

Turbulent nature of menopause triggered by gene battles

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Credit: Paul Gauguin

The hormonal mayhem, reduced fertility and hot flushes experienced by a woman in the run up to menopause may owe to warfare between her own genes, according to a team of scientists working in the United Kingdom and Japan.

The study, which will appear in the February issue of the journal *Ecology*

Letters, informs the development of personalised family planning and preventative medicine strategies for dealing with [cardiovascular problems](#) – and even some cancers.

Current evolutionary theory suggests that menopause was favoured among our ancestors because it let women focus on bringing up their relatives' children, with whom they shared genes in common.

"But our ecology meant that a woman would typically be more related to her neighbours through her father than through her mother," explains Dr Andy Gardner, an evolutionary biologist at the University of St Andrews. "So while the genes she got from her father would be happy for her to give up her reproduction in this way, the genes she got from her mother would be less happy."

This conflict of interest within a women's genome could explain why the menopausal transition is so turbulent.

"The woman's [paternal genes](#) are pushing for an earlier menopause, while her [maternal genes](#) are trying to stall the process," says Francisco Úbeda of Royal Holloway University, who led the study. "Our mathematical model predicts that this conflict will lead to chaotic gene expression regulated by epigenetic factors, which is when gene expression is determined by factors other than the underlying DNA sequence."

The possibility that the [genes](#) underpinning menopause are epigenetically regulated can help researchers identify genetic markers for associated disorders, such as cardiovascular disease and certain cancers.

The research also suggests novel applications in [family planning](#), personalised according to a woman's genetic background. "Choosing if and when to start a family is one of the biggest decisions that we have to

make in our lives," says Dr Úbeda. "Having better, individualized information about when our fertility is likely to tail off will help avoid anxiety and make sure that people don't leave it too late."

More information: Ecology drives intragenomic conflict over menopause." Francisco Úbeda¹, Hisashi Ohtsuki, Andy Gardner. *Ecology Letters* (2013). 9 Dec 2013 [DOI: 10.1111/ele.12208](https://doi.org/10.1111/ele.12208)

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