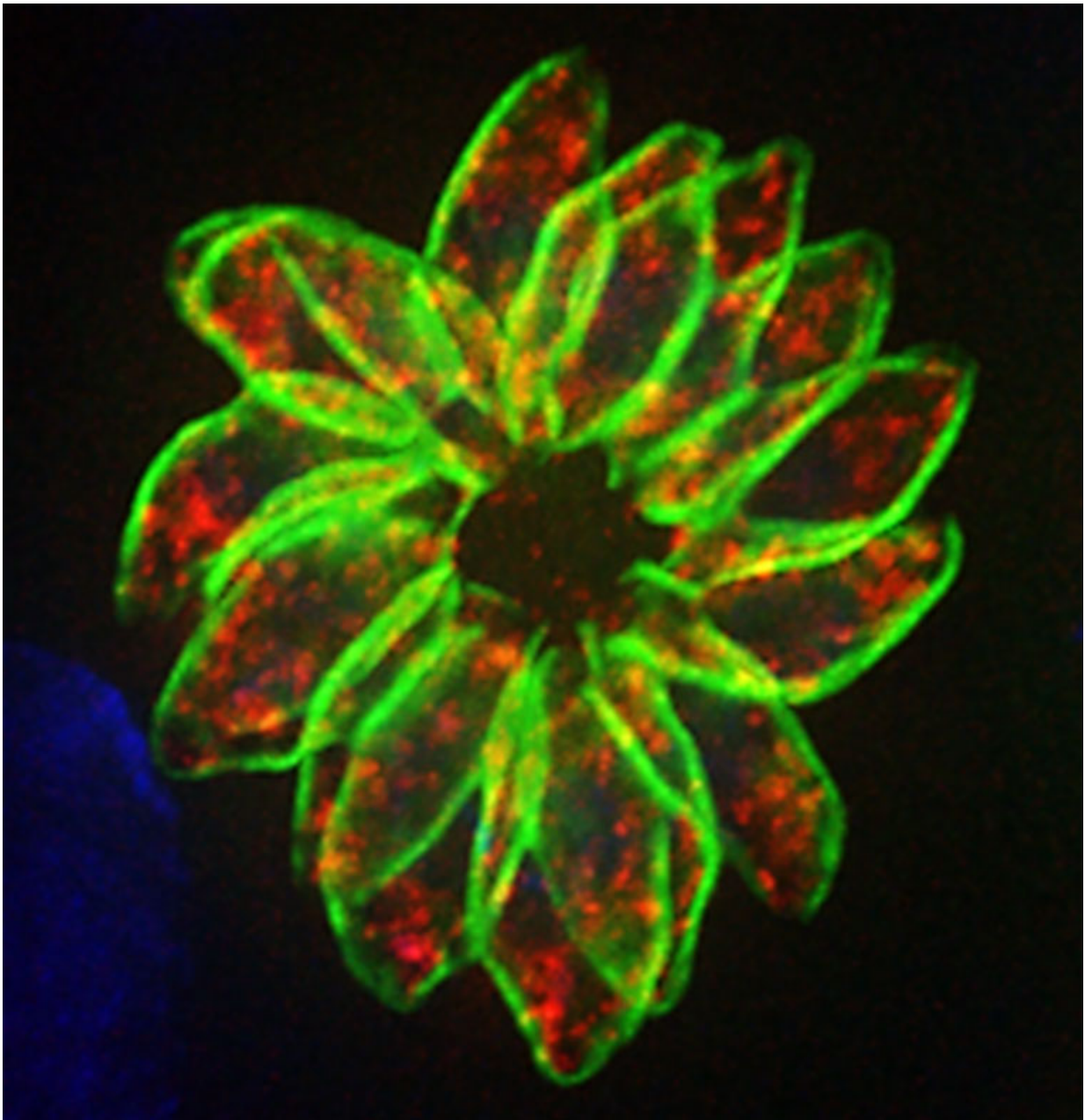


Toxoplasma parasite's greedy appetite may be its downfall

August 12 2015



Toxoplasma gondii parasite up close. Credit: University of Melbourne

Toxoplasma gondii is estimated to chronically infect nearly one-third of the world's population, causing the condition Toxoplasmosis. It is most commonly associated with handling cat faeces and is a particular threat to pregnant women and immune-compromised individuals, such as HIV/AIDS patients

It may even be implicated in mental illnesses, such as schizophrenia and depression.

Toxoplasma has an unusual ability infect any warm-blooded animal cell, from immune cells to brain and muscle cells.

A study led by researchers at the University of Melbourne's Bio21 Molecular Science and Biotechnology Institute has shown, for the first time, the extraordinary capacity of Toxoplasma to infect and grow within these cells, is due to its very broad culinary tastes. The research was published today in the journal *Cell Host and Microbe*.

Scavenging [nutrients](#), such as glucose, from the host cell is one of the biggest challenges that microbial pathogens face.

Lead author Martin Blume and colleagues demonstrated that Toxoplasma is able to steal and utilise a range of energy-rich nutrients from the host cell, allowing it to adapt to different host cell niches.

Professor Malcolm McConville, senior author and Director, Bio21 Institute, at the Department of Biochemistry and Molecular Biology said that unlike other pathogens that tend to only use one nutrient at a time,

Toxoplasma gondii, can use multiple nutrients at the same time.

"This may give these parasites enormous flexibility as well as the ability to grow in a range of different [host cell](#) types," he said.

"Being adaptable is good, but it comes at the cost of having to make all of the enzymes need to metabolise these nutrients all of the time, an apparently wasteful exercise."

However, the researchers have shown that *Toxoplasma* repurposes some of these enzymes, so that they improve nutrient metabolism, regardless of the nutrient being used.

Toxoplasma has managed to tweak its metabolism in a way that allows it to be both more adaptable and more efficient, allowing it to colonize a new animal or human host and grow very rapidly.

But its survival advantage may also turn out to be its Achilles' heel.

At least one of the enzymes that is switched on all of the time, TgFBP2, is also needed when parasites are using nutrients that are not normally metabolised by the enzyme.

When the function of TgFBP2 is blocked, *Toxoplasma* is no longer infective.

This new insight makes it possible to develop drugs that specifically target and block TgFBP2 and prevent acute *Toxoplasma* infection.

Provided by University of Melbourne

Citation: *Toxoplasma* parasite's greedy appetite may be its downfall (2015, August 12) retrieved

6 May 2024 from

<https://phys.org/news/2015-08-toxoplasma-parasite-greedy-appetite-downfall.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.