

Specializing Early: T Cells as Rugrats of the Immune System

By Jason Socrates Bardi

In a comical scene from Ron Howard's 1989 movie "Parenthood", Rick Moranis is reading Kafka to his three-year old daughter at bedtime—probably to pad her application to nursery school so that she can stand out in the highly competitive world of pre-school.

Specializing early pays—so says Rick Moranis, and so says the immune system.

A controversial new discovery by Louise and Michael McHeyzer-Williams in the Department of Immunology at The Scripps Research Institute suggests that helper T cells in the immune system specialize earlier than was previously believed.

Helper T cells, also known by the CD4 protein marker on their surface, are the master regulator of the adaptive immune system, initiating and regulating the entire adaptive immune response. Once activated by the recognition of an antigen, the helper T cell will produce a swirl of chemicals to clear the infection and to attract and activate other immune cells, like killer T cells and B cells.

Activated helper T cells are always one of two kinds—either especially good at helping B cells or exceptionally good at helping killer T cells. For years, the prevailing opinion among scientists has been that helper T cells become specialized into one of these two types after they are activated by antigen-presenting dendritic cells.

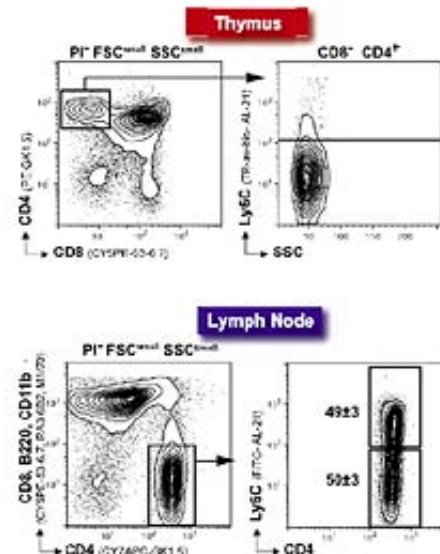
But in an article that appears in the February issue of the journal *Immunity*, the McHeyzer-Williamses show that a division among helper T cells is preexisting and occurs after the helper T cells develop in the thymus but before they are activated in the periphery.

The McHeyzer-Williamses sorted mature, na•ve helper T cells by looking at a specific marker protein called Ly6C expressed on the surface of helper T cells. Activated mature helper T cells that specialize in stimulating antibody production by B cells show high expression of Ly6C on their surface.

After three days in the periphery, and with no stimulation by the presence of antigen, the helper T cells the McHeyzer-Williamses studied could already be divided into their two corresponding phenotypic pools. When tested *in vivo* for their ability to stimulate B cells, the helper T cells with high levels of Ly6C expression were more adept at activating the B cells.

Now the McHeyzer-Williamses would like to know how the Ly6C (high) helper T cells do their specialized job and how they differ from the Ly6C (low) subset. It is also intriguing to speculate on the pre-existing function of the Ly6C (low) cells and to test their capacity to help killer T cells.

To read the article, "Developmentally Distinct Th Cells Control Plasma Cell Production In Vivo" by Louise J. McHeyzer-Williams and Michael G. McHeyzer-Williams, see



Ly6C expression divides helper T cells.

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the February 2004 issue of the journal *Immunity* (231-242)
or go to: [http://www.immunity.com/content/article/
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