

Understanding and Exploiting the T - Cell Memory

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Abstract

Immunological memory is one of the lesser understood aspects of adaptive immunity which protects organisms from recurrent and persistent attack by pathogens. The central event in the generation of both humoral and cell mediated immune responses is the activation and clonal expansion of T cells. T cell activation is initiated by interaction of the TCR-CD3 complex with processed antigenic peptide bound to either a class I (CD8+cells) or class II (CD 4+cells) MHC molecule on the surface of antigen presenting cell (APC). On interaction of a naïve T cell with the processed antigen initiates a cascade of events which activates the resting T cell to enter the cell cycle, proliferating and developing into a clone of progeny cells, which differentiate into memory or effector T cells. Memory T cells are generated by antigen interaction and remain long but quiescent in nature, however responding with greater reactivity to a subsequent challenge with the same antigen, generating a secondary response. Memory cells, though in the G0 stage of the cell cycle require a lower level of activation than so naïve cells. A lot of work in this direction can yield a whole lot of interesting findings which will help us develop better vaccines for chronic animal diseases like Tuberculosis, Johne's disease using suitable animal models. A better understanding of these issues may lead to improvements in the design of vaccines which can be used to generate potent protective T cell memory against pathogens. In the present article various properties of memory T cells along with their implications to vaccine development have been reviewed.

Key words: Effector T cells; Memory T cells; CD4+ cells; CD8+ cells; T cell vaccines