

New research investigates how the common 'cat parasite' gets into the brain

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A new study demonstrates for the first time how the *Toxoplasma gondii* parasite enters the brain to influence its host's behavior. This research was led by researchers from the Karolinska Institute and Uppsala University in Sweden publishes today in the Open Access journal *PLOS Pathogens*.

The *Toxoplasma gondii* parasite causes toxoplasmosis. The parasite is common and infects between 30 and 50 per cent of the [global population](#). It also infects animals, especially [domestic cats](#). Human infection is contracted by eating poorly cooked (infected) meat and handling cat feces. Toxoplasmosis first appears with mild flu-like symptoms in adults and otherwise healthy people before entering a chronic and dormant phase, which has previously been regarded as symptom-free. But when the immune system is weakened toxoplasmosis in the brain can be fatal. The fetus can be infected through the mother and because of this risk, pregnant women are recommended to avoid contact with cat litter boxes. Surprisingly, several studies in humans and mice have suggested that even in the dormant phase, the parasite can influence increasing risk taking and infected people show higher incidence of schizophrenia, [anxiety and depression](#), which are broader public health concerns.

In their recent study Fuks et al. showed for the first time how the parasite enters the brain and increases the release of a [neurotransmitter](#) called GABA (gaba-Aminobutyric acid), that, amongst other effects, inhibits the sensation of fear and anxiety. In one laboratory experiment, human dendritic cells were infected with toxoplasma. After infection,

the cells, which are a key component of the [immune defense](#), began actively releasing GABA), In another experiment on live mice, the team was able to trace the movement of infected dendritic cells in the body after introducing the parasite into the brain, from where it spread and continued to affect the GABA system.

"For toxoplasma to make cells in the immune defense secrete GABA was as surprising as it was unexpected, and is very clever of the parasite," says Antonio Barragan, researcher at the Center for Infectious Medicine at Karolinska Institute and the Swedish Institute for Communicable Disease Control. "It would now be worth studying the links that exist between toxoplasmosis, the GABA systems and major public health threats."

More information: *PLOS Pathogens*
[dx.plos.org/10.1371/journal.ppat.1003051](https://doi.org/10.1371/journal.ppat.1003051)

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