

Busy Bs: Lymphocyte uses multiple mechanisms to shape immune response

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New research expands our understanding of how a type of immune cell called a B lymphocyte enables the immune system to mount a successful defense against an intestinal parasite. The study, published by Cell Press online in the journal *Immunity* on 26 February, provides some intriguing insight into the variety of mechanisms implemented by B cells to protect the host from infection.

B cells are critical cells of the immune system that produce antibodies (Abs) to help rid the body of harmful pathogens. This type of immunity, called "humoral immunity", is complemented by "cellular immunity" which is mediated by T lymphocytes. Research has shown that B cells do not just produce Abs but can regulate the immune response in many other ways as well. B cells produce critical regulatory chemicals called cytokines and there is some evidence that B cells may amplify T cell dependent immune responses.

An earlier study by Dr. Frances E. Lund from the Department of Medicine at the University of Rochester indicated that specific types of B cells may promote the maturation of T cells. To gain insight into the mechanisms used by B cells, Dr. Lund and colleagues performed a series of experiments to examine whether cytokine-producing B cells are required for protection against the intestinal parasite, *Heligmosomoides polygyrus* (*Hp*).

The researchers found that B cells were required for protection against *Hp* and that B cells mediate protection, in part, by producing Abs. In

addition, B cells promoted the production and long-term maintenance of an essential type of T cell, called T helper 2 cells (Th2), which are known to be critical for protection from *Hp*. Importantly, the influence of B cells on the Th2 cells was independent of antibody production.

The researchers went on to show that B cell-derived cytokines interleukin-2 and tumor necrosis factor γ were required both for effective Ab and for Th2 cell responses to *Hp*. Therefore, in addition to Ab production, B cells also make a critical contribution to the immune response to this pathogen by regulating T cells.

"Our findings fill an important gap as they show for the first time that multiple cytokines made by B cells regulate both humoral and cellular protective immune responses to infectious organisms," says Dr. Lund. "In addition to protective effects, we also suggest that cytokine-producing B cells may play a role in damaging immune responses, such as reactions to allergens and autoantigens. Therefore, B cell subsets may represent future targets for many types of therapeutics to treat allergy, asthma and autoimmunity."

Source: Cell Press

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