

Protein complexes of iron metabolism

ABSTRACT

Iron is an essential element in the human body where its metabolism is strictly controlled. When mechanisms participating in the homeostasis are disturbed several dysfunctions occur.

In the organism iron can be found as a component of many proteins or protein complexes. It is still not completely clear how many proteins participate in iron processing in the cells.

The aim of my work was to identify mitochondrial iron containing protein complexes. In my experiments the transport of iron in the cells was monitored by radioactive iron (^{59}Fe). The work with complex proteins which bind iron by non-covalent bonds requires a very sensitive handling and mild separation techniques. I used such protein separation methods which do not break the non-covalent couplings of iron and protein. That way the integrity of the protein complex with bound and radioactively marked iron was not affected. These experiments were performed on model liver cells in tissue culture. In my thesis I described the protein composition of iron-labeled protein complexes and possible relationships between the identified proteins and iron. Since iron participates in the formation of free radicals the roles of free radical-protecting enzymes identified in protein complexes are also discussed.

Keywords: iron, iron overload, mitochondria, reactive oxygen species, protein complexes, proteomics, mass spectrometry