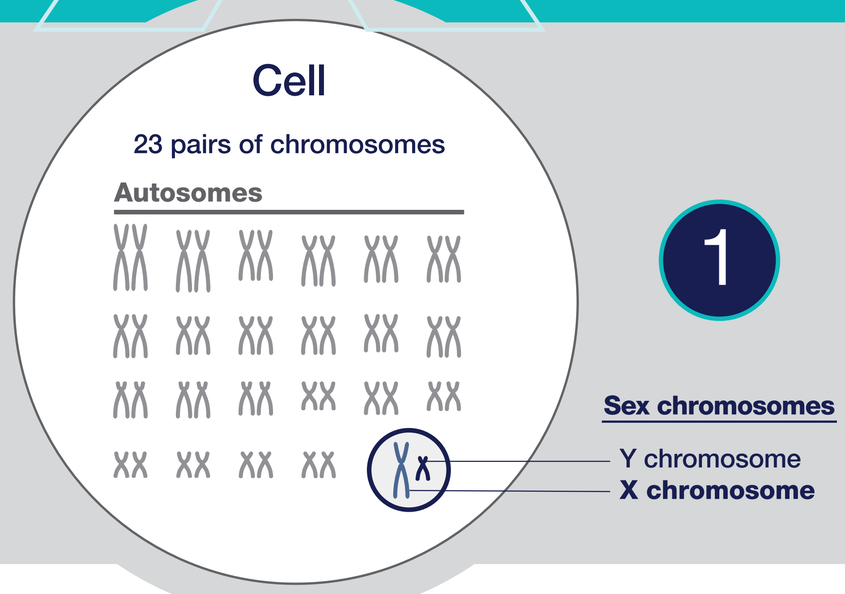
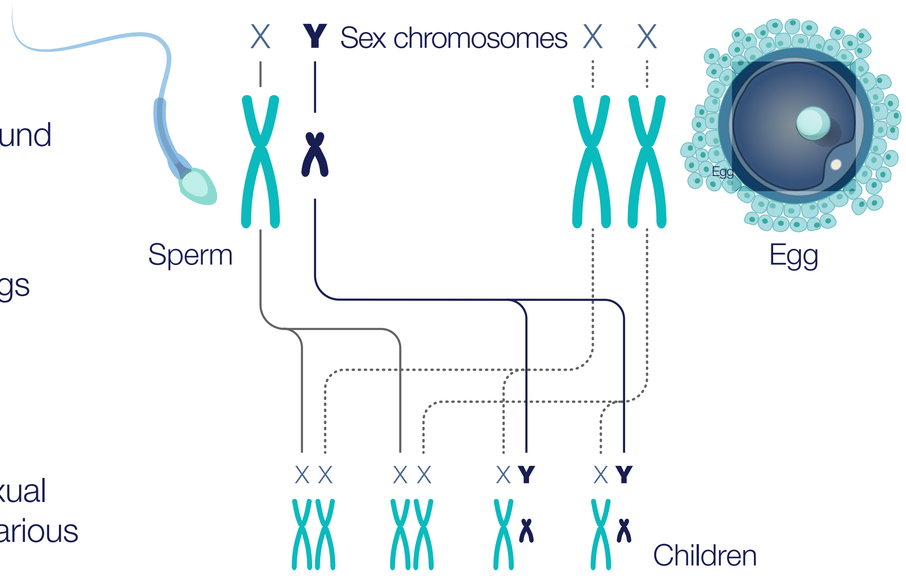
10 Neat Facts About the X Chromosome



1 In the nucleus of a human cell, each DNA molecule is packaged into a long, thread-like structure called a **chromosome**. Most human cells contain 23 pairs of chromosomes. One half of each pair of chromosomes comes from one parent, while the other half comes from the other parent. The 23rd pair are the X and Y chromosomes, often called the sex chromosomes. The other 22 pairs are called **autosomes**.

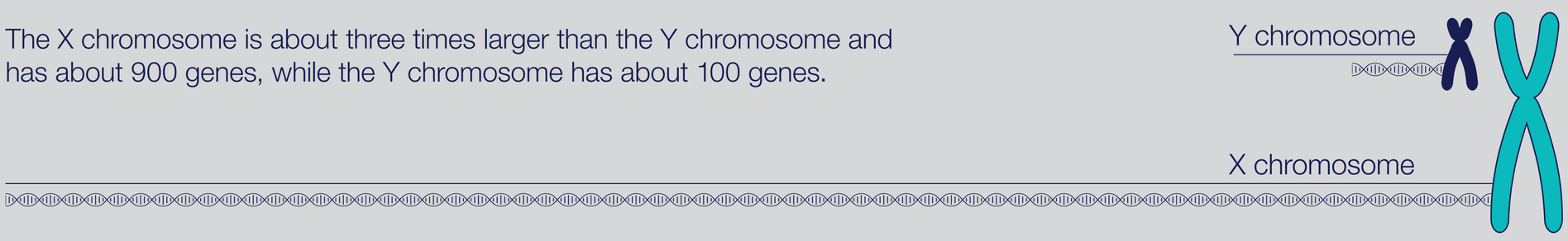
2 The X and Y chromosomes are central for the process of sexual development, but other genes throughout the genome play a role. This complex process gives rise to the array of human sex characteristics found among male, female and intersex individuals.

