Metals in Biology
BMB 961 (section 4), MMG 803 (section 1), & CMB (section 3) – 2 credits
Fall 2014

Instructor: Eric Hegg
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Lectures: Tu and Th  9:10 A.M. 10:00 A.M. 402 Biochemistry

Office Hours: By appointment

Text: A significant portion of the reading will come from journal articles. All primary and secondary articles will be available online via Angel.

Short readings may also be assigned from a variety of texts including: Biological Inorganic Chemistry: Structure and Reactivity (Bertini, Gray, Stiefel, and Valentine), Principles of Bioinorganic Chemistry (Lippard and Berg), Inorganic Biochemistry: An Introduction (Cowan), Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life (Kaim and Schwederski), and Physical Methods in Bioinorganic Chemistry (Que, Ed.). These short text sections will be available via Angel.

Topics: Electron transfer
O₂ and activation by heme and nonheme sites
Mn cluster in photosystem II: O₂-production
Metal regulation/homeostasis
Fe/Cu/Ni/Zn transport and storage
Biochemistry of Nickel: [NiFe] H₂ase and CODH
Nitrogen cycle: Nitrogenase and NOₓ reductases
Hydrolysis reactions
Metals in medicine
Metal toxicity
Metal cofactor biogenesis
Metals in energy transduction

Grading: Two student presentations (50%)
Presentation evaluations/class participation (20%)
Midterm exam (15%)
Final exam (15%)

Metals in Biology (BMB 961) is intended for graduate students with backgrounds in biochemistry, molecular/cellular biology, microbiology, and/or chemistry. In this course we will discuss the roles of metals in biological systems, including metalloenzymes, metallocenter biosynthesis, metal transport, metal toxicity, and metallocregulation. Discussions will focus on the catalytic mechanisms as well as the way in which the different protein environments “tune” their active site. Student presentations will be an important emphasis in this class.