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Is there a gene that makes you gay

The largest study of its kind found new evidence that genes contribute to same-sex sexual behavior, but it echoes research that says there are no specific genes that make people gay. The genome-wide research on DNA from nearly half a million U.S. and U.K. adults identified five genetic variants not previously linked with gay or lesbian sexuality. The variants were more common in people who reported ever having had a same-sex sexual partner. That includes people whose partners were exclusively of the same sex and those who mostly reported heterosexual behavior.The researchers said thousands more genetic variants likely are involved and interact with factors that aren't inherited, but that none of them cause the behavior nor can predict whether someone will be gay.The research "provides the clearest glimpse yet into the genetic underpinnings of same-sex sexual behavior," said co-author Benjamin Neale, a psychiatric geneticist at the Broad Institute in Cambridge, Massachusetts. Story continues below advertisement "We also found that it's effectively impossible to predict an individual's sexual behavior from their genome. Genetics is less than half of this story for sexual behavior but it's still a very important contributing factor," Neale said.The study was released Thursday by the journal Science. Results are based on genetic testing and survey responses.Some of the genetic variants found were present in both men and women. Two in men were located near genes involved in male-pattern baldness and sense of smell, raising intriguing questions about how regulation of sex hormones and smell may influence same-sex behavior.WATCH: The longest-married U.S. same-sex couple tells their story 3:47 The longest-married U.S. same-sex couple tells their story The longest-married U.S. same-sex couple tells their story – Jun 22, 2019 Importantly, most participants were asked about frequency of same-sex sexual behavior but not if they self-identified as gay or lesbian. Fewer than 5% of U.K. participants and about 19% of U.S. participants reported ever having a same-sex sexual experience. Story continues below advertisement The researchers acknowledged that limitation and emphasized that the study's focus was on behavior, not sexual identity or orientation. They also note that the study only involved people of European ancestry and can't answer whether similar results would be found in other groups.Origins of same-sex behavior are uncertain. Some of the strongest evidence of a genetic link comes from studies in identical twins. Many scientists believe that social, cultural, family and other biological factors are also involved, while some religious groups and skeptics consider it a choice or behavior that can be changed.A Science commentary notes that the five identified variants had such a weak effect on behavior that using the results "for prediction, intervention or a supposed 'cure' is wholly and unreservedly impossible.""Future work should investigate how genetic predispositions are altered by environmental factors," University of Oxford sociologist Melinda Mills said in the commentary.Other experts not involved in the study had varied reactions.Dr. Kenneth Kendler a specialist in psychiatric genetics at Virginia Commonwealth University, called it "a very important paper that advances the study of the genetics of human sexual preference substantially. The results are broadly consistent with those obtained from the earlier technologies of twin and family studies suggesting that sexual orientation runs in families and is moderately heritable." Story continues below advertisement Former National Institutes of Health geneticist Dean Hamer said the study confirms "that sexuality is complex and there are a lot of genes involved," but it isn't really about gay people. "Having just a single same sex experience is completely different than actually being gay or lesbian," Hamer said. His research in the 1990s linked a marker on the X chromosome with male homosexuality. Some subsequent studies had similar results but the new one found no such link.Doug Vanderlaan, a University of Toronto psychologist who studies sexual orientation, said the absence of information on sexual orientation is a drawback and makes it unclear what the identified genetic links might signify. They "might be links to other traits, like openness to experience," Vanderlaan said.The study was a collaboration among scientists including psychologists, sociologists and statisticians from the United States, United Kingdom, Europe and Australia. They did entire human genome scanning, using blood samples from the U.K. Biobank and saliva samples from customers of the U.S.-based ancestry and biotech company 23andMe who had agreed to participate in research. © 2019 The Canadian Press In 1993, researchers discovered a stretch of DNA on the X chromosome they believed to be linked to male homosexuality. In the years since, the concept of a "gay gene" has been a source of debate within both the scientific community and the general public, inspiring ever-larger follow-up studies over the years. A new study published in Science, thought to be the most comprehensive on the topic, adds important information to that back-and-forth. After studying the DNA of nearly half a million people with varying sexual experiences, the researchers found no evidence of a single "gay gene." There was some genetic association with self-reported same-sex sexual activity, but environmental factors likely play an even larger role, according to the study. The researchers examined genotyping data and self-reported sexual histories from almost 500,000 (mostly white) people of both sexes who were either participating in genetic research projects, like the U.K. Biobank study, or had purchased genetic testing products from 23andMe and consented to inclusion in the study. Most participants came from the U.K. Biobank study, which involves adults ages 40 to 70, though the paper also included some young adults and adolescents participating in other studies. Among the human genome's approximately 30,000 genes, the researchers—who have previously presented research on this topic—found five variants related to same-sex sexual activity, though each one only minimally influenced an individual's sexuality. Known genetic markers could only account for