

General aspects of metal toxicity.

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Streszczenie

This review is focused on the general mechanisms of metal toxicity in humans. The possible and mainly confirmed mechanisms of their action is discussed. The metal are divided into four groups due to their toxic effects. First group comprises metal ions acting as Fenton reaction catalyst mainly iron and copper. These type of metal ions participate in generation of the reactive oxygen species. Metals such as nickel, cadmium and chromium are considered as carcinogenic agents. Aluminum, lead and tin are involved in neurotoxicity. The representative of the last group is mercury, which may be considered as generally toxic metal. Fenton reaction is naturally occurring process producing most active oxygen species, hydroxyl radical: $\text{Fe}^{2+} + \text{H}_2\text{O}_2 \leftrightarrow \text{Fe}^{3+} + \text{OH}^- + \text{OH}\bullet$ It is able to oxidize most of the biomolecules including DNA, proteins, lipids etc. The effect of toxicity depends on the damage molecules i.e. production site of the hydroxyl radical. Chromium toxicity depends critically on its oxidation state. The most hazardous seems to be Cr^{6+} (chromates) which are one of the strongest inorganic carcinogenic agents. Cr^{6+} species act also as oxidative agents damaging among others nucleic acids. Redox inactive Al^{3+} , Cd^{2+} or Hg^{2+} may interfere biology of other metal ions e.g. by occupying metal binding sites in biomolecules. All these aspects will be discussed in the review.

Słowa kluczowe

metal toxicity, fenton reaction, heavy metals

Adres publiczny

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