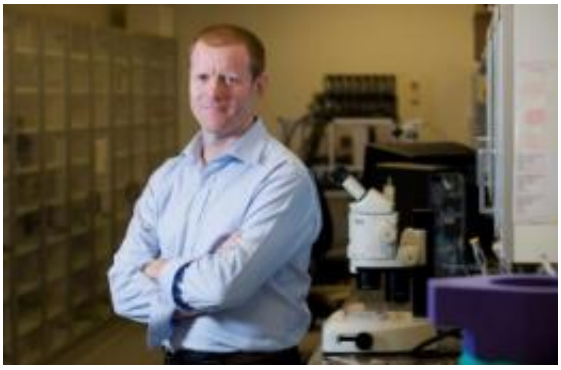
New cell type offers new hope

June 14 2011



Professor Jamie Rossjohn.

(Medical Xpress) -- A team of Melbourne scientists has discovered a new type of cell in the immune system. Their findings could ultimately lead to the development of novel drugs that strengthen the immune response against particular types of infectious organisms.

The discovery, published today in the international journal Nature Immunology, is a fundamental advance in understanding the different components of the immune system and how this system casts a net wide enough to catch all kinds of different infectious organisms.

It may also be significant for many other important diseases, including allergies, cancer and coronary artery disease.

The research team includes Dr. Onisha Patel and Professor Jamie

Rossjohn from Monash University, Dr. Adam Uldrich and Professor Dale Godfrey from the University of Melbourne, and Professor Mark Smyth from the Peter MacCallum Cancer Center.

Together, they have identified a new type of cell in the immune system that can specifically target lipids, or fats, found in the cell walls of bacteria, including Mycobacteria.

The new cell type, a kind of white blood cell, belongs to a family of T-cells that play a critical role in protection against infectious disease.

Typically, when the body is threatened with bacterial or viral infection, molecules called T-cell receptors interact with protein fragments (called peptides) from the bacterium or virus, triggering the immune response. This process has been widely studied and leads to the killing of microbes and protection against severe infection.

While the immune system is known to focus on proteins from viruses and bacteria, some T-cells in the immune system (known as NKT cells) can recognise lipid-based molecules. As such, there is great enthusiasm for the potential of these lipid-sensing T-cells in the development of novel vaccines.

Using the Australian Synchrotron, the team produced a molecular image of precisely how the new cell type's T-cell receptor recognizes lipid-based molecules.

"The use of the Australian synchrotron was essential for us to undertake our study," Dr. Patel said

"We still have so much to learn about the immune system and its various components, and the identification of a new cell type paves the way for many new studies into the unique function of these cells and how they

might be harnessed for the development of new types of vaccines," Professor Godfrey said.

Provided by Monash University