between 8% and 25% of the variation in sexual behaviors, they estimate. Environmental factors, which include everything from a person's upbringing to where they live today, likely account for the rest. Despite the genetic link, an individual's genome cannot fully predict his or her sexual preferences, the authors say. "Individual-level prediction is not going to be a reality," says study co-author Benjamin Neale, a geneticist at Massachusetts General Hospital. The study did, however, provide some clues as to how genetics could relate to same-sex sexual behaviors. One variant, for example, was located on a stretch of DNA that's also home to genes related to sense of smell, which previous research has suggested may be linked to sexual preferences. Another was related to a gene associated with male baldness, which suggests a possible link to sex hormone levels. The researchers also found genetic overlap with traits that could predispose people to mental health issues, which are disproportionately common in the LGBTQ community, and to risk-taking behavior, which could theoretically include sexual exploration. About 40% of the genetic connection to same-sex sexual activity was shared between sexes, while the other 60% was sex-specific, the researchers found. "Same-sex sexual behavior is…very polygenic, meaning there are a lot of variants that contribute to this trait, and this is very similar to many other behavioral traits," says first author Andrea Ganna, an instructor at Massachusetts General Hospital and Harvard Medical School. The researchers emphasize that their study dealt primarily with sexual experiences, not sexual orientation or identity. While participants were asked if they'd had sex with someone of the same sex, they did not necessarily identify as queer. In fact, Ganna says the research suggests that measures like the Kinsey Scale, which argue that sexuality exists on a spectrum from totally gay to totally straight, are overly simplistic. "From a genetic standpoint, there is no single continuum from opposite-sex to same-sex sexual behaviors," Ganna says. "There is no dimension in which, the more someone is attracted to the same sex, the less they're attracted to the opposite sex." The study leaves many questions unanswered, in part because it dealt with a fairly homogenous sample: people of European ancestry, many of whom came of age during a time when homosexuality was highly stigmatized or even criminalized. But Neale says the ambiguity is part of the point. "It underscores that there is an element of biology, and it underscores that there is an element of the environment and it underscores that [sexual diversity] is a natural part of our species," Neale says. "This is a natural and normal part of variation in our species, and that should support the position that we shouldn't try and develop 'gay cures.' That's not in anyone's interest." For your security, we've sent a confirmation email to the address you entered. Click the link to confirm your subscription and begin receiving our newsletters. If you don't get the confirmation within 10 minutes, please check your spam folder. Write to Jamie Ducharme at jamie.ducharme@time.com. image copyrightGetty ImagesA genetic analysis of almost half a million people has concluded there is no single "gay gene".The study, published in Science, used data from the UK Biobank and 23andMe, and found some genetic variants associated with same-sex relationships.But genetic factors accounted for, at most, 25% of same-sex behaviour.Advocacy group GLAAD said the study confirmed "no conclusive degree to which nature or nurture influenced how a gay or lesbian person behaves."The researchers scanned the genomes - the entire genetic make-up - of 409,000 people signed up to the UK Biobank project, and 68,500 registered with the genetics company 23andMe.Participants were also asked whether they had same-sex partners exclusively, or as well as opposite-sex partners.The Harvard and MIT researchers concluded genetics could account for between 8-25% of same-sex behaviour across the population, when the whole genome is considered.Five specific genetic variants were found to be particularly associated with same-sex behaviour, including one linked to the biological pathway for smell, and others to those for sex hormones.But together they only accounted for under 1% of same-sex behaviour.Ben Neale, an associate professor in the Analytic and Translational Genetics Unit at Massachusetts General Hospital, who worked on the study, said: "Genetics is less than half of this story for sexual behaviour, but it's still a very important contributing factor."There is no single gay gene, and a genetic test for if you're going to have a same-sex relationship is not going to work."It's effectively impossible to predict an individual's sexual behaviour from their genome."Fah Sathirapongsasuti, senior scientist at 23andMe, added; "This is a natural and normal part of the variation in our species and that should also support precisely the position that we shouldn't try and develop gay 'curism'. That's not in anyone's interest."David Curtis, honorary professor at the UCL Genetics Institute, University College London, said: "This study clearly shows that there is no such thing as a 'gay gene'. "There is no genetic variant in the population which has any substantial effect on sexual orientation. "Rather, what we see is that there are very large numbers of variants which have extremely modest associations."Even if homosexuality is not genetically determined, as this study shows, that does not mean that it is not in some way an innate and indispensable part of an individual's personality."Zeke Stokes, from the LGBT media advocacy organisation GLAAD, said: "This new research re-confirms the long-established understanding that there is no conclusive degree to which nature or nurture influence how a gay or lesbian person behaves."The BBC is not responsible for the content of external sites. Ever since Charles Darwin taught us that we are just another species in the natural order, science has tried to unravel what specifically makes us human, what we all have in common. But at the same time, scientists continue to investigate what makes us diverse, from physical traits or personality to our sexual orientation. And while much remains to be learned about the latter, modern science suggests that it is a complex interaction of biological