Allergies and autoimmune diseases such as type 1 diabetes, multiple sclerosis, ulcerative colitis and psoriasis are a serious health and economic problem on the world. We talk about these diseases when our immune system, instead of defending us against pathogens or destroying cancer cells, makes mistakes and begins to recognize our own cells as foreign. The chronic and debilitating nature of these diseases, which can lead to high treatment costs and a lower quality of life, is a burden for patients and also affects their families and society. It is estimated that autoimmune disorders occur even in 1/5 of the world's population and are now the third cause of global health problems. Despite the currently available pharmacological treatment, new strategies for fighting this type of diseases are needed to improve patients' health and provide an alternative, because of the low effectiveness of conventional therapies.

At the end of the 1980s, there has been observed a relationship between improving hygiene conditions and an increased risk of chronic inflammatory and allergic diseases. Based on this, the hygiene hypothesis was formulated. It assumes that the lack of exposure to infectious agents in early childhood increases the susceptibility to allergic and autoimmune diseases, by inhibiting the natural development of the immune system. Numerous of epidemiological data have shown a link between the reduced incidence of helminth infections and the increased incidence of autoimmune disease in developed countries.

Parasites have the ability to manipulate the immune response of the host, so that they are able to survive in his organism for a long time. During the infection, parasites secrete many proteins with immunomodulatory properties. These proteins are a promising perspective for the current treatment of autoimmune diseases. Multiple animal-based studies, confirm the action of parasitic proteins leading to the inhibition of autoimmune diseases and allergies, however, immunoregulatory mechanisms induced by parasites are still not fully understood.

Our preliminary *in vitro* studies on the human macrophages derived from THP-1 cell line showed that cathepsin B3 secreted by *Fasciola hepatica* affects the properties and polarization of macrophages. Therefore, we hypothesize that in the future, cathepsins B1, B3 and excretory-secretory products from juvenile stage of *F. hepatica* can be used as potential immunosuppressants in the treatment of autoimmune diseases.

Using molecular biology, immunological and proteomic methods, we intend to obtain recombinant cathepsins B1 and B3 and then determine their effect on human immune cells. The received results will allow us to better understand the parasite-host interactions and define whether the tested parasitic proteins are able to immunomodulate cells of the host immune system in order to reduce the inflammation.