

## New evidence casts doubt on the 3:1 ratio of phenotypes

### Gene Research – Breaking News

The frequency of people with mid-digital hair in more recent research Bernstein and Burke (1942) reported that mid-digital hair was present in about half of females under 21, with a higher percentage in males.

Read the short news clipping above.

Does this evidence support the theory that mid-digital hair is controlled by a single gene with two alleles and simple dominance? Explain what ratios of phenotypes you would expect.

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Some geneticists have suggested that the gene could be sex-linked. Evaluate this alternative explanation.

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What ratio of phenotypes would you expect in the children of two parents with the following genotypes  $X^H X^h$  &  $X^h y$ ?

Use the punnet square to determine the offspring genotypes which are possible.

	$X^h$	$y$
$X^H$		
$X^h$		

What offspring phenotype ratios have you found?

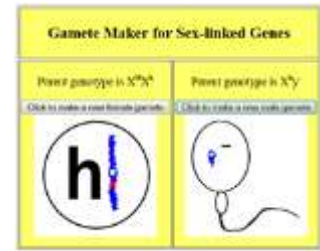
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Again, we can test the theory is to collect data about the frequency of the different genotypes.



Use the [online gamete maker for a sex-linked gene](#) to make ten gamete pairs, and record the results in this second table



Trial Number	Sperm gamete allele	Egg gamete allele	Genotype	Phenotype
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

What was the ratio of phenotypes ?

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Do you think the evidence supports the theory that the gene is sex linked? Explain why.

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Hindley and Damon (1973) collected family data in the Solomon Islands. They obtained results which show no genetic influence on mid-digital hair; about the same proportion of children have mid-digital hair when their parents both have mid-digital hair, and when neither of their parents have this hair.

The genetics of the trait seem more complicated. It is thought there could be an environmental influence.