menu

counselor health Structure of the coronavirus: spike protein alone is enough to trigger Covid

An intensive care nurse cares for a patient suffering from Covid-19 in the intensive care unit at the Braunschweig Clinic. A team of researchers has taken a closer look at how coronavirus infection can lead to serious complications such as stroke. (Archive image) © Ole Spata / dpa

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NEW KNOWLEDGE ABOUT VIRUS STRUCTURE

Spike protein alone is enough to trigger Covid - especially blood vessels are damaged

Researchers were able to prove for the first time how exactly the coronavirus damages blood vessels in the body. “In reality it is a vascular disease,” is the conclusion.

The so-called spike protein is one reason why our immune system reacts with complaints after a coronavirus infection. The Sars-CoV-2 pathogen uses the protein to dock onto human cells and to facilitate the uptake of the virus into the cell. **The coronavirus therefore needs the spike protein so that it can attack a cell.** As the Helmholtz Center further informs, the protein binds to a receptor called ACE2 *on the surface of human cells. The virus can then fuse with the cell membrane and release its genetic material into the cell interior. This is where the corona vaccinations come into play: They cause the body to produce antibodies. They in turn can recognize the virus based on the spike protein, bind to it and mark it as a target for immune cells - which usually destroy it.

But the spike protein also makes coronaviruses potentially very dangerous pathogens, as an international research team informs. John YJ. Shyy from the Department of Medicine at the University of California and his team conducted a study to get to the bottom of the mechanism by which the coronavirus acts in the

body. **One of the most important findings: The damage that the spike protein can do to cells can be significant** . In addition, the researchers can confirm that Covid-19 is primarily a vascular disease - and not a respiratory disease.

Coronavirus infection can promote vascular diseases like stroke

In their study, the scientists were able to show how the Sars-CoV-2 virus damages and attacks the vascular system at the cellular level. The findings would help explain the multitude of **seemingly unrelated complications from Covid-19** and could open the door for new research into more effective therapies, according to a press release from the Salk Institute for Biological Studies in California.

“A lot of people think it's a respiratory disease, but it is actually a vascular disease,” said Professor Uri Manor, co-author of the study: “This could explain why some people have strokes and why some people have problems have in other parts of the body. What the complaints have in common: They all have vascular causes. ”Medical professionals describe diseases that affect the blood vessels as“ vascular diseases ”. How exactly coronaviruses attack the blood vessel system was not yet known. The researchers working with Shyy have now been able to prove that the spike protein contributes to damage to vascular endothelial cells.

Spike protein alone is enough to trigger Covid

In the new study , the researchers created a “pseudovirus” that was surrounded by spike proteins from the Sars-CoV-2 pathogen, but did not contain a real virus. Exposure to this pseudovirus resulted in damage to the lungs and arteries in animal experiments. **That would prove that the spike protein alone is**

enough to trigger the disease, the researchers concluded. After infection, tissue samples showed inflammation in the endothelial cells that line the walls of the pulmonary arteries. In the laboratory, too, the research team examined how healthy endothelial cells that line the arteries behave after contact with the spike protein. Here, too, the cells were damaged - among other things by the contact between the spike protein and the ACE2 receptor.

"If you remove the replication **abilities of** the virus **, it still has a great damaging effect on the vascular cells, simply because of its ability to bind to this ACE2 receptor, the S-protein receptor** , which is now known thanks to Covid", Manor is quoted in the press release of the Salk Institute for Biological Studies: "Further studies with mutated spike proteins will also provide new insights into the infectivity and severity of the mutated Sars-CoV-2 viruses," said the researcher.

More sources: https://www.helmholtz.de/glossar/glossar-detail/spike-protein/

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