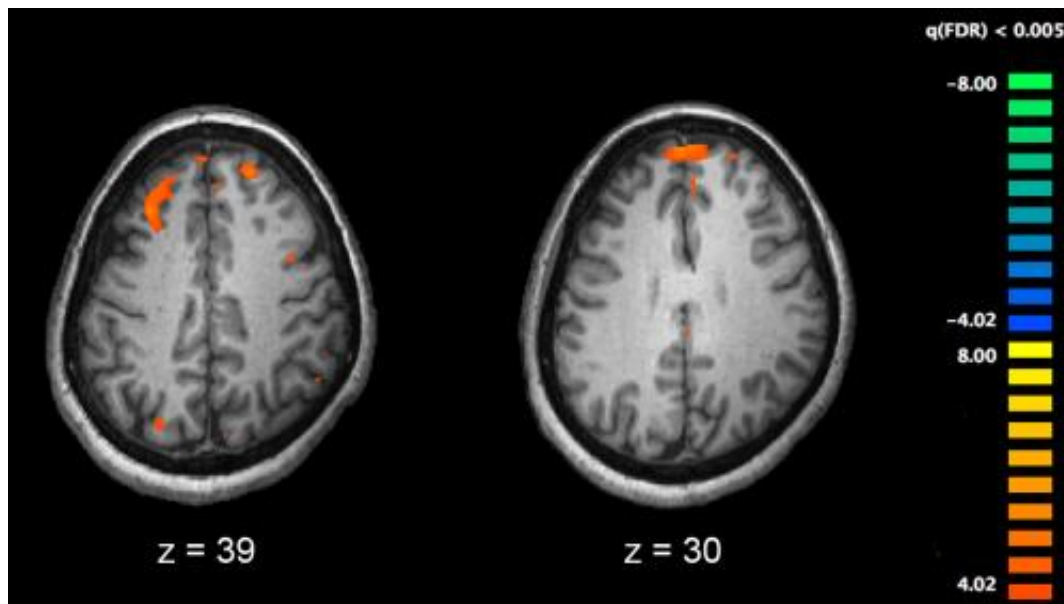


Pilot study finds evidence of bartonella infection in schizophrenia patients

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Functional magnetic resonance imaging (fMRI) and other brain imaging technologies allow for the study of differences in brain activity in people diagnosed with schizophrenia. The image shows two levels of the brain, with areas that were more active in healthy controls than in schizophrenia patients shown in orange, during an fMRI study of working memory. Credit: Kim J, Matthews NL, Park S./PLoS One.

A pilot study from North Carolina State University and the University of North Carolina at Chapel Hill has found evidence of Bartonella infection in the blood of people with schizophrenia and schizoaffective disorder.

"Researchers have been looking at the connection between bacterial infection and neuropsychiatric disease for some time," says Dr. Erin Lashnits, a former veterinary internist at NC State, current faculty member at the University of Wisconsin and first author of the study.

"Specifically, there has been research suggesting that cat ownership is associated with [schizophrenia](#) due to the zoonotic parasite *Toxoplasma gondii*, but to date there has been no conclusive evidence in support of a causative role for this parasite. So we decided to look at another cat-associated infectious agent, *Bartonella*, to see if there could be a connection."

Bartonella are bacteria historically associated with cat-scratch disease, which until recently was thought to be solely a short-lived (or self-limiting) infection. Cats can become infected with *Bartonella* via exposure to fleas and potentially ticks, which are natural vectors of the bacteria. The cat is a host for at least three of the 40 known *Bartonella* species: *Bartonella henselae*, *Bartonella clarridgeiae* and *Bartonella koehlerae*.

"While there is emerging understanding of neuropsychiatric illnesses such as schizophrenia as disorders of brain networks, the question about the actual causes remains unanswered," says corresponding author Flavio Frohlich, associate professor of psychiatry at the UNC School of Medicine. "It was an exciting opportunity for us in the UNC Department of Psychiatry to team up with the leading experts on *Bartonella* to pursue this innovative idea of a potential link to schizophrenia. To our knowledge, this is the very first work that examines a potential role of *Bartonella* in schizophrenia."

The research team enrolled a group of 17 people with stable, medically managed schizophrenia or schizoaffective disorder, and a control group of 13 healthy adults, to test for evidence of *Bartonella* infection.

All participants filled out questionnaires on severity of symptoms and potential *Bartonella* exposure. Blood samples were taken from participants twice in a one-week period. The samples were cultured in a growth medium, and both cultured and whole [blood samples](#) underwent qPCR and droplet digital, or ddPCR testing, at seven-, 14- and 21-day intervals, to look for evidence of *Bartonella* organism-specific DNA. Blood samples were also tested for *Bartonella* species-specific antibodies.

Of the 17 patients with schizophrenia, 12 had *Bartonella* DNA in their blood, as compared to only one of 13 in the [control group](#). According to the questionnaires, both patients and controls reported similar pet ownership and flea exposures.

"*Bartonella* ddPCR, a very new diagnostic technology, provides a more sensitive molecular test than we've previously had access to," says Dr. Ed Breitschwerdt, Melanie S. Steele Distinguished Professor of Internal Medicine at NC State and study coauthor. "If we had not used ddPCR to test this cohort of individuals, we would not have found *Bartonella* DNA in any of the participants, either case or control."

"It is important to remember that our study was by design not able to demonstrate a causal link between *Bartonella* infection and schizophrenia," Frohlich says. "However, we believe this initial observational study strongly supports the need for follow-up research."

The researchers plan to proceed with a larger study to see whether their preliminary results are borne out.

"Many of these patients have been undergoing care for years," Breitschwerdt says. "What we're starting to see is a pattern—*Bartonella* can persist for a long time. And for the subset of people who can't eliminate the infection, the bacteria can cause chronic or progressive

illness."

The research appears in *Vector Borne and Zoonotic Diseases*.

More information: Erin Lashnits et al, Schizophrenia and Bartonella spp. Infection: A Pilot Case–Control Study, *Vector-Borne and Zoonotic Diseases* (2021). [DOI: 10.1089/vbz.2020.2729](https://doi.org/10.1089/vbz.2020.2729)

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