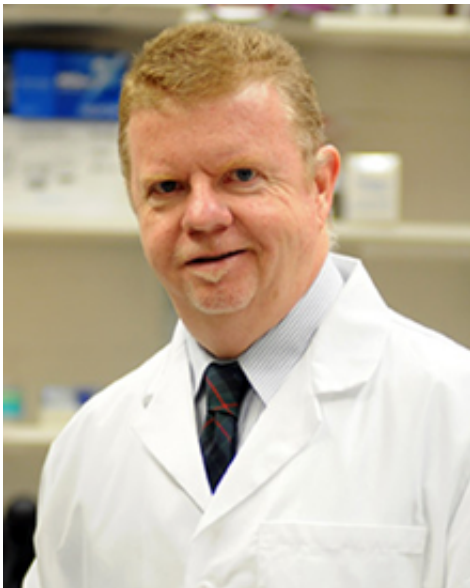


# Researcher adapting breakthrough technologies to combat parasitic worm infections

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Recent breakthroughs may pave the way for vaccines and new drugs for those infected by parasitic helminths. These flatworms, including tapeworms that cause hydatid diseases and neurocysticercosis, liver flukes, and blood flukes (schistosomes), infect more than 300 million people and cause approximately four million disability-adjusted life years lost due to chronic illness and death each year.

Paul Brindley, Ph.D., professor of microbiology, immunology, and tropical medicine, and scientific director of the Research Center for Neglected Diseases of Poverty at the George Washington University School of Medicine and Health Sciences, co-authored a perspective in the journal *Science*, calling for researchers to adapt new technologies to research these neglected pathogens.

"It took several years of work to sequence the genomes of the major species of [flatworm](#) parasites. However, now that we have this information, we can focus on genes of interest," said Brindley. "Even now, researchers are deploying retroviruses for transgenesis and genome editing of flatworm parasites to identify new ways to cure people who are afflicted by these infections. This is a major focus of research at the GW Research Center for Neglected Diseases of Poverty, which demonstrates the potential of what can already be done with new technologies."

In addition to breakthroughs in manipulation of genomes of these flatworm pathogens, as well as revolutionary strategies such as harnessing the bacterial clustered regulatory interspaced short palindromic repeats, known as CRISPR, isolation of organs of the parasites, characterization of stem cells of these worms, and advances in primary cell culture are expanding the molecular toolkit available to scientists. These resources are now all available to the scientific community. These technologies have been in use in mammals and model species for some time, but comparable research on neglected tropical disease helminth parasites has lagged far behind.

Brindley, along with his co-authors Karl Hoffman, Ph.D., professor of parasitology and leader of the Animal and Microbial Sciences Research Theme at Aberystwyth University, and Mathew Berriman, Ph.D., program leader for parasite genomics at the Wellcome Trust Sanger Institute, encourage researchers to take advantage of these break-through

techniques to address long-asked questions about the pathogenesis, developmental biology, and evolution of flatworm parasites.

"Because of issues like global warming and migrations of people, these diseases are spreading," said Brindley. "While historically considered as tropical diseases, infections by these parasites have recently expanded to Western Europe, including Corsica, and expansions to other continents are expected. Current drugs, in use for the last 40 years, are unsustainable and in danger of over-reliance, unless new interventions are found."

**More information:** The full perspective, "Halting Harmful Helminths: Vaccines and New Drugs Are Needed to Combat Parasitic Worm Infections," is available at [www.sciencemag.org/content/346/6206/168.summary](http://www.sciencemag.org/content/346/6206/168.summary)

Provided by George Washington University

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