

COURSE TITLE:

BIOINORGANIC CHEMISTRY

COURSE DESCRIPTION:

Course principles: Introduction into the bioinorganic chemical approach and explanation of chemical, biological, biochemical, and medical questions by considering these different aspects. Demonstration of the multiple connection of geological and biological environment. Presentation of the role of essential and toxic elements in the living organisms on molecular level.

Brief course summary: Development of bioinorganic chemistry. Biochemical evolution: the effect of primeval atmosphere to the biochemical evolution of copper and iron. Summarized presentation of the role of elements in biological systems. Interaction of geological and biological environment; uptake of elements. Bioinorganic chemistry of essential (Na, K, Mg, Ca, Fe, Mn, Co, Cr, Ni, Cu, Zn and Mo) and some non-essential (Ti, V) metals. Biochemistry of oxygen and nitrogen groups, complexes of oxygen and nitrogen. Biomineralization. Toxicity of elements: molecular mechanism, effects of some toxic elements (Hg, Pb, Cd, Al, As) for the living organisms. Natural detoxification. Medical problems: disorder of copper metabolism (Wilson-, Menkes disease) and therapy. Effect of deficiency and excess of elements. Metals and metal-complexes in the therapy of different diseases (Li, Au,): Anti carcinogenic metal-complexes (Pt).

LITERATURE:

Margit Varga, Bioinorganic chemistry lecture notes in pdf form

Referenced literature:

W. Kaim, B. Schwederski, A. Klein, Bioinorganic Chemistry, John Wiley and Sons Ltd., 2013, ISBN: 978-0-470-97524-4

I. Bertini, H. B. Gray, S. J. Lippard, J. S. Valentine, Bioinorganic chemistry, University Science Books, Mill Valley CA, 1994, ISBN: 0-935702-57-1

S. J. Lippard, J. M. Berg, Principles of Bioinorganic Chemistry, University Science Books, Mill Valley CA, 1994, ISBN-13: 978-0935702729

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