Lactoferrin Inhibition of SARS-CoV-2 Viral Entry and Immunomodulatory Suppression of IL-6
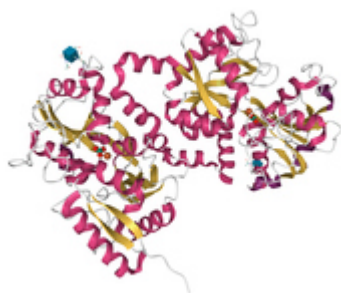
TECHNOLOGY NUMBER: 2020-433

Technology ID
2020-433

Category
Therapeutics and Vaccines
Life Sciences

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OVERVIEW

The novel discovery that lactoferrin inhibits SARS-CoV-2 viral infection in human cells

- Recognition that lactoferrin blocks virus spike attachment to the host cell antigens
- Provides a potential treatment for COVID alone or in combination with other agents

BACKGROUND

The global pandemic of COVID-19 resulted from an acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which has similarities to severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-C0V). The viral genome of SARS-CoV-2 has been sequenced to enable diagnostic testing, epidemiologic tracking, and development of preventative and therapeutic strategies. Lactoferrin is a single chain metal binding glycoprotein which may bind to receptors on cell types such as monocytes, macrophages, lymphocytes, and brush-border cells. Lactoferrin serves as an essential growth factor for both B and T lymphocytes as well as being involved in a wide array of other functions related to host primary defense mechanisms. These mechanisms suggest a strong biological plausibility for the anti-viral efficacy of lactoferrin. As such, a need exists for research into the potential effectiveness of lactoferrin against the SARS-CoV-2 virus.

INNOVATION

Researchers have discovered that lactoferrin inhibits SARS-CoV-2 viral infection in human cells. This glycoprotein, which is naturally present in secretory fluids such as milk, saliva, tear, and nasal secretions, showed viral entry inhibition at various concentrations and was not associated with any discernible toxicity. The antiviral activity of lactoferrin in these studies related to its binding to SARS-CoV-2 and cells while preventing viral spike attachment to angiotensin converting enzyme 2 (ACE2) receptors on the human cells. This interaction therefore blocked entry of the virus into the host cells. The invention suggests a pathway for treatment of adult respiratory distress syndrome resulting from COVID-19 infection through intravenous administration alone or in combination of other agents, such as remdesivir. Additionally, the investigators believe that oral lactoferrin may be considered for the symptomatic treatment of COVID-19 related diarrhea. The apparent efficacy, low toxicity profile, and ease of production of lactoferrin suggest that additional trials need to be undertaken for this viral infection.

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