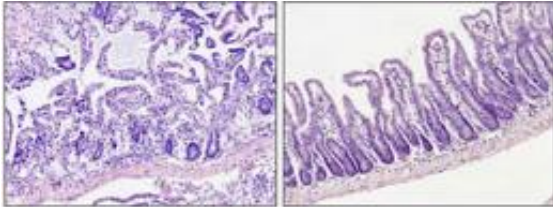


Common parasite uncovers key cause of Crohn's

23 February 2011, By Carly Hodes



Intestinal wall after *Toxoplasma* infection and inflammation, compared to undamaged intestinal wall.

(PhysOrg.com) -- Immune systems have their sinister side, especially when they have not learned how hard to fight. Crohn's disease and other inflammatory bowel diseases inflict more than a million Americans with debilitating pain and digestive unrest because of uncontrolled immune responses in the gut.

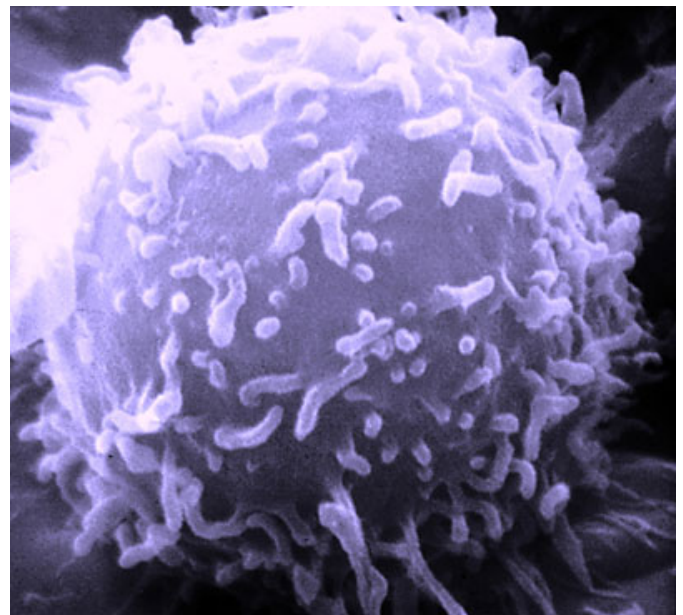
How this happens remained a mystery until immunologists at Cornell's College of Veterinary Medicine caught a key culprit in [Crohn's disease](#): a cell from our own immune forces. With unconventional help from a common parasite, Eric Denkers, professor of immunology, and research associate Charlotte Egan identified a renegade cell responsible for this largely arcane and increasingly prevalent illness.

"Auto-immune diseases are on the rise in this country but their causes have remained largely unknown," said Denkers. "It's possible that these diseases are more common in the West because we're too clean. Exposure to germs trains immune systems how to respond to threats. Early protection from germs may contribute to the increasing prevalence of immune system overreactions in our population, leading to auto-immune problems like allergies and [inflammatory bowel disease](#)."

Similar symptoms arise when some hosts first face

the prevalent protozoan *Toxoplasma gondii*. Denkers' lab studies this parasite's arsenal of host-manipulating powers, but recently they have steered *Toxoplasma* research in an entirely new direction.

"We noticed that the initial [intestinal inflammation](#) these parasites can cause looks very similar to what happens during Crohn's disease," said Denkers, one of the first to study this connection. "Our lab has started using *Toxoplasma* to model Crohn's disease in humans and help us find the pivotal perpetrator, which has turned out to be a cell from our own immune forces."



A single human lymphocyte, a white blood cell that acts as part of the immune system. Intraepithelial lymphocytes, which specialize in patrolling intestinal walls, can cause human Crohn's disease.

Specialized [immune cells](#) called intraepithelial [lymphocytes](#) patrol intestinal walls. Upon

encountering invaders, they release messenger proteins that call more immune cells to the battleground. "Too many messenger proteins recruit too many immune cells, causing inflammation that can devastate the host's own tissue," Denkers explained. "Bad balance between good bacteria, bad bacteria, and immune interactions like inflammation cause Crohn's disease."

"For the first time we've discovered how infection can turn these immune cells pathogenic, stimulating them to cause disease, inflammation and necrosis in the small intestine," said Denkers. "This marks a major leap toward understanding human Crohn's disease. Unveiling this kind of immunological interplay may lead to improved prevention and care in an array of auto-immune diseases."

Denkens and colleagues published their discovery in *Mucosal Immunology*, followed by a review article discussing *Toxoplasma* infection as a model for Crohn's disease in the *Journal of Biomedicine and Biotechnology* in 2010.

Provided by Cornell University

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