

# The pig whipworm genome may aid to treat autoimmune diseases

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An international team, composed of 11 institutions from six countries, including BGI, presented the whole-genome sequence of *Trichuris suis*, a parasitic worm in pig. Understanding the genetics mechanisms underlying the pig parasite may aid to modify the human immune response that could result in better treatments for autoimmune diseases, including inflammatory bowel disease (IBD) and multiple sclerosis. The latest research was published online in [Nature Genetics](#).

The human whipworm (*Trichuris*) infects around 1 billion people worldwide and causes a disease (trichuriasis) that results in major socioeconomic losses. In contrast, the pig whipworm causes disease and losses in livestock, but it does not cause disease in humans. It's reported that pig whipworm infection could even prevent inflammatory disease in humans, and has been used to treat inflammatory bowel disease and [multiple sclerosis](#).

In this study, researchers sequenced the genomes of single adult female and male pig whipworm at about 140-fold coverage, producing draft assemblies of 76 Mb and 81 Mb, respectively. It was previously reported that the XX and XY karyotypes for female and male whipworm, respectively, but in this study researchers found no evidence for a Y chromosome among the male-specific scaffolds, suggesting that the sex chromosomes were the smallest chromosomal pair and were morphologically very similar in both sexes.

Intriguingly, they found the microRNAs (miRNAs) seem to have a

major role in regulating sexual development in this species. Among them, the tsu-miR-228 in male, and tsu-miR-236 and tsu-miR-252 in female worms were predicted to regulate and suppress key feminizing and masculinizing developmental genes, respectively. According to the authors, this is the first time they observed such results in a metazoan.

When investigating how pig whipworm regulates the host immune response, researchers explored the stage-, sex- and tissue-specific transcription of mRNAs and small noncoding RNAs. The secretory proteins showed high representation in transcriptome of pig whipworm. The peptidases, particularly the secreted peptidases upregulated during larval development and in the stichosome, seemed to have a central role in human [autoimmune disorders](#), primarily through inhibiting inflammation. Researchers also constructed the models of [inflammatory bowel disease](#) and other autoimmune disorders, trying to figure out a way for parasite-derived therapies.

Li Hu, Project Manager from BGI, said, "The constructed pig whipworm genome sequence provides us a genetic resource for deeply investigating the mechanisms underlying human [autoimmune diseases](#). Meanwhile, the pig whipworm-host interactions will shed new light on the control of helminth and other immunopathological diseases in human. "

**More information:** [medicalxpress.com/news/2014-06...reatments-human.html](http://medicalxpress.com/news/2014-06...reatments-human.html)

Provided by BGI Shenzhen

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