

Metals in Biology

BMB 961 (section 3), MMG 803 (section 1), & CMB 800 (section 1) – 2 credits
Spring 2021

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Lectures: Tu and Th, 9:10 a.m. to 10:00 a.m., held by Zoom

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 D2L.

Short readings may also be assigned from a variety of texts and made available via D2L.

Topics: Metals in biogeochemical cycles
Electron transfer
Metal-dependent hydrolases
Metal toxicity
Calcium biochemistry
Biochemistry of nickel
Fe/Cu/Ni/Zn sensing, transport, and storage
O₂ activation by heme and non-heme sites
Medical aspects of metals
O₂-production by the Mn cluster in photosystem II
Nitrogen cycle
Metal regulation/homeostasis
Metal cofactor biogenesis
Metals in energy transduction

Grading: Two student presentations — (50%)
Presentation evaluations/class participation — (20%)
Midterm quiz (take-home problem set) — (15%)
Final quiz (take-home problem set) — (15%)

Metals in Biology (BMB 961) is intended for graduate students with backgrounds in biochemistry, molecular/cellular/plant 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 metalloregulation. 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.