

## 「《Nature Medicine》 New Evidence shows that novel coronavirus infects the mouth cells」

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In a study published on March 25 in Nature Medicine, a National Institutes of Health (NIH)-funded international team has found evidence that SARS-CoV-2, the virus that causes COVID-19, infects cells in the mouth. While it's well known that the upper airways and lungs are primary sites of SARS-CoV-2 infection, there are clues the virus can infect cells in other parts of the body, such as the digestive system, blood vessels, kidneys and, as this new study shows, the mouth. The potential of the virus to infect multiple areas of the body might help explain the wide-ranging symptoms experienced by COVID-19 patients, including oral symptoms such as taste loss, dry mouth and blistering. Moreover, the findings point to the possibility that the mouth plays a role in transmitting SARS-CoV-2 to the lungs or digestive system via saliva laden with virus from infected oral cells. A better understanding of the mouth's involvement could inform strategies to reduce viral transmission within and outside the body.

It is well documented that the saliva of people with COVID-19 can contain high levels of SARS-CoV-2, suggesting that saliva testing is nearly as reliable as deep nasal swabbing for diagnosing COVID-19. What scientists don't entirely know, however, is where SARS-CoV-2 in the saliva comes from. In people with COVID-19 who have respiratory symptoms, virus in saliva possibly comes in part from nasal drainage or sputum coughed up from the lungs. But that may not explain how the virus gets into the saliva of people who lack those respiratory symptoms.

The researchers surveyed tissues in the mouth and found that some salivary gland and gum cells were vulnerable to infection because of containing RNA instructions for making ACE2 and TMPRSS2 proteins, which are the receptors the virus uses to enter cells. They further examined the bodies of 18 people who died of COVID-19 and found 88.9% had the virus in the salivary glands. In salivary gland tissue from one of the people who had died, as well as from a living person with acute COVID-19, the scientists detected specific sequences of viral RNA that indicated cells were actively making new copies of the virus — further confirming the evidence for infection.

They also studied living people with COVID-19 and found that asymptomatic patients (22%) were linked to a 1-week faster average viral clearance time than the symptomatic people. In symptomatic people, saliva that was infected with the virus were 4.8-fold likely to have altered taste and smell. The study also discovered that saliva from people with mild or asymptomatic COVID-19 contained mouth cells carrying SARS-CoV-2 RNA and RNA for the entry proteins. When saliva from eight of the asymptomatic people was added to monkey cells grown in dishes, some of these cells became infected. This raises the possibility that even people without symptoms might transmit infectious SARS-CoV-2 to others through

saliva.

Taken together, the study's findings suggest that oral transmission plays a greater role in SARS-CoV-2 infection than previously thought. "By revealing a potentially underappreciated role for the oral cavity in SARS-CoV-2 infection, our study could open up new investigative avenues leading to a better understanding of the course of infection and disease," stated lead author Blake M. Warner. "Such information could also inform interventions to combat the virus and alleviate oral symptoms of COVID-19."

**Reference:**

1. Ni Huang et al. 2021 Mar 25 "SARS-CoV-2 infection of the oral cavity and saliva" *Nature Medicine*.
2. 2021 Mar 25 "Scientists find evidence that novel coronavirus infects the mouth's cells" *NIH News Releases*.

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