Chromosomes and X-linked inheritance

Activity

Sheet 15

Learning aim B2

Name:

Sex inheritance

The sex chromosomes make up the twenty-third pair of chromosomes in a cell. A woman’s egg cells only carry X chromosomes. However, sperm cells can carry either an X or a Y chromosome. So it is the fertilising sperm that determines whether a child will be male or female.

X-linked recessive conditions

X-linked recessive conditions are caused by a gene alteration on the X chromosome. As males have only one X chromosome, if they have a gene alteration on their X chromosome they will develop the condition.

Females rarely show signs of X-linked recessive conditions because their other X chromosome compensates for the altered gene. A female who has a gene alteration on one of her X chromosomes is said to be a carrier for the X-linked recessive condition.

Males transmit their Y chromosome to their sons. This means that sons will not inherit an X-linked recessive condition from their father.

Exercise

In the example below, calculate the probability of any of the children inheriting the **X gene alteration** from these two parents.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mother** X**X (gene alteration)** | | | | | **Father** XY | | | |
| **Sperm/egg cells** |  | |  | |  | |  | |
| **Children** |  |  |  |  |  |  |  |  |

Probability of children inheriting the X gene alteration = 1 in \_\_\_\_\_\_

<http://www.eurogentest.org/index.php?id=623>

<http://www.nhs.uk/Conditions/Genetics/Pages/Introduction.aspx>