

3. Lactoferrin

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Lactoferrin: a multifunctional glycoprotein involved in the modulation of the inflammatory process.

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Lactoferrin is an iron-binding glycoprotein found in exocrine secretions of mammals and released from neutrophilic granules during inflammation. This review describes the biological roles of lactoferrin in host defence. Secreted lactoferrin exerts antimicrobial action either by chelation of iron or by destabilization of bacterial membranes. Furthermore, lactoferrin modulates the inflammatory process, mainly by preventing the release of cytokines from monocytes and by regulating the proliferation and differentiation of immune cells. Some of these activities are related to the ability of lactoferrin to bind lipopolysaccharides (LPS) with high affinity. Indeed, recent in vitro studies indicate that lactoferrin is able to compete with the LPS-binding protein for LPS binding and therefore to prevent the transfer of LPS to CD14 present at the surface of monocytes. Moreover, the prophylactic properties of lactoferrin against septicemia in vivo have been demonstrated. Taken as a whole, these observations strongly suggest that lactoferrin is one of the key molecules which modulate the inflammatory response.

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Lactoferrin: a modulator of immune and inflammatory responses.

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Lactoferrin is an iron-binding glycoprotein of the transferrin family. Abundant expression and secretion of lactoferrin, in particular in milk and fluids of the digestive tract, are related to its implication in the first line of host defense. Lactoferrin is also a prominent component of the secondary granules of neutrophils (PMNs) and is released in infected tissues and blood during the inflammatory process. In addition to its direct antimicrobial properties, the abilities of lactoferrin to regulate the immune response and to protect against infection and septic shock have been described in numerous in vitro and in vivo studies. Although the cellular and molecular mechanisms that account for the modulation of the inflammatory and immune responses by lactoferrin are not yet totally elucidated, many are now established. At the cellular level, lactoferrin modulates the migration, maturation and function of immune cells. At the molecular level and in addition to iron binding, interactions of lactoferrin with a plethora of compounds, either soluble or membrane molecules, account for its modulatory properties. This paper reviews our current understanding of the cellular and molecular mechanisms that explain the regulatory properties of lactoferrin in host defence.