

Genetic exchange discovered in anciently asexual rotifers

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Bdelloid rotifers (*A. vaga*) under the microscope. Credit: E.A. Mnatsakanova and O.A. Vakhrusheva/Skoltech

Evolutionary biologists at Skoltech have discovered recombination in bdelloid rotifers, microscopic freshwater invertebrates characterized by their presumed ancient asexuality. The existence of such anciently asexual groups calls into question the hypothesis that sexual reproduction is indispensable for the long-term evolutionary success of a species. However, the recent study published in *Nature Communications* provides evidence of recombination and genetic exchange in bdelloids.

Sexual reproduction involves recombination and exchange of genetic material between individuals of the same species, and is thought to be essential for the long-term survival of species. Although transitions to [asexual reproduction](#) are quite frequent in eukaryotes, they typically result in rapid extinction. On these grounds, transition to asexual reproduction is usually regarded as an evolutionary dead end. However, there are a few notable exceptions to this rule, such as bdelloid rotifers, which were assumed to have switched to asexual reproduction several tens of millions of years ago.

An international team of scientists led by Georgii Bazykin, a professor at the Skoltech Center for Life Sciences (CLS), and Alexey Kondrashov, a professor at Moscow State University (MSU), obtained whole-genome sequencing data for several individuals of *Adineta vaga* and found evidence suggesting recombination in this bdelloid species.

The scientists analyzed whole genomes of 11 *A. vaga* individuals revealing signatures of recombination and interindividual genetic exchange.

Olga Vakhrusheva, the lead author and a junior research scientist at Skoltech, says, "We have shown that variation within the population of *A. vaga* is inconsistent with strict clonality and lack of recombination. Bdelloid rotifers are frequently referred to as 'an evolutionary scandal.'" However, our results suggest that the status of bdelloid rotifers as an

ancient asexual group should probably be reconsidered. Our findings underscore the importance of recombination for the long-term evolutionary success of species. Although some data hint at the existence of meiosis in [bdelloid rotifers](#), mechanisms of genetic exchange in this group of species remain obscure and are subject to further research."

More information: Olga A. Vakhrusheva et al. Genomic signatures of recombination in a natural population of the bdelloid rotifer *Adineta vaga*, *Nature Communications* (2020). [DOI: 10.1038/s41467-020-19614-y](#)

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