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"The impact of helminth-coinfection on the innate and adaptive immune response to *Toxoplasma gondii*"

by
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Infection, Immunity and Inflammation Program

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Thursday, March 24th, 2022
11:00 A.M.

Join Zoom presentation
https://rutgers.zoom.us/j/98696536444?pwd=OTFKVGNLUVdaL25WbzF1N3AvNHRPdz09
Meeting ID: 986 9653 6444
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ABSTRACT

More than 2 billion people worldwide are infected with parasitic worms (helminths). Upon helminth infection, the host mounts a type 2 immune response to promote helminth expulsion and repair the tissue damaged by the worm. Given the high incidence in helminth infections, it is possible for individuals to experience concomitant infection with helminth and intracellular microbes. Although it is known that the helminth-induced type 2 response have the potential to suppress the efficacy of the type 1 pro-inflammatory responses required for the immunity against intracellular pathogens in the context of a coinfection, the exact mechanism(s) for the helminth-induced immunomodulation is still a fundamental question in the field. Moreover, as type 1 responses are required for the induction of a protective immunity in numerous microbial vaccination models, it is relevant to understand the helminth triggered immunomodulatory effects to maximize vaccine efficacy. My work focuses on describing how infection with an intestinal helminth decreases host survival and blunts the innate and adaptive immune response towards the intracellular microbe *Toxoplasma gondii* (*T.gondii*). Using a coinfection model with the murine intestinal helminth *Heligmosomoides polygyrus* (*H.polygyrus*) followed by infection with *T.gondii*, we evaluated the impact of the helminth infection on the innate and adaptive compartments of the type 1 immune response to *T.gondii*. Helminth coinfection had a strong suppressive effect on the neutrophil, monocytic and early IFNγ/IL-12 responses. The IFNγ response was later restored by compensatory production from T cells despite decreased effector differentiation of *T.gondii*-specific CD8 T cells. In accordance with the attenuated IFNγ response, parasite loads were elevated during the acute phase (d10) of *T.gondii* infection, but were transiently controlled by the compensatory T cell response. Unexpectedly, 40-percent of helminth coinfected mice exhibit a sustained weight loss phenotype during the post-acute phase (d14-18) that was not caused by *T.gondii* outgrowth, indicating that coinfection led to decreased disease tolerance during *T.gondii* infection. Altogether, these results highlight the variability and dynamic nature of the helminth immunomodulatory effects on concomitant infections or immune responses.