IRON(II), ZINC(II) AND MANGANESE(II) BINDING TO PEPTIDES DERIVED FROM THE BACTERIAL FeoB PROTEIN

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Bacterial resistance to antibiotics is a major problem worldwide [1], hence development of alternative methods of treating bacterial infections is crucial. During infection, bacteria need to assimilate transition metal ions from the host environment, such as Fe(II), which play a key role in pathogenicity and survival. The Feo system, common in both pathogenic and non-pathogenic bacteria, is considered to be the most important bacterial transport system for Fe(II) ions, possibly transporting other divalent metal cations, such as Mn(II) and Zn(II), which are often transported by ferrous iron transporters [2]. Feo consists of three proteins, transmembrane FeoB and cytoplasmatic FeoA and FeoC proteins. The most important is the transmembrane FeoB protein, which transports metal ions to the bacterial cell from the periplasm. C- terminal end of FeoB protein located in the cytoplasm is rich in cysteine, histidine and glutamic and aspartic acids residues, that could potentially bind Fe(II), Mn(II) and Zn(II) cations.

In order to explore metal binding properties of FeoB C-terminus, two peptides derived from the C-terminus of *E.coli* K12 strain FeoB protein were chosen and their complexes with Fe(II), Zn(II) and Mn(II) ions were studied with the use of methods such as potentiometry, mass spectrometry, EPR and NMR spectroscopies. We've determined ligands protonation constants, stability constants of complexes and propose geometries of complexes and metal binding modes.

Iron(II) coordination studies are significantly lacking in the literature, due to the difficulties of maintaining the oxidation state of the metal ion. When exposed to air, Fe(II) is rapidly oxidized to Fe(III), thus anaerobic conditions must be maintained throughout the experiments. This is possibly the first study of the coordination of Fe(II) in peptide complexes conducted with various physicochemical methods.

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