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# Coronavirus and Covid-19 from the Common Cold to Severe Acute Respiratory Syndrome

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## Editorial

Coronaviruses are a family of viruses, some of which can infect humans, most often causing mild cold-like symptoms. Nevertheless, three deadly epidemics have already occurred in the 21st century, including the current one. They involve emerging coronaviruses harbored by animals and suddenly transmitted to humans: SARS-CoV and MERS-CoV.

While the epidemic linked to the SARS-CoV-2 coronavirus has spread around the world, research is mobilized to accelerate the production of knowledge on this virus, on the disease it causes (Covid-19) as well as ways to cure and prevent it.

The origin of SARS-CoV-2 is not fully understood. Particularly common in some animals, coronaviruses only episodically cross the species barrier to infect humans. However, there are exceptions, such as SARS-CoV, which was accidentally transmitted to humans through consumption of masked civets, and MERS-CoV through camels.

SARS-CoV-2 belongs to the coronavirus (CoV) family, a name linked to the "crown" formed by certain proteins on the surface of these viruses. It was first identified in Wuhan, China, in December 2019.

Several coronaviruses are already known to be capable of infecting humans: three seasonal coronaviruses responsible for mild winter symptoms (colds), SARS-CoV responsible for severe acute respiratory syndrome (SARS) and MERS-CoV responsible for illness potentially severe respiratory syndrome (Middle East Respiratory Syndrome). SARS-CoV-2 is the seventh coronavirus pathogenic to humans. He is responsible for the Covid-19 disease (COronaVIrus Disease 2019).

SARS-CoV-2 is genetically closer to viruses that infect bats than to MERS-CoV or SARS-CoV. But, so far, no direct viral transmission has been described between this species and humans. Therefore, researchers believe it is likely that transmission to humans has occurred through an intermediate host species. The pangolin was initially identified as a carrier of a coronavirus similar to SARS-CoV-2; however several elements cast doubt on this possibility, in particular because the genetic sequences of the virus responsible for the current epidemic and those of the coronavirus which infects the pangolin retain significant differences.

The virus enters the body through the airways, from the nose and mouth. Part of its surface protein (the RBD region of protein S) attaches to the ACE2 receptor expressed on the surface of cells that line our airways. Another cellular protein (TMPRSS2) then allows the virus to enter the cell. Once inside, it uses the host's cellular machinery to multiply there. New virions are formed and will infect new cells.

In about 80% of cases, symptoms remain mild or moderate and disappear after 5 to 14 days. In some people, respiratory discomfort from fluid build-up in the bronchioles can lead to a lack of oxygenation of the blood and require hospitalization.

Most severe forms develop within the second week of symptom onset, when hyperinflammatory syndrome occurs as a result of fluid buildup in the airways. This can lead

to respiratory failure or even acute respiratory distress syndrome (ARDS) requiring admission to intensive care.

Other potentially serious complications may also develop, such as kidney failure, cardiac arrhythmias, thromboembolic events (formation of clots in the bloodstream), secondary bacterial infections or sepsis.