

Replication in the lung and immune system alerted

The viral load study in Germany showed that active viral replication occurs in the upper respiratory tract. Seven out of nine participants listed a cough among their initial symptoms.

In contrast to the falling numbers of viral units in the upper respiratory tract, numbers in sputum rose for most of the participants.

In two individuals with some signs of lung infection, the virus in sputum peaked at day 10-11. It was present in the sputum up to day 28 in one person. Across all participants, there was an average of 7 million units millilitre (about 35 million units a teaspoon), this amount is about 1000 times more than that in people with SARS

In the lung, the ACE2 receptor sits on top of lung cells called pneumocystis. These have an important role in producing surfactant- a compound that coats the air sacs (alveoli), thus helping maintain enough surface tension to keep the sacs open for the exchange of oxygen and carbon dioxide.

As soon as the body recognizes foreign protein, it mounts the first response. One part of the body's immune response- The lymphocytes- begin to produce the first defence IgM-type antibodies and then the longer-term specific neutralizing antibodies (the IgG type).

In the German viral study, 50% of the participants had IgM or IgG antibodies by day 7, and they all had these antibodies by day 14. The amount of antibodies did not predict the clinical course of the disease.

80% of people with COVID-19 will have mild or asymptomatic disease, with common symptoms including fever, cough, and loss of sense of smell. Most will only have phase 1 or 2 physiological responses to SARS-CoV-2 infection.

The body attempts to heal itself by promoting inflammatory and immune responses. The World Health Organization (WHO) advises against the use of glucocorticosteroids during this phase, as they could prevent the natural healing response. The evidence seems to refuse this position, but this is a fast-developing field, and findings are subject to change.

Most patients will recover at this stage with supportive intravenous fluids and oxygen via a mask or an external positive pressure mask.

In severe acute respiratory distress syndrome (ARDS), the inflammation stage gives way to the fibrosis stage. Fibrin clots form in the alveoli and fibrin-platelet micro thrombi (small blood clots) pepper the small blood vessels in the lung that are responsible for gas exchange with the alveoli.