Periodontal diseases belong to a group of multifactorial, infectious diseases, initiated by an ecological shift in the composition of subgingival biofilm and an exaggerated host immune response, resulting in inflammation and destruction of tooth-supporting tissues. Oral bacteria belonging to the phylum Bacteroidetes, including *Porphyromonas gingivalis, Tannerella forsythia* and *Prevotella intermedia,* predominate in individuals with periodontitis. As part of the infective process, they require heme, which is indispensable for life and enables them to survive and multiply at the infection site, which is acquired, among others, with engagement of a novel HmuY family of hemophore-like proteins. According to our hypothesis, these proteins are used not only to acquire heme, but also take part in induction of host immune response. This project proposes continuation of our studies on structure-function relationship to further explore the importance of heme acquisition mechanism in virulence of pathogens, investigation of the correlation between different mechanisms of host recognition of main virulence factors and disease severity, and finally development of biological markers of periodontitis. Proposed studies will employ chromatographic methods to purify proteins, UV-visible spectroscopy to examine heme binding and heme sequestration from host hemoproteins, crystallography. Influence of examined proteins on host immune response will be examined using determination of IgG antibodies reactivity with antigens and determination of cytokines levels produced by blood cells. We assume that data gained from this project should broaden our knowledge on the novel mechanism of heme acquisition and explain differences in recognition of antigens produced by bacteria. This is especially important in relation to current research trends, focused on the study of the human microbiome and the existing relationships between the components of such a consortium, ensuring the maintenance of healthy tissues.