Inhibitory effect of Decidual Culture Supernatants on Antigen Presentation by Dendritic cells

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Abstract

Introduction: Despite the unrecognized nature of fetal antigens for maternal immune system, the fetus is usually not rejected and is rather sustained by maternal immune system. The immunological mechanisms that protect the fetus from rejection are not completely understood. One of the main hypotheses is the appearance of immuno-suppressive factors in the feto-maternal interface that suppress maternal immune responses against the fetus. Although the effects of decidual or placental cell culture supernatants on the function of different immune cells have been studied, the effects of such factors on dendritic cells (DCs) have not been evaluated yet. In this study the immunomodulatory activity of decidual cell culture supernatants on in vivo antigen presentation by DCs has been addressed.

Materials and Methods: Decidual cells obtained from the uteri of allogenic pregnant mice (Balb/c× C57BL/6) on day 12 post conception, were cultured for 48 hours and supernatants collected. DCs were purified from Balb/c mice spleens by a four step method including collagenase digestion of splenic tissues, selection of low density cells by Optiprep density gradient centrifugation, plastic adherence and overnight culture. The purity of dendritic cells was detected by flow cytometry method using anti CDllc antibodies. During overnight cultures, DCs were pulsed with antigen. In some cultures decidual supernatants were added at 5%, 10% or 20% fractions of the final volume. Antigen pulsed DCs were injected into the footpads of syngeneic mice and after 5 days, draining lymph nodes were excised. Lymph node cells of immunized mice were cultured in the presence of antigen and the rates of cell proliferation were measured on the 4^{th} day by thymidine incorporation.

Results: The results showed that antigen-pulsed DCs primed antigen-specific lymphocytes efficiently and the primed lymphocytes did proliferate vigorously in response to recall antigen in vitro (cpm=89210± 3632). Treatment of DCs with decidual culture supernatants by any concentration, markedly blocked antigen presention by these cells and significantly reduced the extent of antigen-specific proliferation of lymphocytes primed with such DCs. (cpm= 6200±582) ($p<0.0001$).

Conclusion: To our knowledge this is the first report on the effect of decidual culture supernatants on antigen presentation by DCs. It seems that inhibition of antigen presentation by DCs is one of the main mechanisms of maternal immunological tolerance to the fetus since DCs, as the most potent antigen presenting cells, could potentially present paternal antigens to maternal T lymphocytes and thereby provoke destructive immunological responses to the fetus.

Key Words: Dendritic cells, Antigen Presentation, Decidua, Cell culture supernatant, Pregnancy, and Fetus.

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