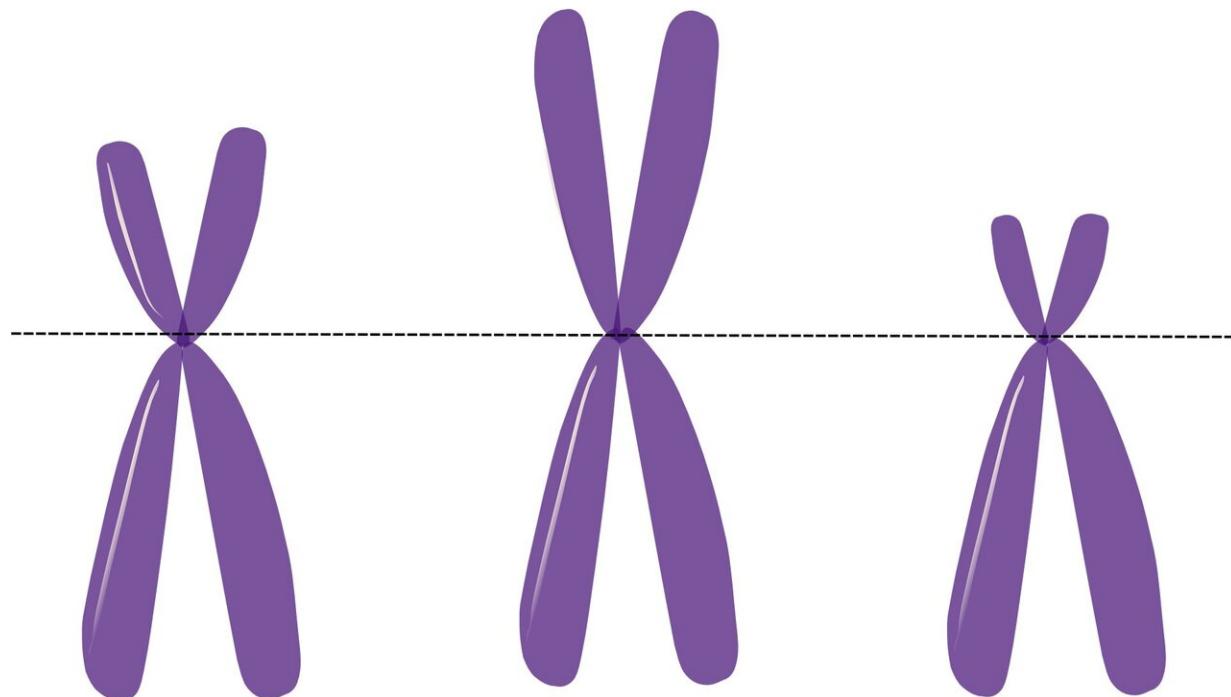


The male Y chromosome does more than we thought

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New light is being shed on a little-known role of Y chromosome genes, specific to males, that could explain why men suffer differently than women from various diseases, including COVID-19.

The findings were published this month in *Scientific Reports* by Université de Montréal professor Christian Deschepper, director of the

Experimental Cardiovascular Biology research unit of the Montreal Clinical Research Institute.

"Our discovery provides a better understanding of how male [genes](#) on the Y chromosome allow male [cells](#) to function differently from [female cells](#)," said Deschepper, the study's lead author, who is also an associate professor at McGill University.

"In the future, these results could help to shed some light on why some diseases occur differently in men and women."

Genes that females lack

Humans each have 23 pairs of [chromosomes](#), including one pair of sex chromosomes. While females carry two X sex chromosomes, males carry one X and one Y chromosome. This male chromosome carries genes that females lack. Although these male genes are expressed in all cells of the body, their only confirmed role to date has been essentially limited to the functions of the sex organs.

In his study, Deschepper performed a genetic manipulation that inactivated two male genes on the Y chromosome, altering several signalling pathways that play important roles in certain functions of non-sex organ cells. For example, under stress, some of the affected mechanisms could influence the way in which cells in human hearts defend themselves against aggressions such as ischemia (reduced [blood supply](#)) or [mechanical stress](#).

In addition, the study showed that these male genes performed their regulatory functions in a way that was unusual compared to the mechanisms generally used by most other genes on the non-sex chromosomes. Thus, instead of specifically activating certain genes by direct action at the genome level, the Y chromosome seems to affect

cellular functions by acting on protein production.

The discovery of these differences in function may explain in part why the functions of male Y chromosome genes have so far been poorly understood, said Deschepper.

Males differ from females in the manifestation, severity and consequences of most diseases. A recent example of this duality is COVID-19, which has a mortality rate twice as high in men than in women.

More information: Christian F. Deschepper, Regulatory effects of the Uty/Ddx3y locus on neighboring chromosome Y genes and autosomal mRNA transcripts in adult mouse non-reproductive cells, *Scientific Reports* (2020). [DOI: 10.1038/s41598-020-71447-3](https://doi.org/10.1038/s41598-020-71447-3)

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