Universität Basel

Research Project

T cell receptor control of T cell fate

Third-party funded project

Project title T cell receptor control of T cell fate
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The strength of the adaptive immune system lies in the enormous number of lymphocytes, which provide protection from an enormous number of pathogens.ă In generating such a large number of lymphocytes it's inevitable that the immune system develops some cells that are autoimmune.ă Fortunately, the body has several mechanisms to remove these autoimmune cells.ă For T lymphocytes, one important mechanism occurs in the thymus and is called negative selection.ă The general rule is that T cells with a high affinity for self-antigens are removed by programmed cell death. One project examines the relationship between the T cell affinity for self-antigen and negative selection. The goal is to determine the molecular mechanism behind the removal of dangerous T cells from the developing immune system. We are also working on a mathematical model to describe the precision of negative selection. A second project involves understanding the first steps in the activation of an autoimmune T cell. This involves activating proteins that stabilize the contact between an autoimmune T cell and a cell in the body. Finally, a third project examines how regulatory T cells control the activity of autoimmune T cells. Although self-tolerance has fascinated immunologists for 60 years, the basic molecular mechanisms are still not understood. This represents a challenging intellectual problem. A deeper understanding of self-tolerance may also lead to a deeper understanding of autoimmune diseases.

Keywords T cell, self-tolerance, thymus, negative selection, regulatory T cell, autoimmune disease
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