Abstract

Trichobilharzia regenti is an avian schistosome extraordinary for its neurotropism. Besides infecting its final hosts, waterfowl, it can also infect mammals where the immune response quickly kills the parasite. Yet, the mechanisms are still unclear. Therefore, the main objective of this thesis was to describe the dynamics of the myeloid part of the immune system in the central nervous system (CNS) part of the infection. Our results showed that the main cells responding to the presence of *T. regenti* in the CNS of mice were eosinophils. Their numbers peaked at 14 days post infection when many of the migrating schistosomula are damaged or destroyed suggesting that eosinophils might play a role in parasite clearance. At the same time point the markers of M2 polarization of microglia/macrophages culminated. The most upregulated molecules were those inducing oligodendrogenesis and neuron regeneration. Based on the polarization of microglia/macrophages and their close proximity to schistosomula, they seem to be important for tissue repair after the infection.

Eosinophils, like neutrophils, can produce extracellular traps formed from DNA and contents of granules. These traps can capture and damage various nematodes and they might be effective against other parasites too. Therefore, we aimed to test whether these traps might be effective against *T. regenti*. Indeed, we observed increased *in vitro* trap formation after stimulating eosinophils with *T. regenti* schistosomula homogenate together with higher eosinophil apoptosis rate. However, whether the traps are effective against live schistosomula, especially in *in vivo* setting, remains to be tested.

Finally, we tested whether the M2 polarization, which is present in the whole CNS regardless of presence of the parasite in the CNS segment, is strong enough to counteract the inflammation induced by experimental autoimmune encephalomyelitis, a model of multiple sclerosis. Unfortunately, that is not the case as the *T. regenti* infection did not alleviate the clinical symptoms. However, we were able to uncover a novel interaction between IFN-γ and eosinophils which could diminish the M2 healing properties.

Taken together, this thesis presents a complex insight into the myeloid cell response during the *T. regenti* infection of CNS of mice, supports the importance of M2-polarized cells during and after neuroinfection or neuroinflammation, widens the range of parasites which can be fought using eosinophil extracellular traps and finally adds to the pool of immunomodulatory helminths unsuitable for treatment of autoimmune disease but helpful in understanding the immune pathways of some pathologies.

Key words

Trichobilharzia regenti; myeloid cells; microglia; macrophages; eosinophils; eosinophil extracellular traps; multiple sclerosis; experimental autoimmune encephalomyelitis