

Sex is Good for Evolution, Researcher Says

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University of British Columbia evolution biologist Sarah Otto has proof that sex is good for you -- and the human species as a whole. Previous evolutionary theories -- typically based on the assumption of an infinite population -- have failed to find a clear role for sexual reproduction in evolution.

In a research paper published in today's edition of the journal *Nature*, Otto and co-author Peter Keightley from the University of Edinburgh's Institute of Evolutionary Biology explain that in real populations -- which are never infinitely large -- reproduction through sex breaks apart harmful mutations and creates new gene combinations, giving species better adaptability.

"If populations were infinitely large, all combinations of genes would already exist and sex would not be much use," says Otto, a zoology professor at UBC.

"Mutations take place naturally, and some mutations cause illness or physical features that make it harder for individuals to survive and reproduce in their environment," says Otto.

"Sex -- and the recombination of chromosomes that results -- places mutations in new contexts, allowing selection to act more or less independently on each mutation. In asexual reproduction, the entire genome is selected upon in one block, which is extremely inefficient. So sex helps species better adjust to their environment, whether the species is a plant, animal, or human."

Within a species, the number of individuals limits the number of genetic combinations available. Sex can, however, create new combinations from those already present. Otto and Keightley's work shows that the benefit of sex is really only felt when population sizes are limited.

“In humans, for example, each egg or sperm carries dozens of new mutations not carried by the parents. If some of these mutations cause disease but they are embedded within chromosomes that are otherwise quite healthy, natural selection cannot separate out the bad from the good without sex and recombination,” says Keightley.

“We've shown that in finite populations, this model works extremely well,” says Otto. “It provides a solid foundation upon which to base our understanding of evolution, because sexual reproduction is so fundamental.”

Source: University of British Columbia

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