

B cells are required for optimal resistance to the gastrointestinal nematode *Heligmosomoides polygyrus*

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Acquired resistance to the parasitic gastrointestinal nematode *Heligmosomoides polygyrus* is thought to be largely dependent on the presence of IL-4-secreting CD4⁺ T cells. The role of B cells (and their products) has not however been extensively evaluated in *H. polygyrus* infection. Using intracellular cytokine staining we previously reported that CD19⁺ B cells isolated from mesenteric lymph nodes of *H. polygyrus*-infected B6 mice express low levels IL-4 upon restimulation (Harris et al., 2000). A small fraction of CD19⁺; GFP⁺ B cells can be detected directly *ex vivo* in 4get, IL-4-transcription reporter mice following *H. polygyrus* infection. To further characterize the role of B cells and B cell-derived IL-4, mixed bone marrow chimeric mice lacking either the entire peripheral B cell pool or lacking IL-4-sufficient B cells were infected with *H. polygyrus*. We found that B cell-deficient chimeras were significantly impaired in their ability to clear a secondary worm infection whereas worm expulsion in control, B cell-sufficient chimeric mice was very efficient. Chimeric mice lacking IL-4-sufficient B cells were able to clear worms almost as effectively as control mice and were able to mount normal IgG1 *H. polygyrus*-specific antibody responses. However, these mice had significantly reduced titers of total IgE, suggesting that production of IL-4 by B cells, may play a role in the regulation of switching to IgE in an autocrine fashion. The development of normal lymphoid architecture is dependent in part on Lymphotoxin β , produced largely by B cells. Chimeric mice lacking LT β -sufficient B cells showed an intermediate phenotype with respect to their ability to clear worms, being less effective than control mice but not as impaired as mice devoid of B cells. Mice lacking LT β -sufficient B cells also had significantly lower titers of IgM and IgG1 antigen-specific antibody, but were not impaired in their capacity to mount IgA or IgE responses. Our data shows that optimal induction of immunity to the intestinal nematode *H. polygyrus* requires B cells. Furthermore, cytokines made by B cells are likely to play an important role in regulating appropriate B cell immune responses and may also contribute to the regulation of other effector cells during parasitic infections.

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Harris et al., Nature Immunology (2000). 1:475