

# Capturing Iron in the Cytosol of Mammalian Cells

**September 12**

**Tuesday, 12:30 pm**

**Billings Building—Rosedale Room**

**SPEAKER:**



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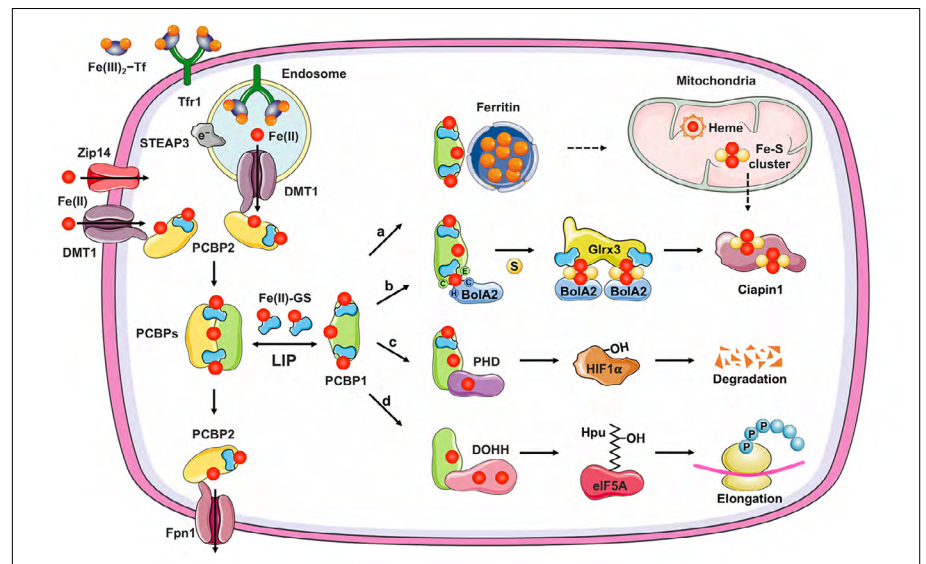
Bethesda, MD

**Hosts: Rajiv R. Ratan, M.D., Ph.D.  
Ian Chambers, Ph.D.**

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## Abstract

Iron is an essential nutrient—it is required by every cell in the human body, yet it can also be a potent cellular toxin. Iron deficiency continues to be the most common nutritional deficiency in the world, especially among children and women of childbearing age, where it causes anemia and impairs neurological development and function. Although the pathogenesis of anemia in iron deficiency is well understood, other manifestations of iron deficiency are not understood at the cellular or metabolic level. Hundreds of iron, zinc, copper, and manganese proteins are expressed in human cells, yet little is known about the mechanisms by which these metalloproteins acquire their native metal ligands and avoid mis-metallation. We have studied the processes of iron uptake and utilization in simple eukaryotes, mammalian cells and mice and have made significant advances in understanding the transport of iron compounds across membranes, the impact of iron deficiency on cellular metabolism, and the delivery of iron to iron-dependent enzymes in the cell. My laboratory is currently focused on identification and characterization of intracellular delivery systems for iron cofactors. Our studies indicate iron chaperones play critical roles in the flux of iron and efficient heme synthesis in erythropoietic tissues, are important for preventing iron-mediated oxidative damage in liver tissue, and are critical for the regulated absorption of dietary iron.



## Publications

1. Patel SJ, Frey AG, Palenchar DJ, Achar S, Bullough KZ, Vashisht A, Wohlschlegel JA, Philpott CC. A PCBP1-BolA2 chaperone complex delivers iron for cytosolic [2Fe-2S] cluster assembly. *Nat Chem Biol.* 2019 Sep;15(9):872-881.
2. Patel S, Protchenko O, Shakoury-Elizeh M, Baratz E, Jadhav S, Philpott CC. The iron chaperone and nucleic acid-binding activities of poly(rC) binding protein 1 are separable and independently essential. *Proc Natl Acad Sci U S A* 2021
3. Protchenko O, Baratz E, Jadhav S, et al. Iron chaperone PCBP1 protects murine liver from lipid peroxidation and steatosis. *Hepatology* 2021;73:1176-93.