



MODULE	CONTENT	YEAR	TERM	CREDITS	TYPE
Optional subject	Bioinorganic chemistry	3 <sup>o</sup>	1 <sup>a</sup> (one group) and 2 <sup>a</sup> (two groups)	6	Optional
<b>LECTURERS</b>			<b>Postal address, telephone n<sup>o</sup>, e-mail address</b>		
<ul style="list-style-type: none"> <li>Juan Nicolás Gutiérrez</li> <li>Josefa María González Pérez</li> </ul>			Inorganic Department. Third floor. Faculty of Pharmacy. Postal Code 18071. Mails: <a href="mailto:jniclos@ugr.es">jniclos@ugr.es</a> , <a href="mailto:jmgp@ugr.es">jmgp@ugr.es</a>		
<b>DEGREE WITHIN WHICH THE SUBJECT IS TAUGHT</b>					
Degree in Pharmacy					
<b>PREREQUISITES and/or RECOMMENDATIONS (if necessary)</b>					
<ul style="list-style-type: none"> <li>- It is recommended to have passed the following subjects: Inorganic Chemistry and Biochemistry.</li> <li>- Have adequate knowledge of:                             <ul style="list-style-type: none"> <li>- structure and conformation of proteins.</li> <li>- Coordination Chemistry.</li> <li>- Knowledge of Bioelements.</li> </ul> </li> </ul>					
<b>BRIEF ACCOUNT OF THE SUBJECT PROGRAMME (ACCORDING TO THE DEGREE)</b>					
<ul style="list-style-type: none"> <li>• Section 1: Generalities.</li> <li>• Section 2: Bioinorganic Chemistry of certain biological systems.</li> <li>• Section 3: Therapeutic action and toxicity</li> </ul>					
<b>GENERAL AND PARTICULAR ABILITIES</b>					
1. General skills: CG1. Identify, design, collect, analyze, control and produce drugs and medicines and other health products and raw human interest or veterinary subjects. CG4. Design, prepare, deliver and dispense medications and other health interest. CG11. Assessing the toxicological effects of substances and designing and implementing appropriate tests and analysis.					
2. Specific Skills: CEM1.1 Identify, design, collect, analyze and produce active ingredients, drugs and other products and materials of sanitary interest. CEM1.4 Estimate the risks associated with the use of chemicals and laboratory processes. CEM1.9 Know the origin, nature, design, acquisition, analysis and control of drugs and health products.					



## OBJECTIVES (EXPRESSED IN TERMS OF EXPECTED RESULTS OF THE TEACHING PROGRAMME)

In the course of Bioinorganic Chemistry, the student is expected to:

1. Know the implications of metals in biological systems, with particular emphasis on the study of active centers of metalloproteins as primarily responsible for the activity that they play in biological systems.
2. To introduce students to the knowledge of the medical aspects of inorganic chemistry, specifically a Theme on to the study of inorganic compounds with antitumor action and another where the student is introduced to the field of toxicology of metals, with special reference to its chelating therapy is addressed.

## DETAILED SUBJECT SYLLABUS

### Section I: GENERALITIES

Topic 1: INTRODUCTION AND OVERVIEW OF THE PRESENCE OF METALS IN BIOLOGICAL SYSTEMS.

Topic 2: INTERACTIONS OF METAL IONS WITH ORGANIC LIGAND.

Topic 3: Some IONS ELECTRONIC CONFIGURATIONS OF INTEREST IN BIOLOGICAL SYSTEMS.

Topic 4: METHODOLOGY AND TECHNIQUES USED IN EXPERIMENTAL BIOINORGANIC CHEMISTRY:

4.1- Methods of approach to research in bioinorganic chemistry.

4.2- Brief Introduction of different methods used in the characterization of model compounds with biological and similar ligands.

### Section II: BIOINORGANIC CHEMISTRY OF SOME BIOLOGICAL SYSTEMS.

Topic 5: OXYGEN AND NITROGEN BIOINORGANIC CHEMISTRY.

Topic 6: IRON BIOINORGANIC CHEMISTRY.

Topic 7: COPPER BIOINORGANIC CHEMISTRY.

### Section III: THERAPEUTIC ACTION AND TOXICITY.

Topic 8: ANTITUMOR COMPOUNDS.



Topic 9: TOXICOLOGICAL INFORMATION OF SOME TRANSITION METALS.

## READING

### A) BASIC TEXTS:

"QUIMICA BIOINORGÁNICA" J. S. Casas, V. Moreno, A. Sánchez, J. L. Sánchez, J. Sordo. Ed. Síntesis (2002).

"QUÍMICA BIOINORGÁNICA" Enrique Baran Ed. McGraw-Hill

"BIOINORGANIC CHEMISTRY: INORGANIC ELEMENTS IN THE CHEMISTRY OF LIFE" Wolfgang Kaim and Brigitte Schwederski. Ed. John Wiley and Sons.

"INTRODUCCION A LA QUIMICA BIOINORGANICA" M. Vallet, J. Faus, E. García-España y J. Moratal Ed. Síntesis (2003).

### B) SUPPLEMENTARY TEXTS

"PRINCIPLES OF BIOINORGANIC CHEMISTRY" Stephen J. Lippard and Jeremy M. Berg. Ed. University Science Books.

"BIOINORGANIC CHEMISTRY" Bertini; Gray; Lippard and Valentine. Ed. University Science Books.

"THE BIOLOGICAL CHEMISTRY OF THE ELEMENTS. THE INORGANIC CHEMISTRY OF LIFE" J.J.R. Frausto da Silva and R.J.P. Williams. Ed. Oxford University Press.

