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How does the SARS-CoV-2 virus enter the human body?

Ludovico Cantuti-Castelvetri and others have identified a new possible pathway through which the SARS-CoV-2 enters into the central nervous system.

SARS-CoV-2 uses angiotensin-converting enzyme 2 as a host receptor to enter the human cells. However, in this study the authors found that the cellular receptor neuropilin-1, NRP-1 significantly activates SARS-CoV-2 infectivity.

NRP-1 is found abundantly in the respiratory and olfactory mucosa with a high expression in endothelial cells and the epithelial cells facing the nasal cavity. Analysis at post-mortem revealed that the SARS-CoV-2 infected NRP-1 positive cells in the olfactory epithelium and bulb.

In the olfactory bulb infection was detected particularly within NRP-1 positive endothelial cells of the small capillaries and medium size vessels.

Studies in mice have shown the NRP-1 mediated transport of virus sized particles into the central nervous system.

The authors therefore concluded that NRP-1 could explain the enhanced spread of SARS-CoV-2.

What about the antibody defence against COVID-19?

An article by Yan Wu and others published in Science, 12 June 2020, found that the authors had isolated four neutralising antibodies from a convalescent COVID-19 patient.

Two of the antibodies, B38 and H4, blocked the receptor binding domain of the famous viral spike protein from binding to the cellular receptor-angiotensin-converting enzyme 2, ACE-2. This bound antibody and receptor binding domain (RBD) overlaps with the binding site for the ACE-2.

Interestingly H4 binds at a different site and blocked RBD binding to ACE-2. Thus the two antibodies bound simultaneously.

They argue that this pair of antibodies could potentially be used in clinical applications.

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