Unsuspected aspect of immune regulation revealed

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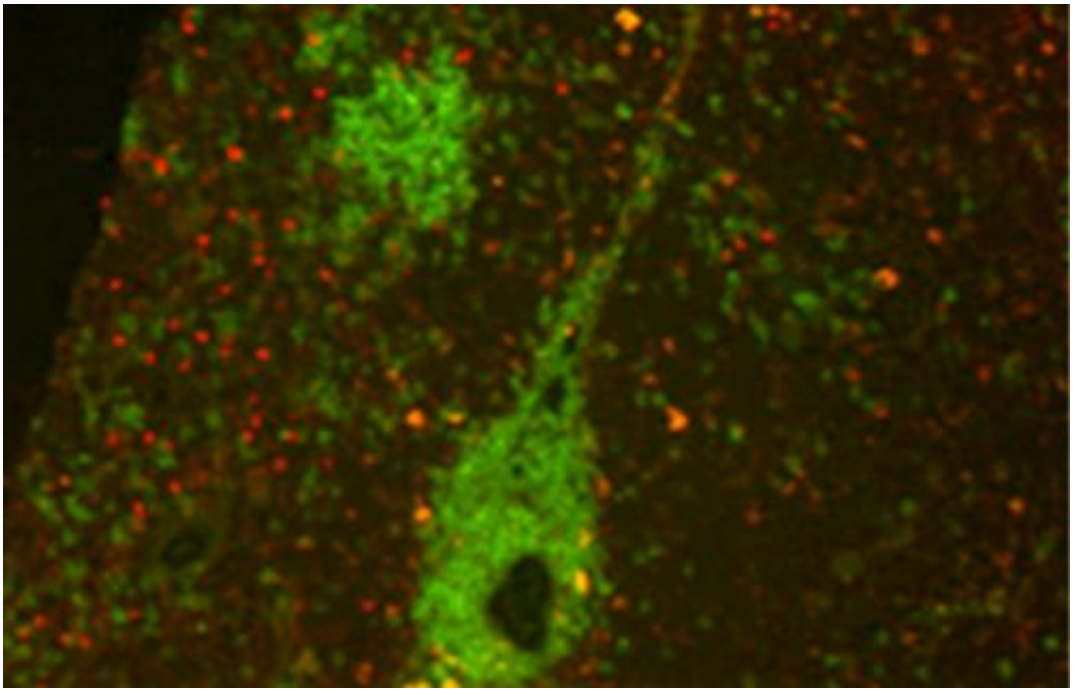

This image depicts B cells (stained green) and regulatory T cells (stained red) in the thymus. Credit: Garvan Institute of Medical Research

Until now, the immune cells known as 'B cells' have been thought to specialise only in the production of antibodies. A discovery by Garvan immunologists shows they also have a role to play in regulating another important aspect of the immune system. This finding may benefit research into autoimmunity and transplantation.

A discovery by Australian immunologists, uncovering an additional role for antibody-making 'B cells', is considered important enough by the American Association of Immunologists to rank it among the top 10% of articles in the latest issue of *The Journal of Immunology*, off the press today.

The finding by Senior Research Assistant Stacey Walters and Associate Professor Shane Grey, from Sydney's Garvan Institute of Medical Research, shows that B cells also participate in the development of 'regulatory T cells'.

T cells develop in the thymus gland, a soft triangular organ in the chest cavity. From a 'naïve', or undifferentiated, state they are gradually 'educated' to become helpers, or warriors, or regulators.

Until now, the only non-thymic cells known to educate the regulators were dendritic cells, which travel to the thymus to deliver 'antigen', samples of substances toxic to the body. We now know that B cells can do the same thing.

B cells have been thought to specialize only in the production of antibodies. As newfound educators of T cells as well, B cells become much more interesting and complex characters, potentially useful in helping to prevent organ rejection, or control inflammatory bowel disease, or quell autoimmune conditions.

That is because regulatory T cells control how killer T cells behave – and can effectively prevent the warriors from attacking 'self' tissue, or tissue perceived as foreign. In the case of organ transplantation, several studies have shown that high levels of regulatory T cells can prevent organ rejection.

"Regulatory T cells are critical in the outcome of an immune response –

so anything that in turn regulates them becomes very interesting to immunologists," said Associate Professor Grey.

"Right now there are clinical trials around the world looking to expand populations of these cells in patients. Researchers are also working on ways to grow regulatory cells in the laboratory – to infuse into patients as therapy."

"Everyone is interested in finding ways to treat autoimmunity and prevent transplant rejection. Expansion of regulatory T cells should help in both cases."

"Our finding suggests it should be possible to set up systems that harness B cells to expand regulatory cells."

The Garvan lab members worked with mice genetically modified to express high levels of 'BAFF', a substance that increases survival of B cells. The higher number of B cells overall allowed researchers to track the activity of B cells in the thymus.

"It has been known for years that some B cells travel to the thymus, but no-one has understood why," said Stacey Walters.

"Our experiments showed clearly that B cells participated in the creation of regulatory T cells – the more B cells that were in the thymus, the higher the number of regulatory cells generated. That direct correlation raises interesting possibilities."

"One possibility is using BAFF, a non-toxic substance, to ramp up the B cell count of patients before transplant procedures. It will be very interesting to test whether or not that would prevent rejection."

More information: *The Journal of Immunology*,