

# PLASMODIUM BERGHEI INFECTION MODULATES BCG-INDUCED MEMORY IN WILDTYPE C57BL/6 MICE.

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## Background

A coinfection of tuberculosis and malaria is common in many tropical areas where the distributions of these diseases overlap. Bacillus Calmette-Guerin (BCG) vaccination has been widely used against tuberculosis over the decades despite its variability in efficacy. The variability in efficacy could be attributed in part to coinfections. Very few studies have investigated the impact of malaria on BCG vaccination. A previous study in mouse pulmonary TB on the less virulent strain, *Plasmodium yoelli* showed that malaria infections do not abrogate BCG immunity against *M. tuberculosis*, however, during *Plasmodium berghei* infection, mice succumb to massive inflammatory complications and eventually die if not treated. We postulate that malaria hampers BCG-induced memory and the effect is virulence driven. The study aimed to investigate the impact of *Plasmodium berghei* on BCG-induced memory in wild type C57BL/6 mice and to examine the immune mechanisms involved.

## Methods

C57BL/6 mice were infected intraperitoneally with *Plasmodium berghei* six weeks after BCG vaccination alongside appropriate controls. Six mice per group were killed at predetermined time points and splenocytes stained for analysis by flow cytometry. In vitro coculture of splenocytes from BCG vaccinated mice and *Plasmodium berghei* infected erythrocytes was also done to stain for apoptosis. Data was analyzed using graphpad prism and significant differences between groups was done using student t test.

## Results

We observed a time-dependent loss of central memory T cells and marginal zone B cells following infection with *Plasmodium berghei*, with a strong effector T cell response enhanced by BCG vaccination. Both in vivo and in vitro staining revealed a role for apoptosis in the destruction of central memory T cells. It remains to be confirmed whether loss of central memory T cell results in loss of protection against *Mycobacterium tuberculosis*.

## Conclusion

Therefore, *Plasmodium berghei* alters the immunity induced by BCG. Further investigation on the mechanisms involved would suggest new strategies to the search for more effective vaccines that could withstand the pressures from coinfections.