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What parasites eat is the key to better drug design

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A new study has revealed in unprecedented detail how parasites use different nutrients needed for growth, providing University of Melbourne researchers with unique drug targets against Leishmania, a tropical parasite that infects 12 million people worldwide and causes 500,000 deaths annually.

A team led by Professor Malcolm McConville from the Bio21 Institute, University of Melbourne developed a new analytical method which can be used for many infectious parasites and bacteria. The technique has revealed which metabolic pathways are essential for the parasite's survival, down to the particular atoms it uses as a food source.

"This a very significant breakthrough in this field because the more we know about these dangerous pathogens and how they live, the better we can fight them with new, effective drugs," said Professor McConville.

"Current anti-parasitic drugs have enormous side effects as they don't target specific pathogen metabolic pathways. We now have a greater understanding of Leishmania and can develop specific drugs with minimal side effects."

The team studied the parasite's metabolism by labelling carbon atoms in its food source (the sugar glucose) and using cutting edge equipment including nuclear magnetic resonance (NMR) to follow how the atoms were used in the parasite's metabolism. The results reveal which of the metabolic pathways are essential to Leishmania's survival, and therefore

good drug targets to block and kill the parasite.

The parasite Leishmania was used to develop the technique as its complex life cycle and ability to infect many animals makes treatment very difficult and limits the effectiveness of a vaccine .

Leishmania causes a range of infections in humans, from skin conditions to organ infection which can be fatal. The parasite lives within tiny sandflies which bite an animal or human to get the blood they require to produce eggs, thereby passing on the Leishmania parasite.

The new study is published in the current issue of the international *Journal of Biological Chemistry*.

Provided by University of Melbourne