

Researchers conclude that what causes menopause is—wait for it—men

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After decades of laboring under other theories that never seemed to add up, a team led by biologist Rama Singh has concluded that what causes menopause in women is men.

Singh, an evolutionary [geneticist](#), backed by computer models developed by colleagues Jonathan Stone and Richard Morton, has determined that menopause is actually an unintended outcome of natural selection – the result of its effects having become relaxed in [older women](#).

Over time, human males have shown a preference for [younger women](#) in selecting mates, stacking the Darwinian deck against continued fertility in older [women](#), the researchers have found.

"In a sense it is like aging, but it is different because it is an all-or-nothing process that has been accelerated because of preferential mating," says Singh, a professor in McMaster's Department of Biology whose research specialties include the evolution of human diversity.

Stone is an associate professor in the Department of Biology and associate director of McMaster's Origins Institute, whose themes include the origins of humanity, while Morton is a professor emeritus in Biology.

While conventional thinking has held that menopause prevents older women from continuing to reproduce, in fact, the researchers' new theory says it is the lack of reproduction that has given rise to menopause.

Their work appears in the online, open-access journal *PLOS Computational Biology*.

Menopause is believed to be unique to humans, but no one had yet been able to offer a satisfactory explanation for why it occurs, Singh says.

The prevailing "grandmother theory" holds that women have evolved to become infertile after a certain age to allow them to assist with rearing grandchildren, thus improving the survival of kin. Singh says that does not add up from an [evolutionary perspective](#).

"How do you evolve infertility? It is contrary to the whole notion of natural selection. Natural selection selects for fertility, for reproduction—not for stopping it," he says.

The new theory holds that, over time, competition among men of all ages for younger mates has left older females with much less chance of reproducing. The forces of natural selection, Singh says, are concerned only with the survival of the species through individual fitness, so they protect fertility in women while they are most likely to reproduce.

After that period, natural selection ceases to quell the genetic mutations that ultimately bring on menopause, leaving women not only infertile, but also vulnerable to a host of health problems.

"This theory says that [natural selection](#) doesn't have to do anything," Singh says. "If women were reproducing all along, and there were no preference against older women, women would be reproducing like men are for their whole lives."

The development of menopause, then, was not a change that improved the survival of the species, but one that merely recognized that fertility did not serve any ongoing purpose beyond a certain age.

For the vast majority of other animals, fertility continues until death, Singh explains, but women continue to live past their fertility because men remain fertile throughout their lives, and longevity is not inherited by gender.

Singh points out that if women had historically been the ones to select younger mates, the situation would have been reversed, with men losing fertility.

The consequence of menopause, however, is not only lost fertility for women, but an increased risk of illness and death that arises with hormonal changes that occur with menopause. Singh says a benefit of the new research could be to suggest that if [menopause](#) developed over time, that ultimately it could also be reversed.

More information: Morton RA, Stone JR, Singh RS (2013) Mate Choice and the Origin of Menopause. PLoS Comput Biol 9(6): e1003092. doi:10.1371/journal.pcbi.1003092
<http://www.ploscompbiol.org/article/info:doi/10.1371/journal.pcbi.1003092>.

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