

Syllabus

Descrizione corso

Titolo insegnamento	Bioinorganic chemistry
Codice insegnamento	44730
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	CHEM-03/A
Lingua	Inglese
Corso di Studio	Corso di laurea magistrale in Scienze degli alimenti per l'innovazione e l'autenticità
Altri Corsi di Studio (mutuati)	
Docenti	prof. - ass. Walter Baratta, Walter.Baratta@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/43600
Assistente	
Semestre	Primo semestre
Anno/i di corso	2nd
CFU	2
Ore didattica frontale	20
Ore di laboratorio	0
Ore di studio individuale	30
Ore di ricevimento previste	6
Sintesi contenuti	The course aims to provide the students the knowledge of the properties of transition metal compounds. Particular attention will be focused on the thermodynamic and kinetic aspects of chemical reactions with metal compounds. Furthermore, the role of metals within metalloproteins and metalloenzymes in biochemical processes will be presented with the aim to better understand their mechanisms.
Argomenti	

dell'insegnamento	
Parole chiave	
Prerequisiti	Inorganic and organic chemistry
Insegnamenti propedeutici	
Modalità di insegnamento	
Obbligo di frequenza	
Obiettivi formativi specifici e risultati di apprendimento attesi	The course gives a general overview of scientific contents on metalloproteins and their interaction and catalytic activity with metabolites. The aim is to understand and rationalize relevant biochemical processes involving metals in the cell. Chemistry of transition metals compounds, mono and polydentate ligands, aquo complexes, water exchange rate, complexes with EDTA, 18 electron rule, geometry of the complexes. Interaction of metals with small and organic molecules (eg. CO, carboxylic acids, phenols, amines), redox reactions and catalytic activity of metal complexes. Metals in biological systems (porphyrins, peptides, sulfur ligands). Transport, storage and control of iron. Metalloproteins and metalloenzymes: structure, oxygen transport mechanisms (hemoglobin, hemerythrin, hemocyanin), electron transfer mechanism (iron-sulfur proteins, copper blue proteins, cytochrome c). Enzymatic reactions with Zn (carbonic anhydrase, carboxypeptidase, alcohol dehydrogenase) and metals with different oxidation states, namely Fe, Cu and Co, involving oxygen, peroxides and radical reactions (cytochrome P-450, monooxygenase, dioxygenase, catalase, peroxide dismutase, vitamin B12), mediated by the NAD⁺ / NADH system. Anticancer Pt and Ru compounds: structure and their mechanism.
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	
Modalità di esame	Oral exam with review questions to test knowledge and some application skills
Criteri di valutazione	Final mark is assigned taking into account the clarity of the answers, the ability to summarize, evaluate and establish relationships among different topics

Bibliografia obbligatoria	Chemistry of Metalloproteins, Problems and Solutions in Bioinorganic Chemistry, J. J. Stephanos. A. W. Addison, John Wiley & Sons, Inc.
Bibliografia facoltativa	Principles of Bioinorganic Chemistry, S. J. Lippard, J. M. Berg, University Science Books, Mill Valley, CA
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Buona salute