

Worm discovery could help 1 billion people worldwide

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This is the mouse whipworm *Trichuris muris*. Credit: R. Grencis

Scientists have discovered why some people may be protected from harmful parasitic worms naturally while others cannot in what could lead to new therapies for up to one billion people worldwide.

Parasitic worms are a major cause of mortality and morbidity affecting up to a billion people, particularly in the Third World, as well as domestic pets and [livestock](#) across the globe.

Now, University of Manchester researchers have, for the first time, identified a key component of mucus found in the guts of humans and animals that is toxic to worms.

"These [parasitic worms](#) live in the gut, which is protected by a thick layer of mucus," explained Dr David Thornton, from the University's Wellcome Trust Centre for Cell Matrix Research. "The mucus barrier is not just [slime](#), but a complex mixture of salts, water and large 'sugar-coated' proteins called mucins that give mucus its gel-like properties.

"In order to be able to study these debilitating worm diseases, we have been using a mouse model in which we try to cure mice of the whipworm *Trichuris muris*. This worm is closely related to the human equivalent, *Trichuris trichiura*.

"We previously found that mice that were able to expel this whipworm from the gut made more mucus. Importantly, the mucus from these mice contained the mucin, Muc5ac. This mucin is rarely present in the gut, but when it is, it alters the physical properties of the mucus gel."

Co-lead on the study, Professor Richard Grencis, from the Faculty of Life Sciences, continued: "For this new research, we asked how important Muc5ac is during worm infection by using mice lacking the gene for Muc5ac. We found that [mice](#) genetically incapable of producing Muc5ac were unable to expel the worms, despite having a strong immune response against these parasites. This resulted in long-term infections.

"Furthermore, we discovered the reason for the importance of Muc5ac is that it is 'toxic' for the worms and damages their health."

The study, published in the [Journal of Experimental Medicine](#), found that Muc5ac is also essential for the efficient expulsion from the gut of other types of worm that cause problems in humans. These include the hookworm, and the spiral threadworm. Together, these worms cause mortality and morbidity in up to one billion people across the globe.

Dr Sumaira Hasnain, the lead experimentalist on the project, added: "For the first time, we have discovered that a single component of the [mucus](#) barrier, the Muc5ac mucin, is essential for worm expulsion. Our research may help to identify who is and who isn't susceptible to parasitic worms, and it may eventually lead to new treatments for people with chronic worm infections."

Provided by University of Manchester

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