Genetic discovery may offer new avenue of attack against schistosomiasis

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Researchers have discovered a group of genes in this snail, *Biomphalaria glabrata*, that conveys resistance to the parasite that causes schistosomiasis. Credit: Oregon State University

Researchers at Oregon State University have discovered a group of genes in one species of snail that provide a natural resistance to the flatworm parasite that causes schistosomiasis, and opens the door to possible new

drugs or ways to break the transmission cycle of this debilitating disease.

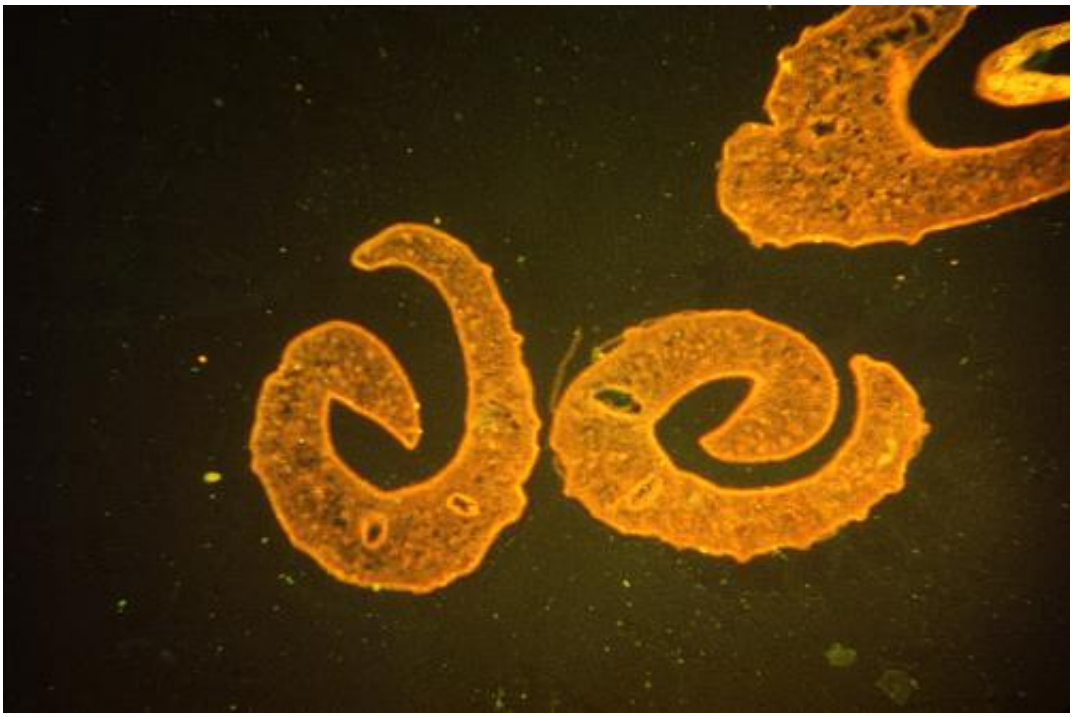
Schistosomiasis infects more than 200 million people in more than 70 countries, and is most common in areas with poor sanitation. It can cause chronic, lifelong disability, beginning with gastrointestinal problems and sometimes leading to liver damage, kidney failure, infertility and bladder cancer.

Schistosomisasis, which is native to Africa but has now spread around the world, has been called a neglected global pandemic. Its impact on human health rivals that of malaria.

However, the circular transmission of this complex disease depends upon spending some time as an infection in aquatic snails, where the number of parasites is greatly magnified. Snails may therefore offer a key opportunity to break the cycle of transmission.

The findings about this genetic discovery were just published in PLOS Genetics, by researchers from OSU and the Universite de Perpignan Via Domitia in France. The work was supported by the National Institutes of Health.

"We've found a new class of previously unknown genes that appear to control the ability to resist schistosomes," said Michael Blouin, a professor of integrative biology in the OSU College of Science. "It was found that a dominant genetic allele in this region conveys an eight-fold decrease in the risk of schistosomiasis infection.



This photomicrograph confirmed the presence of Schistosoma mansoni trematodes. Credit: Marianna Wilson, courtesy of the Centers for Disease Control

"These genes are the type that, in other animal species, help to recognize pathogens and trigger an immune response," Blouin said. "This is important new information. With further research we'll learn more about the exact genetics and molecules that are involved as the parasite interacts with the host."

There are two possible applications of these results that could be pursued in an effort to treat or control this disease, the researchers said. One would be development of new drugs, which could be important - right now only a single medication, praziquantel, exists to help treat the disease. With its increasingly widespread use, resistance to that drug is possible.

Alternatively, researchers might attempt to insert these parasite-resistant genes into the species of snails that most commonly transmit schistosomiasis.

"There are ways to drive new genes into a population," said Jacob Tennessen, an OSU postdoctoral research associate and lead author on this study.

This is already being tried for some other diseases, the scientists noted, such as in mosquitos that transmit malaria. Modifying snail populations to be resistant is currently not practical, they said, but identifying new genes that control resistance to the parasite is a critical first step.

Provided by Oregon State University