Rheumatoid arthritis (RA) is the most common autoimmune, inflammatory, disease and affects approximately 0.5–1% of the adult population worldwide (occurs as 20–50 cases per 100,000 annually). RA mainly affects women over 40. The RA's etiological basis is not fully understood. It is believed that half of the risk factors are caused by genetic condition while the other half are environmental factors such as smoking and infectious agents. *Proteus mirabilis* bacteria are considered to be one of the possible etiologic factors of RA. The link between *Proteus mirabilis* and the etiology of the disease is influenced by many aspects. One of the arguments is molecular mimicry i.e. structural, similarities shared between macromolecules found on infectious pathogens and in host tissues. An example would be the similarity of the hemolysin HpmA structure and one of the molecular marker RA, tissue compatibility antigen HLA-DR4. Moreover, *Proteus mirabilis* have a lipopolysaccharide (LPS, endotoxin) on the cell surface similarly such as other Gram-negative bacteria. Due to strong proinflammatory and immunogenic properties, it is suggested that play a significant role in development of RA. Considering the broad structural variation of the LPS molecules, it seems to be possible that RA patients, characterized by autoimmune disorder, may produce antibodies against LPSs with less specific that lead to cross-reaction anti LPS antibodies with human molecules. There is a lot of evidence suggesting that anti-LPS antibodies may be less specific and react with host molecules. An example would be reactions of antibodies to Lipid A (the most toxic part of LPS) with human ssDNA, cardiolipin or ligand I B lymphocytes. Despite the fact that cross-reactivity of anti-LPS antibodies is the subject of numerous scientific studies, the research is basic on animal studies or cell lines. The results of these studies, are very helpful, but give incomplete arguments for the presence of non-specific immune anti-LPS antibodies in the human body.

The goal of these project is characterize the strength of interaction, kinetic of reaction, specificity and cross-reactivity anti- LPS *P. mirabilis* antibodies isolated directly from sera RA patients and comparison of the properties to healthy donors.

Obtained results will allow for assessment association of *Proteus mirabilis* with the development of RA and the role of Gram-negative bacteria in the development of autoimmune diseases