

Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Bioinorganic chemistry
Code der Lehrveranstaltung	44730
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	CHEM-03/A
Sprache	Englisch
Studiengang	Master in Lebensmittelwissenschaften für Innovation und Authentizität
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Prof. - Ass. Walter Baratta, Walter.Baratta@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/43600
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Erstes Semester
Studienjahr/e	2nd
KP	2
Vorlesungsstunden	20
Laboratoriumsstunden	0
Stunden für individuelles Studium	30
Vorgesehene Sprechzeiten	6
Inhaltsangabe	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.
Themen der Lehrveranstaltung	
Stichwörter	
Empfohlene Voraussetzungen	Inorganic and organic chemistry
Propädeutische Lehrveranstaltungen	
Unterrichtsform	
Anwesenheitspflicht	
Spezifische Bildungsziele und erwartete Lernergebnisse	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.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	Oral exam with review questions to test knowledge and some application skills

Bewertungskriterien	Final mark is assigned taking into account the clarity of the answers, the ability to summarize, evaluate and establish relationships among different topics
Pflichtliteratur	Chemistry of Metalloproteins, Problems and Solutions in Bioinorganic Chemistry, J. J. Stephanos. A. W. Addison, John Wiley & Sons, Inc.
Weiterführende Literatur	Principles of Bioinorganic Chemistry, S. J. Lippard, J. M. Berg, University Science Books, Mill Valley, CA
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Gesundheit und Wohlergehen