Dynamics of Germinal Center and Regulatory B Cells in *Leishmania amazonensis* Infection: Insights from Susceptible and Partially Resistant Mouse Models

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The role of B lymphocytes in leishmaniasis varies by parasite strain and animal model. This study examines B cell responses in BALB/c (susceptible) and C57BL/6 (partially resistant) mice after *Leishmania amazonensis* infection. Both models were infected in the ear. Early in infection, BALB/c mice developed larger lesions, though parasite loads in the ear and lymph nodes were similar. Later, BALB/c mice had more severe lesions and higher parasite loads than C57BL/6 mice. Antibody production was also analyzed. BALB/c mice showed higher IgG (early), IgG1 (early and late), and IgM (early and late) but lower IgG2b and IgG2a/c in early infection. Germinal center (GC) B cell activity was higher in BALB/c mice at both stages, suggesting enhanced antibody production.

Regulatory B (Breg) cells were also investigated. Infection induced PD-L1 expression in BALB/c B cells early on. Both models produced IL-10 in PD-L1$^+$ B cells at this stage, but at later stages, PD-L1 increased only in C57BL/6 mice, without IL-10 production. At the lesion site, PD-L1$^+$ B cells increased in both models early on, but IL-10 production was observed only in C57BL/6 mice. This phenotype disappeared in chronic infection, suggesting IL-10 is linked to peak infection. IL-10 knockout mice showed increased lesion size and parasite load at this peak. Additionally, FACS-sorted IL-10$^+$ B cells transferred into MHCII-/- mice helped control lesion progression but did not affect parasite load.

These findings underscore the role of IL-10$^+$ B cells in lesion control in C57BL/6 mice, offering insights into the immunoregulatory functions of B cells in *L. amazonensis* infection.

Supported by: CNPq, FAPERJ

Keywords: *Leishmania amazonensis*; B lymphocyte; IL-10.