

# Sex: It's costly but worth it. Just ask a microbe

February 8 2006

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The next time you mutter about the high cost of relationship maintenance, take comfort in knowing that microbes share your pain. In the first study to examine the cost of sexuality in microbes, Jianping Xu, associate professor of biology at McMaster University, found that sex exacts physical, morphological and behavioural stress on microbes. His findings are published in the recent edition of *Genetics*.

"There was always an assumption that microbes reproduce asexually, but they are actually asexual and sexual," says Xu. Using a fungus that has two sexes, A and Alpha, he established three populations: A microbes (females), Alpha microbes (males), and a combination of the two. When left to re-produce on their own, the first two groups of microbes performed efficiently and prolifically. The microbe couples, however, were slower to reproduce. But Xu also found that a fair bit of fluffing and flirting goes on when mixed pairs slide into a petri dish, and the results can be detrimental to their fitness.

"We noticed that mating stunted their asexual reproduction because each partner spent more time attracting the other than nourishing its own growth," explains Xu. "Transmitting mating signals costs both partners: one partner uses up materials and energy to produce and transmit the signal, and the other partner gets distracted by the mating signal and loses interest in reproducing on its own."

The irony is that despite the high cost of sex there are benefits.

"In many microbes, mating and sexual reproduction produce genetically diverse and hardy progeny better able to withstand environmental changes, inhospitable conditions, lack of water, extreme temperatures and fewer nutrients," says Xu.

There may be other benefits, too. "Every time DNA replicates and the microbes reproduce, mutations are introduced. While some mutations may be beneficial, most have no effect or are deleterious," says Xu.

"Through mating and sexual reproduction, mutations accumulated in different strains are brought together so that deleterious ones are purged more efficiently, and the beneficial ones are brought together to produce fitter offspring."

As Xu found out, some of those mutations reduced the cost of interacting with sexual partners. The downside is that the same mutations can also reduce their mating ability. "There is some kind of balance out there between the cost and benefit of sex," says Xu. "And we are looking into that right now".

Source: McMaster University

Citation: Sex: It's costly but worth it. Just ask a microbe (2006, February 8) retrieved 2 May 2024 from <https://phys.org/news/2006-02-sex-costly-worth-microbe.html>

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