Effect of pregnant mouse serum on induction of indolamine 2, 3-dioxygenase in dendritic cells

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Abstract

Introduction: Several studies have shown that many factors are involved in the maternal tolerance to the fetus. Indolamine 2, 3- dioxygenase (IDO) enzyme which catabolizes tryptophan is one of the factors that have been reported to play an important role leading to a successful pregnancy. The objective of this study was to evaluate the effects of pregnant mouse serum on the induction of indolamine 2, 3 dioxygenase in dendritic cells (DCs) which may be used as a basis for practical studies on the immunological bases of recurrent abortions.

Materials & Methods: Allogenic pregnant mice sera were collected in mid-pregnancy. DCs were isolated from Balb/c mouse spleen through a three-step method, including: Collagenase digestion of spleen tissue, low density cells separation via the Nycodenz density gradient centrifugation and plastic adherence. T cells were isolated from C57BL/6 mouse lymph nodes through nylon wool method. As stimulator cells, pregnant and non-pregnant mice sera treated DCs were irradiated and co-cultured with purified T cells (allogenic MLR). 1-methyl-tryptophan (1-MT), as the specific inhibitor of IDO, was added to some wells of MLR assay in different concentrations and T cells proliferation response was measured by ^{3}H-Thymidine incorporation. The MLR supernatant was also analyzed by HPLC for its tryptophan and kynurenin (Trp metabolite) content. All tests were repeated for 5 times. Man-Whitney′s non- parametric test was used to evaluate the differences among groups. Confidence interval was 95% and p-values <0.05 were regarded as significant.

Results: The results showed the ability of pregnant mice sera to reduce the dendritic cells ability in T cell proliferation induction compared to non-pregnant mice sera but addition of 1-MT did not have any significant effect on this inhibition. Additionally, IDO metabolites concentration assessment in the presence or absence of 1-MT, through HPLC method, did not show any significant difference.

Conclusion: There are many factors in pregnant mice sera such as progesterone, IL-10, Vit D3, etc. Which might cause inhibition of T lymphocyte proliferation response in allogenic MLR through affecting DCs' efficiency. Although it seems that IDO expression by DCs is not responsible for decrease in T cell proliferation after treatment of DCs by pregnant mice sera, thus some other mechanisms might be responsible for this phenomenon which their identification needs more investigation.

Key Words: Pregnancy, Dendritic cells, IDO, Allogenic MLR, HPLC.

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