

# Intestinal parasites are 'old friends,' researchers argue

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Intestinal parasites such as tapeworms, hookworms and a protist called *Blastocystis* can be beneficial to human health, according to a new paper that argues we should rethink our views of organisms that live off the human body.

To prove the point, paper co-author Julius Lukeš even ingested three developmental stages of a large species of tapeworm called *Diphyllobothrium latum*. After more than a year with the tapeworms, which might have grown to be as long as four metres each by now, he says he feels fine.

"I knew there was no risk," he says.

Lukeš, a senior fellow at CIFAR (Canadian Institute for Advanced Research), and a professor at the University of South Bohemia, co-authored the review published in the August issue of *Trends in Parasitology*. He says the common view that all parasites are damaging is misguided. While medical textbooks tie parasites to problems such as vitamin deficiency, anemia and diarrhea, a critical review of the evidence suggests that most intestinal parasite infections have no negative impact in well-nourished people with low overall parasite loads, the researchers say.

They argue that in some cases, parasite infections could activate the immune system and prevent disorders caused by inflammation of the intestines.

"It is making our immune system in the intestine busy, so that when it faces some stress or some unusual situation it will not overreact. It kind of calms down our intestinal [immune system](#)," Lukeš says.

It is an extension of the "Old Friends Hypothesis" theory to [intestinal parasites](#), based on the idea that they have been part of human life throughout evolution.

"We were parasitized, inhabited by many organisms, and that was happening for millions of years," Lukeš says. "Everything was pretty much eliminated within the last one or two generations, perhaps within the last 50 years, especially from the wealthy countries. That was very abrupt."

He and his colleagues argue that humans should bring these creatures back into their lives, embracing them as helpers rather than pests. Lukeš was so confident of his advice that he even ingested a few friends of his own.

Despite reports that his species of tapeworm can cause B12 deficiencies, Lukeš says he has been tested and found to be healthy. When he traced the evidence for this claim back through the scientific literature, he says he found only one study that reported low levels of vitamins in some patients with this tapeworm.

Human bodies contain 10 per cent human cells and the rest are non-human, largely made up of beneficial microbes that we call the microbiome.

While scientific research has focused heavily on understanding the bacteria in the microbiome in recent years, Lukeš and others in CIFAR's Integrated Microbial Biodiversity program have also started studying eukaryotes within the human body—organisms with complex cell

structures that have a nucleus.

"When everybody is looking at the bacterial microbiome ... we are looking at the eukaryome," he says.

"Our bacterial microbiome is essential to [human health](#), and the parasites that make up the eukaryome are likely important as well," says CIFAR Associate Laura Wegener Parfrey (University of British Columbia). In support of the hypothesis that parasites are part of our normal gut community, Parfrey led a recent study revealing that many species of eukaryotes, including *Blastocystis*, live in the guts of healthy humans from remote areas, and in other mammals. This study was published in June in *Frontiers in Microbiology*.

"In my view, we need to embrace our parasites just as we have embraced our microbiome in recent years, and the review by Lukeš is an important step in this direction," says Parfrey. "Doing so just might lead to better disease treatments and healthier people."

Lukeš is beginning a collaboration with Parfrey to investigate the use of controlled parasite infections as medical treatment for disorders such as the inflammatory bowel disorder Crohn's disease.

Provided by Canadian Institute for Advanced Research

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