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Suppressive effect of pregnant serum on murine dendritic cell function

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Abstract

Aim: Tolerance to the semi-allogenic fetal graft by the maternal immune system is a medical enigma. Many aspects of immunoregulation at the feto–maternal interface have been clarified, but systemic effects of pregnancy on the immune system are still elusive. The present study was undertaken to determine whether mid-pregnancy mouse serum has an inhibitory effect on dendritic cells (DC) function.

Material and Methods: Mid-gestational sera were obtained from allogenic pregnant Balb/c mice (Balb/c ¥ C57BL/6) on days 9–11 of gestation. Splenic DC were purified from Balb/c mice, and treated with mid-pregnancy mouse serum. Antigen pulsed DC were injected into mice palms. After 5 days, draining lymph nodes were removed, cultured in the presence of cognate antigen, and proliferation of responding cells was measured by ^{3}H-thymidin incorporation. Interleukin (IL)-10 and interferon-gamma (IFN-g) production by stimulated lymph node antigen-specific cells was also measured in culture supernatants using sandwich ELISA.

Results: Treatment of DC with pregnant mouse serum markedly blocked their ability to induce antigen-specific lymphocyte proliferation and IFN-g and IL-10 production by primed lymph node cells in comparison with non-pregnant serum-treated DC.

Conclusion: Pregnant mouse serum has an inhibitory effect on DC capacity to induce antigen-specific proliferation and cytokine secretion by lymph node cells. The suppressive effects of pregnant serum on DC could be considered as one of the mechanisms responsible for the systemic immunomodulation observed during pregnancy.

Key words: cytokine, dendritic cell, pregnancy, proliferation, serum.

Introduction

The conceptus genome is half-paternal and half-maternal. It is thus logical to presume that the immune system of the mother should reject it, as it does every paternal graft,[1] but this generally does not occur dur- ing pregnancy. Indeed, the maternal immune system is capable of recognizing and reacting against fetal antigens (Ag). Nonetheless, during normal pregnancy, these kinds of responses do not have any negative consequences.[2]

The pregnancy site is dominated by immunosuppressive microenvironment. Induction of apoptosis in immune cells circulating to decidua by Fas–FasL interaction,[3] secretion of pregnancy-related hormones with immunomodulatory effects,[4] the presence of comple- ment regulatory proteins at the feto–maternal inter- face,[5,6] inhibition of natural killer cell cytotoxic activity