Compositions and Methods for Preventing Interaction Between SARS-CoV-2 and L-SIGN

Background

- Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection causes coronavirus disease 2019 (COVID-19)
- Angiotensin converting enzyme 2 (ACE2) is the sole known receptor mediating the entry of SARS-CoV-2 into host cells and is thought to contribute to virus-mediated injury of Lung and Nasal cells.
- Multiple studies indicate coagulopathy and thrombosis in COVID-19 patients but in the vasculature there is little or no expression of ACE2
- This study reveals a Novel SARS-CoV-2 receptor on endothelial cells that likely contributes to COVID-19-associated coagulopathy

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SARS-CoV-2 receptor contributes to COVID-19-associated coagulopathy

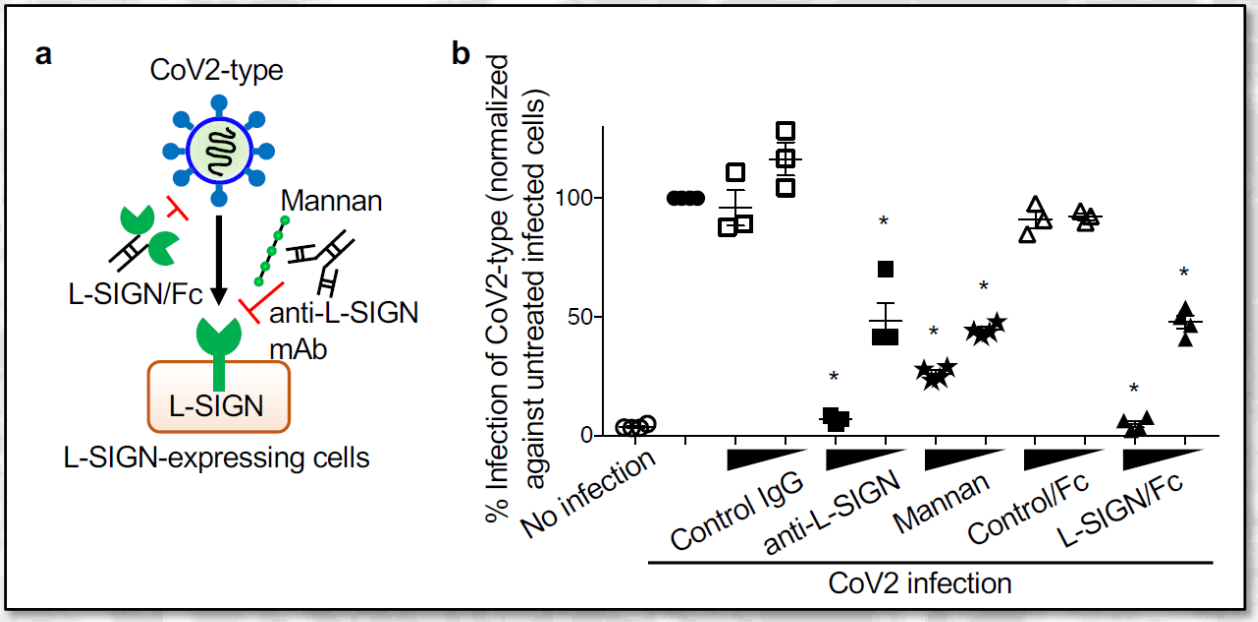
Problem

The COVID-19 pandemic has resulted in extensive efforts to identify an alternative receptor that permits SARS-CoV-2 mediated endothelial dysfunction and coagulopathy in humans

OMRF's Solution

A method for treating SARS-CoV-2 induced tissue dysfunction in a patient comprising administering an inhibitor of SARS-CoV-2 binding to L-SIGN to treat endothelial dysfunction and coagulopathy

Data



a. Schematic diagram depicts inhibitory mechanisms of L-SIGN-mediated CoV2-type infection by mannan, L-SIGN/Fc, and anti-L-SIGN

b. Inhibition assay of L-SIGN-mediated CoV2-type infection using mouse anti-human L-SIGN (10 and 2 μg/ml), mannan (500 and 100 μg/ml), or recombinant L-SIGN/Fc (1 and 0.2 nmole/ml).

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Summary

Dr. Xia has discovered that L-SIGN interacts with mannose on the SARS-CoV-2 spike protein to mediate viral entry into human liver sinusoid endothelial cells (LSECs) and lymph node lymphatic endothelial cells (LECs) and he postulates that infection leads to endothelial cell activation and secretion of VWF and FVIII into the circulation synergizing ACE2-mediated infection to cause coagulopathy in humans.

Importantly, he found that interactions between SARS-CoV-2 and L-SIGN could be blocked by anti-L-SIGN antibody, by mannan, or by recombinant L-SIGN/Fc protein and suggest potential therapeutic options to treat severe COVID-19 infection.

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