

# HOST'S ORGANISM AGAINST PATHOGENS IN COMBAT FOR IRON. THE ROLE OF IRON IN INFECTIONS

## Summary

Iron, owing to its participation in various metabolic processes represents an indispensable nutritional element for all organisms – microorganisms and eukaryotic ones. In vertebrates, iron is necessary for metabolism, maintenance of physiological microflora and defense against pathogens of the host. However, the access to iron has to be strictly controlled in order to limit potential expansion of pathogenic bacteria. This controlling system encompasses proteins able to bind iron ions, mainly siderophilins (lactoferrin and transferrin) as well as ferritin, haptoglobin, hemopexin and albumin. These proteins play a role in iron metabolism both in health and infection. Clinical insult, injury, infection or tumor growth initiates an important physiological defense response called hypoferremia/anemia of inflammation or chronic diseases, aimed at transient

restriction of iron access for pathogens and inflammatory processes. Microorganisms developed during evolution their own systems of iron acquisition in the host's organism including various receptor proteins able to bind siderophilins and regaining from them iron, as well as strongly chelating iron low-molecular compounds, siderophores. Pathogens can also acquire iron following proteolytic degradation of iron-rich proteins, e.g. hemoglobin. The efficacy of iron acquisition by pathogens determines their virulence. At present, various therapeutic strategies are applied, designed to aid the organism in combating infection by diminution of access to iron by pathogens. Depending on circumstances, iron-deficient diet, cyclic bloodletting or iron-chelating compounds such as desferrioxamine and deferiprone, are practised.