Acknowledgements to Guy's and St Thomas' Genetics Department

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X-linked Inheritance

An information leaflet for patients and families

If you need more advice about any aspect of X-Linked inheritance please contact:

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What is X-linked Inheritance?

What are genes and chromosomes?

Genes are the unique set of instructions (inside our bodies) which make each of us an individual. There are many thousands of genes, each carrying a different instruction. If a gene is altered, it can cause a genetic condition or disease. This gene alteration is sometimes known as a mutation.

We have two copies of each gene. One copy is inherited from each of our parents. When we have children, we each pass on only one copy of each of our genes. Genes lie on tiny structures called chromosomes. These also come in pairs and there are 23 pairs. Twenty two of these are the same in both sexes. The twenty third pair are the sex chromosomes. Women have two X chromosomes and men have one X and one Y chromosome. The Y chromosome is much smaller than the X chromosome and contains fewer genes.

What does X-linked inheritance mean?

X-linked conditions occur when an altered gene is located on the X chromosome.

If a woman has an altered gene on one of her two X chromosomes, then she will be a carrier. She is healthy because she has a second normal copy of the gene on her other X chromosome.

If a man has an altered gene on his X chromosome, then he will be affected as he has only one X chromosome.

There are some X-linked conditions where the woman can show symptoms, these are usually much less severe than in males.

Having children

If a woman carrier has a boy, there is a 50% (1 in 2) chance that the boy will be affected by the condition caused by the altered gene that she carries.

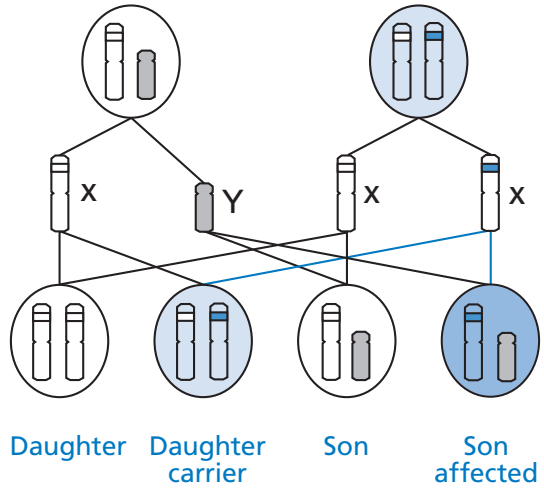
If a woman carrier has a girl, there is a 50% (1 in 2) chance that the girl will inherit the altered gene. If this happens, she will be a carrier, like her mother.

When men who are affected by X-linked conditions have children, all of their daughters inherit the altered gene on their X chromosome. These daughters will all be carriers.

Men do not pass on their X chromosome to their sons. Therefore, all the sons of men with X-linked conditions are unaffected and are not carriers.

Sometimes boys are born with X-linked conditions even though their mothers are not carriers. When this happens, it is particularly important to get specialist advice about future pregnancies.

X-linked inheritance: mother is a carrier



X-linked inheritance: father is affected