Poly-Xaa sequences in proteins - biological role and interactions with metal ions : chemical and medical aspects.

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Background: The understanding of the bioinorganic and coordination chemistry of metalloproteins containing unusual poly-Xaa sequences, in which a single amino acid is repeated consecutively, is crucial for describing their metal binding-structure-function relationship, and therefore also crucial for understanding their medicinal potential. To the best of our knowledge, this is the first systematic review on metal complexes with polyXaa sequences.

Methods: We performed a thorough search of high quality peer reviewed literature on poly-Xaa type of sequences in proteins, focusing on their biological importance and on their interactions with metal ions.

Results: 228 papers were included in the review. More than 70% of them discussed the role of metal complexes with the studied types of sequences. In this work, we showed numerous medically important and chemically fascinating examples of possible ‘poly-Xaa' metal binding sequences.

Conclusion: Poly-Xaa sequences, in which a single amino acid is repeated consecutively, are often not only tempting binding sites for metal ions, but very often, together with the bound metal, serve as structure determinants for entire proteins. This, in turn, can have consequences for the whole organism. Such sequences in bacterial metal chaperones can be a possible target for novel, antimicrobial therapeutics.

Słowa kluczowe

metal-protein complexes, polyXaa peptide sequences, metal chaperones, metal ions, antimicrobial therapeutics

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