CORVALLIS, Ore. – A naturally occurring protein has been discovered that shows promise as a biocontrol weapon against schistosomiasis, one of the world's most prevalent parasitic diseases, Oregon State University researchers reported today in a new study.

Schistosomiasis is transmitted via flatworms shed by the freshwater snails that serve as the parasite's non-human host. It's a potentially life-threatening illness that affects more than 250 million people annually in tropical and subtropical countries, according to the World Health Organization.

The disease can cause frequent, painful or bloody urine; abdominal pain and bloody diarrhea; anemia; fever, chills and muscle aches; inflammation and scarring of the bladder; and enlargement of lymph nodes, the liver and the spleen.

While a drug called praziquantel is an effective treatment, there is no vaccination for schistosomiasis, and those who've had it develop no immunity.

But researchers in OSU's College of Science have discovered a key new protein in a snail, Biomphalaria glabrata, that hosts and releases Schistosoma mansoni parasites that infect humans. Findings were published today in the journal PLOS Neglected Tropical Diseases.

Known as Grctm6, the protein seems to prevent the snails from shedding at least some of the parasites that could go on to infect people working or playing in the water where the snails live.

"Shedding none would be great, but shedding fewer could still feasibly make a difference," said the study's corresponding author, Euan Allan, a postdoctoral scholar in the college's Department of Integrative Biology. "If snails are releasing a smaller number of parasites into the environment, people are less likely to be infected."

Three variants of Grctm6 naturally occur, Allan said, and one of them confers more resistance to Schistosoma than the others.

“What’s interesting about that, from kind of an eye in the sky look, is that in the future we might be able to increase prevalence of the more resistant version and create a new population of more resistant snails without actually interfering with their biological function,” Allan said. “That’s the next step.”

Attempts to control schistosomiasis by focusing on the snail hosts date to the 1950s, but earlier efforts involved either molluscicides – poisons – or the introduction of non-host snail species to eat or compete with the hosts.

“Those approaches bring their own slew of problems,” Allan said. “We’d anticipate far fewer ecological consequences from gene-driving one of these naturally occurring proteins into a population of snails, because they’d remain natural in pretty much every other way – just instead of being more susceptible to Schistosoma, they’d be more resistant.”

Allan says it’s not yet clear if the protein makes snails less likely to pick up the parasite in the first place, more likely to have their immune system kill it, or less likely to shed it.

“It’s speculative, but our best guess is the protein helps a snail’s immune system better recognize the parasite,” he said.

“The real take-home of the work is that we’ve discovered a completely new protein that’s never been discovered in any other species. And this protein is involved in the extent of infection in an intermediate species, and potentially involved in the extent of human infection.”

About the OSU College of Science: Home to the life, statistical, physical and mathematical sciences, the College of Science is a vibrant scientific community committed to expanding the nation’s intellectual capital and preparing a scientifically literate public. The college is

recognized as a national and global center for excellence in research and scholarship, teaching every OSU student and building the next generation of leaders in science.