3 In fertilization, sperm can contribute an X or a Y chromosome, while eggs almost always contribute an X.

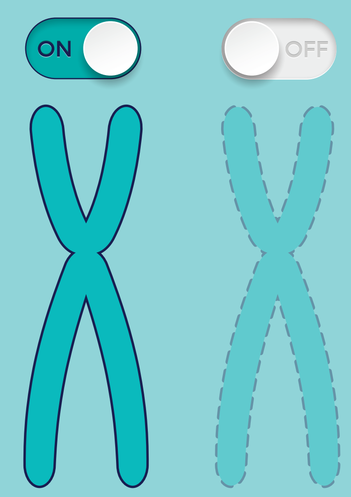


4 All humans have at least one X chromosome, and beyond its role in sexual development, the X chromosome contains many genes important for various biological processes.

5 The X chromosome is about three times larger than the Y chromosome and has about 900 genes, while the Y chromosome has about 100 genes.

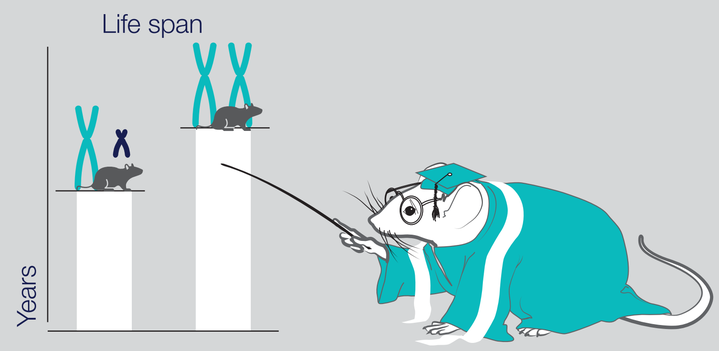


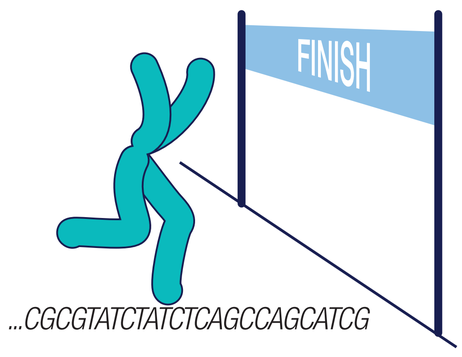
6 In cells with two X chromosomes, one of the X chromosomes is **inactivated**. This stops transcription (creation of RNAs) from occurring, ensuring that cells don't produce a potentially harmful double dose of proteins from X-linked genes.



7 The inactivated X chromosome gets condensed into a small, dense structure in the nucleus, and is called a Barr body. Because Barr bodies are so dense compared to the other DNA, they can easily be seen under a microscope!

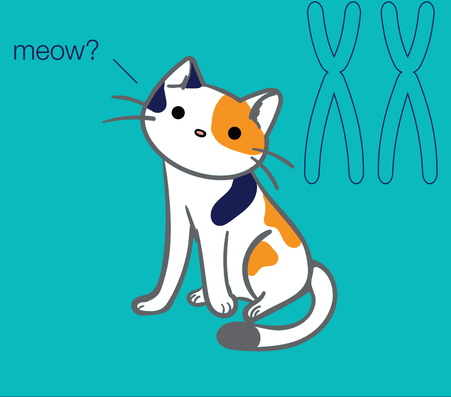
8 The X chromosome plays a key function in aging. Mice with an XX genotype live longer than mice with XY, even if they have testes!





9 The X chromosome was the first human chromosome to be completely sequenced with no gaps or missing pieces! Scientists published the complete X chromosome sequence in 2020, three years before the Y chromosome — the last human chromosome to be completely sequenced — was finished in 2023. Scientists continue to study the X chromosome and its role in human health.

10 Calico and tortoiseshell cats get their distinctive coat color patterns from the X chromosome, which has the genes for orange and black fur. Calico cats have two X chromosomes, and their patches of color are created by the random process of X inactivation. One X chromosome is inactivated in the cells in the black patches, and the other X chromosome is inactivated in the orange patches. Calico cats with Y chromosomes are rare and will have an XXY genotype.



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