How the immune system positions its gatekeepers

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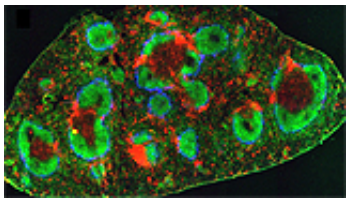

Dendritic cells (red), B cells (green) and marginal zone bridging channels (blue) in the spleen.

(Medical Xpress)—For an immune response to get underway, an invading microbe must first be halted in the spleen, and then digested by immune cells known as 'dendritic cells', which guard specific portals. Australian scientists have now shown how these gatekeepers position themselves to undertake their task.

An immune response involves different immune cells interacting with one another to dispose of an invading organism or 'antigen'. Dendritic cells capture viruses or bacteria, process them, then deliver information to other immune cells known as T helper cells, which in turn deliver information to B cells, the makers of antibodies.

Dr Dominique Gatto and Associate Professor Robert Brink from Sydney's Garvan Institute of Medical Research have shown that the dendritic cells express a particular cell surface receptor known as EBI2. They demonstrated that without EBI2, not only do these cells fail to marshall where they should, they fail to develop at all, effectively disabling the adaptive immune response. The findings are published online today in the journal *Nature Immunology*.

"It so happens that the parts of the spleen where these dendritic cells cluster, known as 'marginal zone bridging channels', are very important filtering points or portals, for capturing blood borne infections," said Associate Professor Brink.

"Blood seeps around the outside of the spleen, carrying antigens, and they tend to get trapped at these points, like particles in a sieve, allowing the exquisitely well-placed dendritic cells to capture them."

"When you see images of the way cells cluster in the spleen, the whole system looks remarkably like a well-organised transport hub, with a T cell area in the middle, B cell zones around that, and clear entry points, guarded by dendritic cells."

"Remove EBI2 and you don't have dendritic cells sitting where they have to be in order to capture antigens and activate other cells."

Movement of immune cells is always guided by 'ligands', or substances that attract cell surface receptors. The ligand for EBI2 is made in the spleen, and also attracts B cells that express EBI2.

Brink observed that the attraction of a receptor to a ligand is very similar to that of a moth to a flame. "It's how the body can organise these cells so exquisitely in three dimensions – can put them in exactly the right places for them to carry out their functions."

"While this is a basic science finding, it's a very important one that advances our understanding of how the adaptive immune response works."

More information:
www.nature.com/ni/journal/vaop … nt/full/ni.2555.html

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