

## Parasitic Worm Eggs Ease Intestinal Ills by Changing Gut Microbiota By Katherine Harmon | November 15, 2012

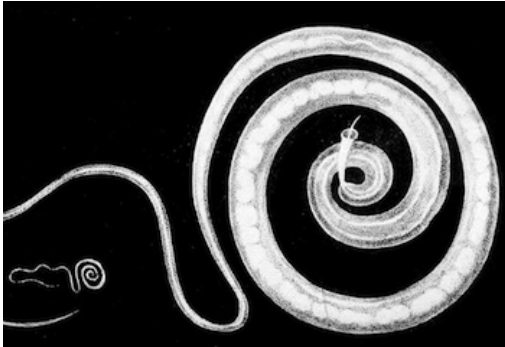


Image of *Trichuris trichiura* courtesy of Wikimedia Commons/Delorieux for Johann Gottfried Bremser

Intestinal issues are not just for us humans. Whereas the [inflammatory bowel disease](#) (IBS) now afflicts some [1.4 million people in the U.S.](#), a similar condition often besets captive monkeys. But these animals are providing new insights about a cure for [this condition](#) in both species—and that cure is [worms](#).

[Rhesus macaque monkeys living in captivity often develop chronic diarrhea similar to the human autoimmune condition ulcerative colitis.](#) Vets are often unable to treat these ill monkeys, which can suffer from dangerous weight loss and dehydration. New research takes advantage of this trend and has found that after [giving the monkeys parasitic whipworm \(\*Trichuris trichiura\*\) eggs, most of them greatly improved.](#) The findings were published online November 15 in [PLoS Pathogens](#).

“The [idea for treating colitis with worms is not new](#),” P’ng Loke, an assistant professor of microbiology at New York University Langone Medical Center and co-author of the new paper, said in a prepared statement. In fact, small human trials have found that [giving people pig whipworm eggs can reduce symptoms of IBS.](#) And in [developing countries where IBS is much less common, parasitic worms \(helminth\) are often endemic,](#) perhaps conferring some benefit. But scientists have still been parsing out just why the presence of these worms might work so well.

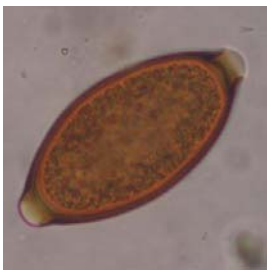


Image of whipworm egg at 400x magnification courtesy of Wikimedia Commons/Joel Mills

For the new study, researchers selected five juvenile rhesus macaques with idiopathic (cause unknown) chronic diarrhea. Each monkey was fed 1,000 *T. trichiura* eggs. After the treatment, four of the five monkeys had substantially improved stool and had regained weight.

In **examining the mucosal membranes of the monkeys' colons both before and after** treatment, the *researchers found that the ill monkeys started out with an abnormally high rate of bacteria attached to the linings. But after the treatment bacterial communities in their colons had changed substantially.*

“Our findings suggest that exposure to **helminthes may improve symptoms by restoring the balance to the microbial communities that are attached to the intestinal wall,**” Loke said. For instance, three of the five monkeys with diarrhea had high levels of the Cyanobacteria Streptophyta before the worm treatment. But these levels dropped to numbers found in healthy control monkeys. In their paper the **team speculated that the presence of the parasite eggs stimulated extra mucus production and healing, in addition to renewing epithelial cells.** These changes **helped to reduce the quantity of immunity-stimulating bacteria that could attach to the gut lining and rev up the immune response unnecessarily.**

They also found that the expression of genes for inflammation had been reduced.

Mounting research points to **important interactions between microbes in the stomach and the immune system.** In fact, mice raised in germ-free environments and those raised with human gut microbiota fail to develop functional immune responses. Two weeks after the treatment, the researchers examined samples from the mucosal lining of the monkey's colons. All five appeared to have a much healthier immune-response profile.

Further research remains to be done, including larger and blinded studies in monkeys. And lest you worry about trading an ailment for a parasite, **the worms themselves did not appear to have matured inside the monkeys—nor did the eggs get passed on in their stool.** And Loke and colleagues are starting a human **clinical trial at New York University** to test pig whipworm eggs (which cannot infect other people) as a treatment for ulcerative colitis based on this probiotic principle.

So if parasitic egg treatments prove successful and do eventually make it to market, don't be too squeamish. Perhaps just think of them as the caviar of probiotics.



**About the Author:** Katherine Harmon is an associate editor for *Scientific American* covering health, medicine and life sciences. Follow on Twitter [@katherineharmon](#).