Abstract

Heme-based gas sensing proteins belong to a group of proteins that are present in signalling pathways of bacteria. A precise regulation of physiological functions, such as intercellular communication or biofilm production, is essential for the survival of these bacteria and their adaptation to the changing surrounding conditions. Heme-based gas sensors are able to detect the concentration of gas molecules in the local environment via their sensory domain (which contains a heme molecule as the intrinsic detection site) and transmit the signal to the functional domain helping to regulate the adaptation of many processes. These, often pathogenic, processes contribute to extended resistance of bacteria against antibiotics. Heme-based sensors are thus potentially a new therapeutic object of interest in antimicrobial treatment. In order to provide this type of treatment, it is crucial to understand the exact mechanism of intramolecular signal transduction facilitated by heme-based sensors. One of the approaches to unravel these mechanisms is further study of model sensory proteins. This thesis focuses on the analysis of a signal transduction performed by two model globin-coupled heme-based oxygen sensors.