

Iron metabolism: from molecular mechanisms to clinical consequences

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Description: During the course we will discuss the role of iron in the metabolism. We will deal with the iron demand of microorganisms and with the role of iron in the protective mechanisms against bacterial infections. The function of influencing factors of iron metabolism, their effects and crosstalk between them will be discussed in detail. The roles of iron containing proteins and their functions will be talked over. During the course we will emphasize the disorders of iron metabolism (iron deficiency, iron overload), their genetic backgrounds and their therapies. Based on the most actual findings the role of iron in the development of neurodegenerative diseases (Parkinson's disease, Alzheimer's disease and Huntington's disease) will be also discussed.

Syllabus:

1. Solution chemistry of iron, interactions with other metal ions.
2. The Importance of Iron for Biological Systems: haemoproteins, iron-sulfur proteins, other iron containing proteins
3. Microbial Iron Transport and Metabolism
4. Iron uptake by yeasts
5. Cellular Iron Uptake and Export in Mammals: iron transporters
6. Intracellular Iron Storage and Biomineralisation: ferritin, haemosiderin
7. Intracellular Iron Metabolism and Cellular Iron Homeostasis I: Labile iron pool, mitochondrial iron uptake and metabolism haem biosynthesis
8. Intracellular Iron Metabolism and Cellular Iron Homeostasis II: synthesis of iron-sulfur clusters, functions of iron responsive elements and iron regulatory proteins
9. Iron Absorption in Man. Regulation of Systemic Iron Balance
10. Pathophysiology of Iron Deficiency and Iron Overload: Acquired and Genetic Disorders of Iron Metabolism, haemochromatosis, thalassemias, secondary iron overload, anemias
11. Iron disorders and Laboratory parameters
12. Iron and oxidative stress: cytoprotective enzymes, antioxidants, aging, role of the immune system
13. Brain iron metabolism, the role of iron in neurodegenerative diseases
14. Exam