

## **Lactoferrin: An Effective Weapon in the Battle Against Bacterial Infections**

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### **Abstract**

The emergence of multidrug-resistant bacterial strains with respect to commercially available antimicrobial drugs has marked a watershed in treatment therapies to fight pathogens and has stimulated research on alternative remedies. Proteins of the innate immune system of mammals have been highlighted as potentially yielding possible treatment options for infections. Lactoferrin (Lf) is one of these proteins; interestingly, no resistance to it has been found. Lf is a conserved cationic nonheme glycoprotein that is abundant in milk and is also present in low quantities in mucosal secretions. Moreover, Lf is produced and secreted by the secondary granules of neutrophils at infection sites. Lf is a molecule of approximately 80 kDa that displays multiple functions, such as antimicrobial, anti-viral, anti-inflammatory, and anticancer actions. Lf can synergize with antibiotics, increasing its potency against bacteria. Lactoferricins (Lfcins) are peptides resulting from the N-terminal end of Lf by proteolytic cleavage with pepsin. They exhibit several anti-bacterial effects similar to those of the parental glycoprotein. Synthetic analog peptides exhibiting potent antimicrobial properties have been designed. The aim of this review is to update understanding of the structure and effects of Lf and Lfcins as anti-bacterial compounds, focusing on the mechanisms of action in bacteria and the use of Lf in treatment of infections in patients, including those studies where no significant differences were found. Lf could be an excellent option for prevention and treatment of bacterial diseases, mainly in combined therapies with antibiotics or other antimicrobials.

**Keywords:** Lactoferrin; anti-bacterial; antibiotic; innate immune system; lactoferricin; synergy.

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