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Study: 'Male' chromosome to stick around

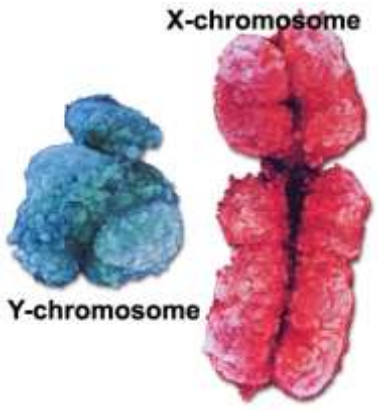
Wednesday, August 31, 2005; Posted: 1:33 p.m. EDT (17:33 GMT)

NEW YORK (AP) -- The human Y chromosome -- the DNA chunk that makes a man a man -- has lost so many genes over evolutionary time that some scientists have suspected it might disappear in 10 million years. But a new study says it will stick around.

Researchers found no sign of gene loss over the past 6 million years, suggesting the chromosome is "doing a pretty good job of maintaining itself," said researcher David Page of the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts.

That agrees with prior mathematical calculations that suggested the rate of gene loss would slow as the chromosome evolved, Page and study co-authors note in Thursday's issue of the journal Nature. And, they say, it clashes with what Page called the "imminent demise" idea that says the Y chromosome is doomed to extinction.

The Y appeared 300 million years ago and has since eroded into a dinky chromosome, because it lacks the mechanism other chromosomes have to get rid of damaged DNA. So mutations have disabled hundreds of its original genes, causing them to be shed as useless. The Y now contains only 27 genes or families of virtually identical genes.



In 2003, Page reported that the modern-day Y has an unusual mechanism to fix about half of its genes and protect them from disappearing. But he said some scientists disagreed with his conclusion. The new paper focuses on a region of the Y chromosome where genes cannot be fixed that way.

Researchers compared the human and chimpanzee versions of this region. Humans and chimps have been evolving separately for about 6 million years, so scientists reasoned that the comparisons would reveal genes that have become disabled in one species or the other during that time.

They found five such genes on the chimp chromosome but none on the human chromosome, an imbalance Page called surprising.

"It looks like there has been little if any gene loss in our own species lineage in the last 6 million years," Page said.

That contradicts the idea that the human Y chromosome has continued to lose genes so fast it will disappear in 10 million years, he said.

"I think we can with confidence dismiss .... the 'imminent demise' theory," Page said.

Jennifer A. Marshall Graves of the Australian National University in Canberra, a gene researcher who argues for eventual extinction of the Y chromosome, called Page's work "beautiful," but said it did not shake her conviction that the Y is doomed.

The only real question is when, not if, the Y chromosome disappears, she said. "It could be a lot shorter than 10 million years, but it could be a lot longer," she said.

The Y chromosome has already disappeared in some other animals and "there's no reason to expect it can't happen to humans," she said. If it happened in people, some other chromosome would probably take over the sex-determining role of the Y, she said.