

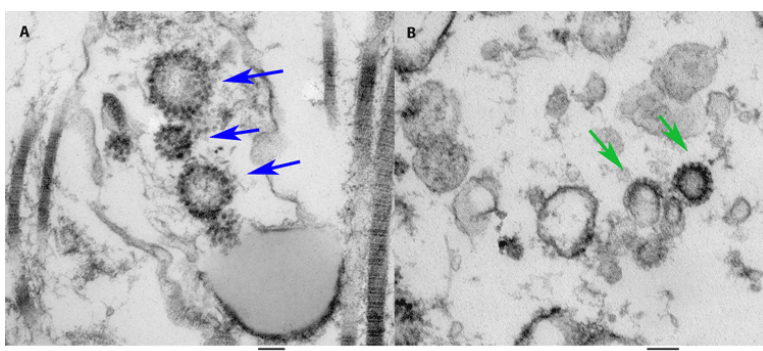


COVID-19 Can Infect Testes with Potential Implications for Male Fertility

COVID-19 can invade testis tissue in some men who are infected with the virus, according to a new study by University of Miami Miller School of Medicine researchers published in *The World Journal of Men's Health*.

These findings could be the first step in discovering COVID-19's potential impact on male fertility and whether the virus can be sexually transmitted, said study lead author Ranjith Ramasamy, M.D., associate professor and director of reproductive urology at the Miller School.

Dr. Ramasamy and Miller School colleagues analyzed testis tissue from autopsies of six men who died of COVID-19 infection. They found impaired sperm function in three of the testis specimens and evidence of COVID-19 using electron microscopy in the tissue of one.



COVID viral particles found via electron microscopy. On the left (A) is tissue taken from a live,



previously COVID-positive patient. On the right (B) is tissue collected via autopsy from a person who died of COVID. The arrows point toward the spiked COVID viral particles in both specimens.

“We also identified the presence of the virus in a man who underwent a testis biopsy for infertility but had a previous history of COVID-19. So the patient tested negative and was asymptomatic after having COVID-19 but still showed the presence of the virus inside the testes,” Dr. Ramasamy said. “This is the first published research to report on the case of a live patient to demonstrate the presence of COVID-19 in testis tissue of a patient who recovered from the virus. The finding is novel, remarkable, and certainly worthy of further exploration.”

It makes sense that the testes, which are responsible for sperm and testosterone production, are a target for COVID-19 infection. The virus has an affinity for angiotensin-converting enzyme-2 (ACE-2) receptors, which are in many of the body’s organs, including the lungs, heart, intestines, kidneys, and testes.

While this study suggests the virus can be present in testis tissue, questions remain about how much of the virus needs to be present in the testes to be detected in semen, as well as what threshold of viral load is needed in the semen to be sexually transmitted.

Several other viruses are known to affect spermatogenesis and fertility, including the mumps. It could be that COVID-19



works in a similar way, causing an inflammatory process, said the study's first author, Justin K. Achua, M.S., a medical student at the Miller School.

"Mumps has been shown to enter the testes, causing inflammation of the testes and leading to impaired sperm production in about 10 to 20% of men who get infected," Achua said. "Evaluating the autopsy findings, we saw that COVID-19 testis had signs of inflammation with white blood cells invading the testes."

More studies are needed to evaluate exactly how testis tissue responds to the virus and what that might mean to male fertility and sexual transmission. This study is the first step in that process and opens the door to important research to pursue, especially in South Florida, Dr. Ramasamy said.

"The University of Miami is a major academic medical center in South Florida, at the heart of the COVID-19 epidemic in the state," he said. "Florida remains in the top three states in the U.S. with the number of COVID-19 infections."

For now, the finding suggests that men of all ages who have COVID-19 and experience testicular pain should make an appointment to see a urologist, Dr. Ramasamy said.

"Testicular pain along with other symptoms could be a sign that COVID-19 has entered the testes, and if men are thinking about fertility and/or low testosterone either at present or in the future, they should get their testosterone levels evaluated with a blood test and sperm parameters evaluated with a semen analysis," he said.

Study coauthors are Kevin Y. Chu, M.D., urology resident at



the Miller School; Emad Ibrahim, M.D., HCLD, assistant professor of urology and neurological surgery; Kajal Khodamoradi, Ph.D., clinical research associate; Katiana S. Delma; Oleksii A. Iakmenko, M.D., resident in pathology and laboratory medicine; Oleksandr N. Kryvenko, M.D., associate professor of pathology; and Himanshu Arora, Ph.D., research assistant professor of urology.