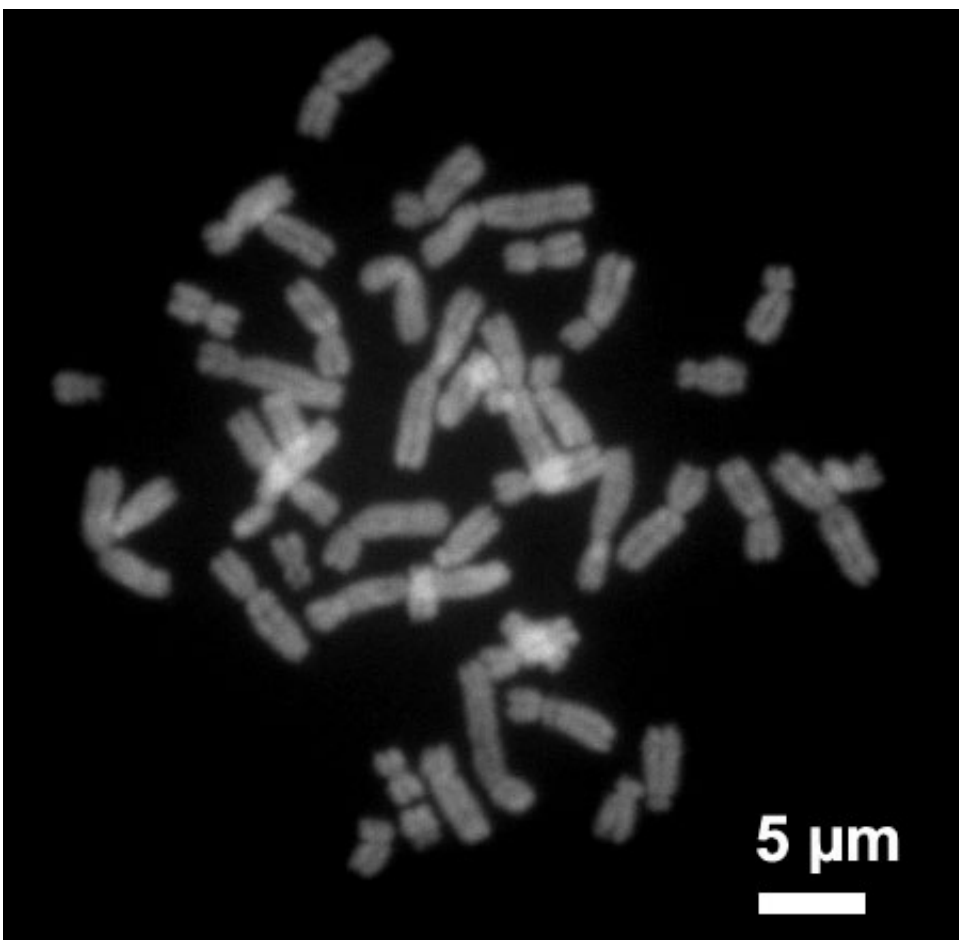


Student gives possible explanation for female mating preferences that decrease male survival chances

June 6 2019, by Bob Yirka



Human chromosomes during metaphase. Credit: Steffen Dietzel/Wikipedia

Pavitra Muralidhar, a Ph.D. student in the Department of Organismic

and Evolutionary Biology at Harvard University, has developed a theory to explain why females of some species are more attracted to some males who have a lesser chance of survival. In her paper published in the journal *Nature*, she outlines her theory of selfish sex chromosomes and how it might work in nature. Mark Kirkpatrick, with the University of Texas has published a [News and Views piece](#) in the same journal issue, outlining the work done by Muralidhar.

Prior research has shown that females of some species are more attracted to males who possess certain impressive features, such as bright plumage. But such research has also shown that males who sport brighter plumage are more likely to be seen and eaten by a predator—so why do the females prefer them? Scientists have been unable to answer this question. But Kirkpatrick notes that there are two main theories. The first is called direct [selection](#), and it is what it sounds like—[genes](#) that affect mating preferences are direct targets of selection. An example might be a male that is good at helping tend a nest, and is therefore highly prized by females looking for a mate.

The other [theory](#), quite naturally, is called indirect selection, and it involves [females](#) choosing mates who have one trait, but get another trait as part of the deal. A female who chooses a male based on plumage, for example, might wind up with a male that also has a good immune system, which is responsible for his great plumage. Unfortunately, neither of these theories explains why a female would go for a male that is clearly less likely to survive; doing so will decrease her male offspring's chances of survival. Muralidhar suggests this phenomenon is due to what she describes as "selfish sex chromosomes."

Muralidhar's theory is based on the indirect selection theory, and also sexually antagonistic selection, in which a gene benefits one [gender](#), but could mean harm to the other. She also considers the possibility of an exception in situations where one gender has a pair of same

[chromosomes](#) and the other has two that are different. She suggests that in cases in which a gene involved in mating is located on the chromosome that is present in only one gender, it can result in only offspring of the same gender carrying that gene, which could benefit them, but it could also bring harm to the offspring of the other gender. She has also carried out a mathematical analysis of her ideas to prove her theory and carried out a study of 36 species, half of which aligned with her "selfish sex chromosome" hypothesis expectations.

More information: Pavitra Muralidhar. Mating preferences of selfish sex chromosomes, *Nature* (2019). [DOI: 10.1038/s41586-019-1271-7](https://doi.org/10.1038/s41586-019-1271-7)

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