Triplet of cysteines – coordinational riddle?

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Streszczenie

Polythiol binding of metal ions plays crucial role in the proper functioning of cysteine-rich proteins that are responsible for metal homeostasis and defending processes against metal toxicity (including heavy metals detoxification). The coordination properties of cysteine residues involved in specific sequencional patterns in proteins (like those present in *e.g.* metallothioneins) are interesting not only from a chemical point of view but may also lead to a better understanding of the purpose and allocation of metal ions in various biomolecules. In this study, the interaction of Zn^{2+}, Cd^{2+} and Ni^{2+} ions with four peptides containing cysteine triplet motif were studied by potentiometric and spectroscopic methods. The main goal of this research was to answer the question how effectively three thiols, each being next to other, are able to bind single metal ion. Two of peptides contain additional, fourth cysteine residue, separated from triplet by two and three other amino acid residues. As results show, all three cysteine residues in the CCC motif are able to participate in the coordination of the metal ion (Cd^{2+}, Zn^{2+}). Except cysteine thiol groups, amide nitrogen atoms are also involved in the coordination of Ni^{2+}.

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