



PROGRAMS AND BIBLIOGRAPHY

Subject	
Code	Name
QI851	Bioinorganic Chemistry

Vector
OF:S-5 T:002 P:000 L:000 O:000 D:000 HS:002 SL:002 C:002 AV:N EX:S FM:75%

Pre requirement	None
------------------------	------

Summary
Concepts and definitions in Bioinorganic Chemistry. Metal ions in biological systems. Essential elements to the human organism (zinc, iron, copper and others) and poisonings caused by heavy metals (lead, mercury and cadmium). Metal complexes in medicine: planning, synthesis and applications.

Program
Bioinorganic chemistry: concepts and definitions. Metal ions in biological systems: physiological and pathological aspects. Zinc and its role as a cofactor of enzymes. Aspects of iron metabolism: transport (hemoglobin) and storage (myoglobin) of oxygen in the human body. The biochemistry of copper in biological systems. Other essential elements (for example, Mn, Co and Mo). Heavy metals: deficiencies caused by the accumulation of Pb^{2+} , Cd^{2+} and Hg^{2+} in the human organism. Metal complexes in medicine: planning, synthesis and applications. Platinum complexes in the treatment of cancer; Gold complexes as anti-inflammatories; Silver complexes as antimicrobials.

Bibliography
1. D. F. Shriver, P. W. Atkins, T. L. Overton, J. P. Rourke, M. T. Weller, F. A. Armstrong, Inorganic Chemistry, 4th Ed. Oxford University Press, Oxford, 2006. 2. H.-B. Kraatz, N. Metzler-Nolte (Eds.), Concepts and Models in Bioinorganic Chemistry. Wiley-VCH, Weinheim, 2006. 3. B. K. Keppler, Metal complexes in cancer chemotherapy. Weinheim. VCH Verlagsgesellschaft, 1993. 4. H. Sigel (Ed.) Metal Ions in Biological Systems-biological action of metal ions (v.6). Marcel Dekker, New York, 1976. 5. S. J. Lippard, J. M. Berg. Principles of Bioinorganic Chemistry. Mill Valley: Univ. Science Books, 1994.

6. H. E. Beraldo, A Química Inorgânica na terapia do câncer. Cadernos temáticos Quím. Nova na Escola, 6, 13-18, 2005.
7. R. Bakhtiar, E.I. Ochiai, Pharmacological applications of inorganic complexes. General Pharmacology, 32, 525-540, 1999.
8. N. Farrell, Biomedical uses and applications of inorganic chemistry. An overview. Coordination Chemistry Reviews, 232, 1-4, 2002.
9. A. Sigel, H. Sigel (Eds.), Metal Ions in Biological Systems - metal ions and their complexes in medication (v.41), CRC Press 2004.
10. Walter Mertz (Ed.), Trace elements in human and animal nutrition (v. 1 and 2). 5th. ed., Academic Press 1986.
11. D. R. Williams, D. M. Taylor, Trace elements Medicine and Chelation Therapy. Cambridge: Royal Society of Chemistry, 1995.

Evaluation criteria

For grading policy, see: Regimento Geral de Graduação, Seção I – Normas Gerais, Capítulo V – Da Avaliação do Aluno na Disciplina. Students are required to attend 75 % of the lectures. For further details, see: Regimento Geral de Graduação, capítulo VI, seção X, artigo 72.