

# Genomic 'haircut' makes world's tiniest genome even smaller: research

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The world's tiniest nuclear genome appears to have "snipped off the ends" of its chromosomes and evolved into a lean, mean, genome machine that infects human cells, according to research published today by University of British Columbia scientists.

Until recently, *E. cuniculi*, a [parasitic fungus](#) commonly found in rabbits that can also be fatal to immunocompromised humans, has been widely regarded as having the smallest known nuclear [genome](#). At 2.9 millions base pairs (Mbp) and approximately 2,000 genes, the genome of *E. cuniculi* is less than one-two thousandth the size of the human genome.

But now, a team of researchers led by UBC Botany Prof. Patrick Keeling sequenced the genome of a closely related parasite that makes the *E. cuniculi* genome seem positively king-sized. The genome of *E. intestinalis*, a sister species of *E. cuniculi* that infects human intestines, is 20 per cent smaller, at only 2.3Mbp.

"On one end of the spectrum, genomes can get larger almost without limit, but there is a limit to how small they can get - they can't be less than zero," says Keeling, whose work is published in today's issue of the journal *Nature Communications*. "And the question that fascinated us was 'in an already tiny genome, what else can be lost?'"

Keeling and a team of researchers from Switzerland, Canada and the U.S. compared the genome of *E. cuniculi* and *E. intestinalis* and found little difference between the chromosome "cores" but that the ends were

all "trimmed" in *E. intestinalis*.

"The [chromosomes](#) are long threads of DNA, and in *E. intestinalis* its almost as though it got a haircut, removing hundreds of genes, but all from the ends of the threads," says Keeling.

Keeling, director of the Centre for [Microbial Diversity](#) and Evolution and a member of Beaty Biodiversity Research Centre at UBC, says the discovery provides insights into how genomes evolve, especially in [extreme conditions](#).

Provided by University of British Columbia

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