

Abstract:

Gastropod molluscs are naturally exposed to various pathogens such as bacteria, or multicellular parasites that include digenetic trematodes (digeneans) which develop in snails. To combat these pathogens gastropods have evolved a sophisticated internal defence system that is composed of humoral and cellular arms. Lectins are probably the most important humoral components, whereas haemocytes represent the main effector cells. Immunity is one of the important factors determining compatibility/non-compatibility of gastropods and pathogens (particularly snails and trematodes).

The introductory part of this thesis includes a review of literature focused on the components of the gastropod immune system and their reactions against pathogens represented by bacteria and digeneans. Additionally, selected immunomodulations caused by compatible digenean species are reviewed. Experimental work (presented in publications) focused mainly on the influence of the bird schistosome *Trichobilharzia regenti* on haemocyte activities of two lymnaeid snail species, *Radix lagotis* and *Lymnaea stagnalis* that are susceptible or refractory to the parasite, respectively. This schistosome parasite causes neuromotor disorders in specific definitive hosts (waterfowl), but it also causes cercarial dermatitis in accidental hosts such as humans.

The original papers include a review that in part concentrates on intramolluscan development of bird schistosomes, and immune interactions between the parasites and the snail hosts. The publication that focused on *R. lagotis* describes haemocyte defence responses related to the initial phase of *T. regenti* infection, and their modulations during the patent phase of infection. The publication concerning *L. stagnalis* summarises investigations on extracellular trap-like (ET-like) fiber production by snail haemocytes against *T. regenti* and other components as a novel defence response. Furthermore, this phenomenon was studied in two other snail species (*R. lagotis* and *Planorbarius corneus*) for comparative purposes.

The results showed that *R. lagotis* haemocytes aggregate near invading *T. regenti*, however, the parasite appears undamaged. During the patent phase of infection, snail defence activities are modulated as shown for phagocytosis and hydrogen peroxide production. Importantly, such modulations likely occur via interference with cell signalling pathways and such changes may be important for sustained *T. regenti* survival and propagation within *R. lagotis*. The ability of haemocytes from several snail species to produce ET-like fibers is low and, therefore, their role in defence against pathogens is likely marginal. Together, the obtained data provide the first insights into the immune reactions of snails against *T. regenti* allowing us to better comprehend compatibility/incompatibility in snail-schistosome interactions.