

Sex Talk Revelations of the Lonely Y Chromosome

September 9 2009

(PhysOrg.com) -- In the week that the University of Leicester celebrates the 25th anniversary of the discovery of DNA fingerprinting (Thursday September 10) new findings from the world-renowned University of Leicester Department of Genetics reveal for the first time that the male and female do truly communicate -- at least at the fundamental genetic level.

The research counters [scientific theory](#) that the X and Y chromosomes - that define the sexes - did not communicate at all.

The research is funded by the Wellcome Trust, and published in [The American Journal of Human Genetics](#). In it Dr Zoë Rosser and colleagues have shown that exchange of DNA does actually occur between the X and Y in the regions previously thought to be completely isolated.

Professor Mark Jobling, who led the study, said: “Recently it was shown that the Y chromosome can talk to itself - swapping bits of DNA from one region to another, and potentially giving it a way to fix mutations that might affect [male fertility](#). In this new research we’ve now shown that it actually maintains a genetic conversation with the X chromosome, potentially giving it a way to fix other kinds of mutations, too. So, maybe it’s not quite the dysfunctional loner we have always imagined it to be.”

The X and Y chromosomes have a vital role- sex is determined by them. Apart from the 22 pairs of regular chromosomes all of us share, women

have two X chromosomes, while men have only one X but also the smaller Y chromosome. It's the Y that determines maleness by triggering development of testes rather than ovaries in the early embryo.

Professor Jobling said: "These days the X and Y are a very odd couple, but long ago, before mammals evolved, they were an ordinary pair of identical [chromosomes](#), exchanging DNA in a companionable way through the process of [genetic recombination](#). However, once the Y chromosome took on the job of determining maleness, they stopped talking to each other. The X remained much the same, but the Y set out on a path of degeneration that saw it lose many of its genes and shrink to about one third the size of the X. Some scientists have predicted that it will eventually vanish altogether.

"These new findings from the Department of Genetics of the University of Leicester now challenge this interpretation of the Y chromosome's fate."

The Leicester researchers discovered that the conversation between the X and Y chromosome goes both ways, and it's also clear that mutations arising on a decaying Y chromosome can be passed to the X - the Y chromosome's revenge, perhaps! Future work will assess how widespread X-Y exchanges have been during evolution, and what the likely functional effects might be.

More information: "Gene conversion between the [X chromosome](#) and the male-specific region of the [Y chromosome](#) at a translocation hotspot" by Zoë H Rosser, Patricia Balaesque and Mark A Jobling, which has been published by AJHG - *The American Journal of Human Genetics* (vol. 85, pp.130-134)

Provided by University of Leicester ([news](#) : [web](#))

Citation: Sex Talk Revelations of the Lonely Y Chromosome (2009, September 9) retrieved 17 April 2024 from

<https://medicalxpress.com/news/2009-09-sex-revelations-lonely-chromosome.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.