factors that determines whether we are attracted to people of our own sex, the opposite sex, or both. In 1993, Science published a study by the U.S. National Institutes of Health that found in 40 pairs of siblings a relationship between male homosexuality and a certain region of the X sex chromosome. The magazine itself published a commentary entitled "Evidence for Homosexuality Gene," and the media immediately echoed what came to be called the "gay gene". However, further research failed to confirm this presumed finding. In 1999, another study in the same journal concluded: "These results do not support an X-linked gene underlying male homosexuality." On this occasion, Science published a new commentary: "Discovery of 'gay gene' questioned." Identical twins more often share the same sexual orientation than fraternal twins. Credit: Daniell Bohnhof / HOCH ZWEI The hypothesis of one or more specific homosexuality genes has been widely abandoned, and today it is considered an unfounded myth. But at the same time, this does not imply that sexual orientation is completely devoid of genetic factors. In fact, studies with identical and fraternal twins reveal that identical twins more often share the same sexual orientation than fraternal twins, indicating a certain genetic component, although to delve deeper into this seemingly subtle influence it is not sufficient to analyse the genes of just a few dozen people—populations of hundreds of thousands are required. The link with genetics With this idea in mind, an international team of researchers led by Brendan Zietsch of the University of Queensland, Australia, gathered nearly half a million genetic profiles from the UK Biobank and the Californian company 23andMe, and subjected them to a genome-wide association study (GWAS) to try to identify genetic variants that could be linked to homosexual behaviour in both men and women. The study, published in Science in 2019, finds that "same-sex behaviour is influenced by not one or a few genes, but many." The paper identifies five chromosomal regions whose variants appear with a more significant frequency in sample subjects who said they had same-sex relationships. The researchers warn that the link between genetics and homosexual behaviour continues to be very complex, since the variants differ between men and women, without also detecting an association between the presence of more or fewer of these genes and a greater or lesser proportion of homosexual relationships. The link is not only complex, but also weak. According to Zietsch and his collaborators, the influence of the genes discovered is between 8% and 25%, which means, as the researcher confirmed to OpenMind, that between 75% and 92% of homosexual behaviour does not depend on genetic components. However, this does not imply that there are no other biological factors involved. Zietsch alludes to an idea that is currently being looked at by numerous experts: "Prenatal hormonal concentrations in the womb are hypothesised to influence sexual orientation." In contrast, there is absolutely no indication of an educational influence. But if there is one thing the authors of the study stress, it is that the genetic variants identified "do not allow meaningful prediction of an individual's sexual behaviour." And yet, shortly after the publication of the paper, a company called Insolent AI launched an app called: How gay are you? which claimed to predict a person's degree of homosexuality based on their genetic profile and in accordance with the study data. The app provoked widespread repulsion and was withdrawn after geneticist Joseph Vitti of the Broad Institute of Harvard —one of the institutions participating in the study— started a petition on change.org for its elimination. A double-edged sword Vitti, an activist with the LGBTQIA+ community, wrote on the Broad Institute blog: "I have yet to see a compelling argument that the potential benefits of this study outweigh its potential harms." The truth is that these investigations arouse misgivings, even though the existence of a biology of sexual orientation is increasingly supported by science. "To my knowledge, there are no data supporting the assumption that sexual orientation and gender identity are determined by psychosocial environmental factors, so I therefore personally presume both phenomena to be substantially influenced by biological and genetic mechanisms," Elke Smith, a neuropsychologist at the University of Cologne (Germany), who studies the cerebral traces of sexual differences, tells OpenMind. March for the LGBTQIA+ rights. Source: Pxhere Moreover, given that the most conservative sectors of morality have been based on the prejudice that orientations other than heterosexual were the product of fashions or lifestyle choices, the existence of a biological basis should be an argument in favour of tolerance. However, experts recognise that this is a double-edged sword. As Oxford University sociologist Melinda Mills wrote in the journal Science, in a commentary on the study by Zietsch and his collaborators: "Attributing same-sex orientation to genetics could enhance civil rights or reduce stigma. Conversely, there are fears it provides a tool for intervention or cure." The ambivalence is also manifested in the effects these scientific findings have on the public. There are studies that document an improvement in the attitude towards homosexuality in people who receive information about this influence of biology. But curiously, there are also studies that show just the opposite. Meanwhile, Zietsch and his collaborators are so aware of the concern surrounding these investigations that they have participated in talks and workshops with the LGBTQIA+ community and have even created a website dedicated to explaining their results. For the scientist, it is fundamental to separate knowledge from moral issues. "Were we to avoid studying sexual preference or other such topics due to political sensitivities, we be leaving these important aspects of human diversity in the dark, and I don't think that would be good for anyone," he argues. For the researcher, what should take precedence over all this is that, "as a society we have decided that individuals should not face discrimination or stigma based on their preference for same-sex or opposite-sex partners or both." Javier Yanes @yanes68

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