helper 1 (TH1) or T helper 2 (TH2) cytokines mediate interactions between lymphocytes, macrophages, B cells and cells associated with the placenta. Cytokines such as INF-g or TNF-a are made and secreted by TH1 lymphocytes and regulate cell-mediated immunity, which may interfere with cells growth in the placenta. In contrast, TH2 cytokines such as IL-4 or IL-10 regulate humoral immunity and may promote placental growth. This review will focus on T helper 1 and T helper 2 immune responses in normal pregnancy, recurrent pregnancy losses (RSA) and infertility of implantation failures (IVFf).

MATERIALS AND METHODS

4 color flow cytometric studies of TH1 and TH2 intracellular cytokine expression, inflammatory cytokines and chemokine levels, natural killer cell cytotoxicity and its subsets, and peripheral blood lymphocyte subsets in women with successful pregnancies, RSAs and/or IVFf will be shown and discussed.

RESULTS

The ratios of TH1/TH2 cytokine expression are significantly elevated in women with RSA and IVFf compared with fertile controls, suggesting a TH1 cytokinopahty in these women.

Inflammatory cytokines, such as TNF-α, INF-γ, and CCR5 are significantly elevated in proportion of women with RSA or IVFf.

Increased CD 69+ and decreased CD94+ expression on peripheral blood NK cells are demonstrated in women with RSA and IVFf. During normal pregnancies, NK cell cytotoxicity is significantly suppressed as compared to non-pregnant status. Suppression of NK cytotoxicity and CD 56+ NK cell levels are not changed during each trimester of pregnancies. However, CD19+/5+ B cell levels are significantly down-regulated towards the third trimester. Intracellular cytokine expression of IL-4 in CD3+/CD4+ cells is significantly elevated during first trimester as compared to those of 3rd trimester in women with successful pregnancies.

CONCLUSION

Proclivity to TH1 immune response is associated with reproductive failures, such as recurrent pregnancy losses and infertility of implantation failures. Contrast to this, TH2 immune response is necessary for a successful pregnancy.