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The Immunoregulatory Function of Indoleamine 2, 3 Dioxygenase and Its Application in Allotransplantation

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Abstract:

Indolemine 2, 3-dioxygenase (IDO) is a cytosolic monomeric hemoprotein enzyme that catalyses tryptophan, the least available essential amino acid in the human body, to N-formylkynurenine, which in turn rapidly degrades to give kynurenine. IDO is expressed in different tissues, especially and prominently in some subsets of antigen presenting cells (APCs) of lymphoid organs and also in the placenta of human and other mammals. Expression of IDO by certain dendritic cells, monocytes and macrophages has a regulatory effect on T cells probably by providing a tryptophan-deficient microenvironment and/or accumulation of toxic metabolites of tryptophan. This immunomodulatory function of IDO plays an essential role in different physiological and pathological states. IDO was shown to prevent rejection of the fetus during pregnancy, possibly by inhibiting alloreactive T cells. Moreover, IDO expression in APCs was suggested to control autoreactive immune responses. In this review we discuss the molecular and biological characteristics of IDO and its function in immune system as well as the potential application of this enzyme in improving the outcome of allogeneic transplantation as a local immunosuppressive factor.

Keywords:

Allogeneic transplantation ، Indoleamine 2, 3 dioxygenase ، T- lymphocytes

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