

Outline

Human sexual behavior
brain structures
genetics

Y chromosome and history
Advantages of using the Y chromosome
The Thomas Jefferson/Sally Hemings debate
The genetic evidence

What about humans?

John Money, an psychologist at Johns Hopkins University, was highly influential in promoting the idea of gender neutrality. Gender identity resulted from childhood experiences, and children could be assigned either gender.



Money's theories affected Bruce Thiessen (a.k.a. Brenda Thiessen, David Reimer)

What about humans?

Congenital adrenal hyperplasia: XX individuals that produce testosterone and can be intersexual.

Individuals who were raised as females (involving surgery and hormone treatments):

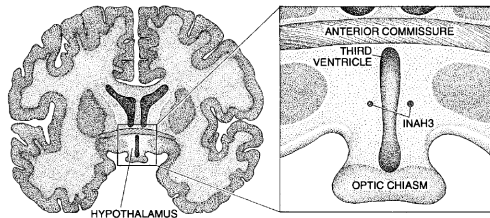
- Increased chance of sexual identity being male.
- At least four times as likely to define themselves as lesbian or bisexual than female relatives.

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Are the brains of men and women different?



RESEARCHERS	BRAIN REGION			
	INAH1	INAH2	INAH3	INAH4
Swaab and Fliers, 1985	Larger in men	Not studied	Not studied	Not studied
Allen et al., 1989	No sex difference	Larger in men than in some women	Larger in men	No sex difference

RESEARCHERS	BRAIN REGION			
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Swaab and Fliers, 1985	Larger in men	Not studied	Not studied	Not studied
Allen et al., 1989	No sex difference	Larger in men than in some women	Larger in men	No sex difference
LeVay, 1991	No sex difference	No sex difference	Larger in heterosexual men than in women or homosexual men	No sex difference



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Do genes other than SRY contribute to sexual orientation?

In other words, is there a gay gene?

Twin studies:

When one brother is gay, 52% of identical twins, 22% of fraternal twins, and 22% of brothers are gay.

When one sister is lesbian, 48% of identical twins, 16% of fraternal twins, and 13% of sisters were also lesbian.



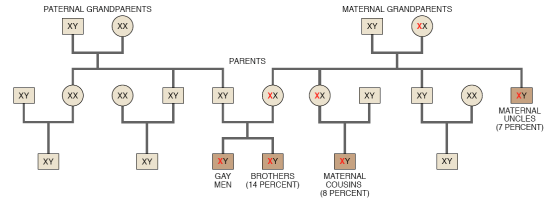
A linkage between DNA markers on the X chromosome and male sexual orientation.

Hamer DH, Hu S, Magnuson VL, Hu N, Pattatucci AM.
 Laboratory of Biochemistry, National Cancer Institute, National Institutes of Health, Bethesda, MD 20892.

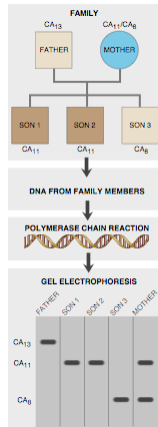
Science 1993



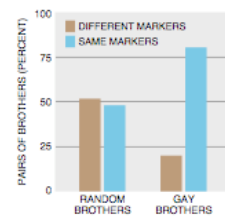
Could there be a gene on the X chromosome that contributes to sexual orientation in males?



Strategy used to identify a region on X



Xq28 region of X correlates



Other investigators have been unable to replicate the Hamer findings!



Is there a gay gene?

If you define a “gay gene” as necessary and sufficient for a particular sexual orientation, then the answer is absolutely no.

If you define a “gay gene” as a gene that predisposes a male or female toward homosexuality, then the twin studies suggest that there may be genes with this property.

Environmental conditions, which could range from conditions in utero to upbringing, might shape sexual orientation.

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Using genetics to study history

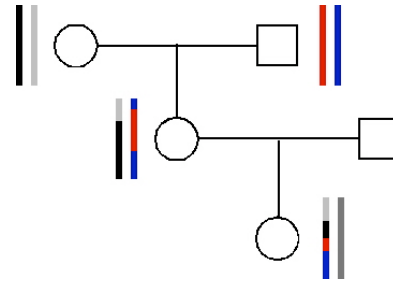
Y chromosome

Mitochondrial chromosomes

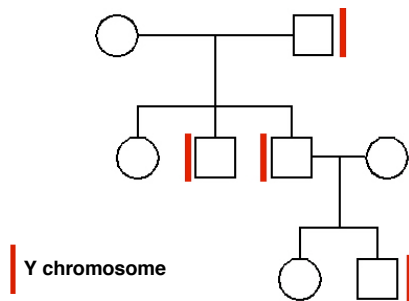
One difference between the Y chromosome and the other chromosomes is the Y doesn't pair with a homolog during meiosis. It pairs with the X chromosome at its ends (the pseudoautosomal region) and disjoins from the X chromosome during meiosis.

Because there is no sequence similarity along the length of the X and Y chromosomes, crossing over does not change the arrangement of alleles.

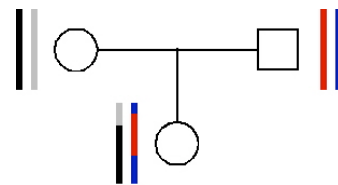
Crossing over rearranges chromosomes



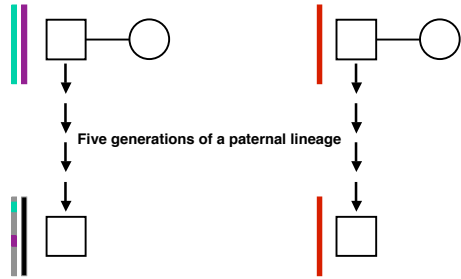
But, the Y chromosome is inherited unchanged



Differences on autosomes are useful for determining paternity after one generation.



But determining paternity becomes more complicated with subsequent generations because of crossing over. But not with the Y chromosome!



Y-DNA Inheritance Descendants Chart (Paternal Line)

