

*Toxocara canis* is a remarkable example of a helminth parasite. This nematode is commonly found in dogs but can invade a wide range of other host, including humans. It follows the conventional life cycle of an ascarid nematode. The eggs enter the host through the oral route, larvae emerge in the stomach and penetrate the epithelium. Larvae then invade the soft tissue, before reaching the lungs and return through the trachea and oesophagus to the gastrointestinal tract. The full development cycle proceeds only in dogs and related canid species, but in all hosts the larvae are capable of surviving for up to a decade in the face of an active immune system. In humans, larvae can enter the muscles, lung, brain or eye, giving rise to visceral or ocular larva migrans.

In the human host, the migration of *T. canis* larvae to lungs results in respiratory distress such as wheezing, coughs, mucous production and hyperreactivity of the airways. Although several epidemiological and experimental studies suggest that *T. canis* contributes to the development of allergic manifestations, including asthma, other studies have not found any association between these two immunopathologies. Therefore, studies to investigate the precise immunological mechanisms and the factors involved in the helminth allergy-association are needed.

The aim of the study is an in-depth characterization of the immune response which develops in lungs of *T. canis* infected hosts. Moreover, we will analyse the association of interleukin 6 with the pathological process. IL-6 is a cytokine with a broad range of effects and it was shown to contribute to asthma and other pulmonary diseases. We hypothesize that it also contributes to lung pathology during toxocariasis. Our preliminary results also suggest that one of molecules which is intensively secreted by the parasite may interfere with signal transduction from the cytokine receptor into the nucleus and by this means it affects target gene expression.

The proposed multidisciplinary project will primarily provide new data and strategies to understand the pathology induced by *T. canis*, with focus on the interaction with respiratory tissues and the pulmonary immune system. A better understanding of these aspects of the infection will hopefully help to improve the therapeutic methods of human toxocariasis.

The project will be conducted in collaboration with scientists from the Institute of Specific Prophylaxis and Tropical Medicine at the Medical University in Vienna which is one of the leading Central European institutes in the development of new strategies to combat immune-mediated inflammatory diseases. This will enable access to knowledge, methodologies and experience of our collaborators.

The project will also provide a PhD student position, therefore the founding will provide the possibility of the education and the development at the beginning of student's scientific career.