

# Mayo Clinic expert discusses potential neurological effects of COVID-19

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SARS-CoV-2, the virus that causes COVID-19, can take a severe toll on the respiratory system. However, recent research suggests that the virus may also infect the nervous system. A study of patients with COVID-19 out of Wuhan, China found that possible neurological signs and symptoms caused by COVID-19 can include loss of taste and smell,

headache, impaired consciousness, and stroke.

Dr. Allen Aksamit Jr., a Mayo Clinic neurologist, says what's unclear is whether that is direct effects of the [virus](#) actually getting into the nervous system and damaging the [brain](#) or an indirect effect as a consequence of the respiratory and other compromise of the rest of the body.

"When people are sick, when their [respiratory system](#) is failing, that will have adverse effects on the brain because of poor oxygenation and other metabolic effects on the brain. Those things we know as serious, but we also know that those are not direct effects of the virus on the brain itself," says Dr. Aksamit.

"There are bits of information that have come out from a number of studies looking at clinical evaluation of patients that would suggest that there is nervous system direct involvement by the virus, but the reliability of those studies is still in question."

Learn more about the potential neurological effects of COVID-19 in this Q&A with Dr. Aksamit:

Q. What is known about the loss of taste and smell some patients with COVID-19 are experiencing?

A. Two things to be said about that. One is, of course, that COVID-19 is not the only virus that causes those kinds of symptoms. Influenza is well-known to do that, and there are other respiratory viruses that can cause similar kinds of troubles. And then the second issue, of course, is whether the virus is actually affecting the nerves that have to do with taste and smell directly. This has to do with what we say is olfaction, or smell. This is mediated by the olfactory nerves, the first cranial nerve. And the question is, is it the nerve itself involved or is it the respiratory

epithelium that interacts with the nerve in the back of the nose. And it seems that the studies point to that as being the principle problem rather than something due to direct involvement or damage to the nerves.

Q. Delirium and impaired consciousness, while not common manifestations, have been associated with COVID-19. Why might that be happening?

A. Delirium is a tough one because it can be a consequence of low oxygen to the brain. So, again, when we're talking about COVID-19 and its respiratory consequences, one of the major issues is compromising the lungs and oxygenation. And, of course, if low oxygen occurs, that has adverse effects on the brain. And one of the manifestations of that can be delirium or even coma. So it's unclear whether the delirium, therefore, is just a respiratory affect or a metabolic affect or, as I've said before, that there might be some suggestion that this virus can in certain circumstances get into the brain and cause the behavioral effects called delirium. Delirium is common in the ICU setting, especially in older individuals, even without COVID-19.

Q. Will some of these neurological effects be long term?

A. The simple answer is we don't have enough information to clearly answer the question with certainty. At least in most of the cases where imaging has been done of the brain in association with the neurological manifestations, the imaging abnormalities have been generally regarded as unrevealing or often normal. So that's a good sign. That means that there's not so much irreversible damage. Now there are exceptions to that. One of those main exceptions is the association with [stroke](#).

Stroke is one of the conditions that has been seemingly occurring at higher incidence in patients who have involvement in the body by COVID-19. And the mechanism by which stroke occurs in the brain is

unclear in this circumstance. It's thought that a lot of it might just be worsening of preexisting conditions; people who have diabetes, who have hypertension; who have other smoking history where they have damaged the blood vessels already and are predisposed to stroke already, and now are being stressed from a respiratory perspective by this intense illness. Therefore, it precipitates a stroke as a consequence of that. So that may be a more likely mechanism than if there is a specific injury to the brain and [blood vessels](#) by COVID-19 that is causing stroke.

Q. What is the key takeaway?

A. The principle things that we'll see from a neurological viewpoint will be changes in mental awareness, cognition, and troubles with difficulty of interaction or ability to interact with the environment. I think again one of our concerns is how much of this is going to be long-lasting, how much of this is just a temporary effect of metabolic disturbances. So those are very much uncertain points at this time.

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