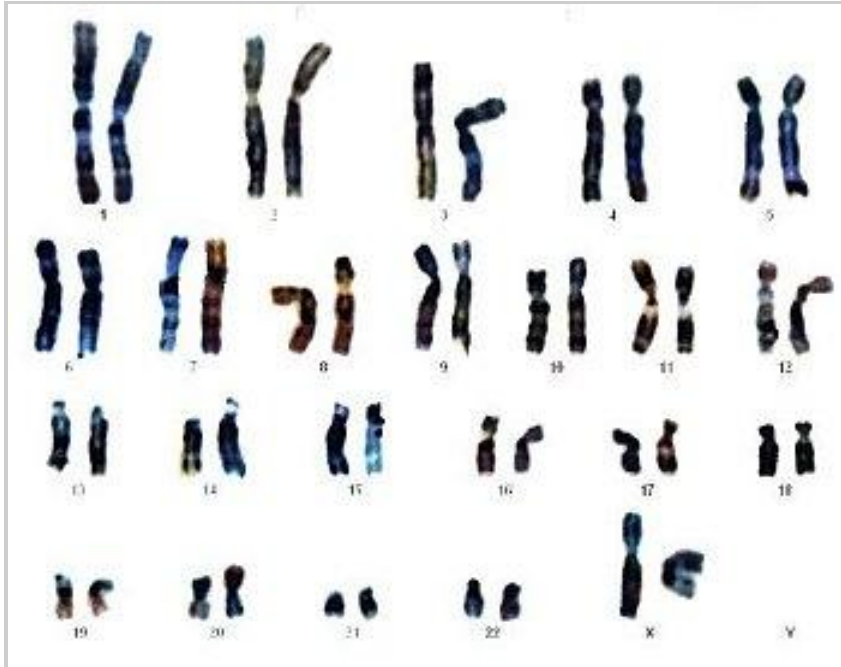


A gene is just a segment of DNA, which codes for a protein. DNA is compressed and packaged into structures called Chromosomes.

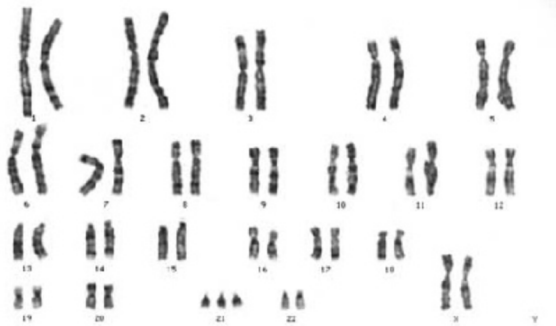
In Humans there are 46 chromosomes or 23 pairs of chromosomes. One from each parent.

[Click here for some genetic abnormalities.](#)



The individual to the left, has an extra Y chromosome. Although you may assume this is an advantage, because the Y chromosome makes us male, it actually causes infertility.

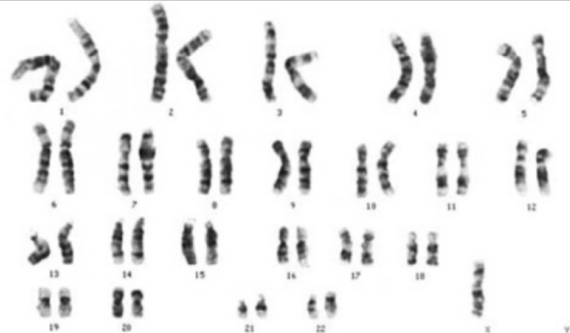
This extra chromosome causes Azoospermia. Meaning the individual's sperm count is incredibly low, and their movement is slow.



Down syndrome is a chromosomal disorder. Unlike some chromosomal disorders, this is visible and noticeable at birth.

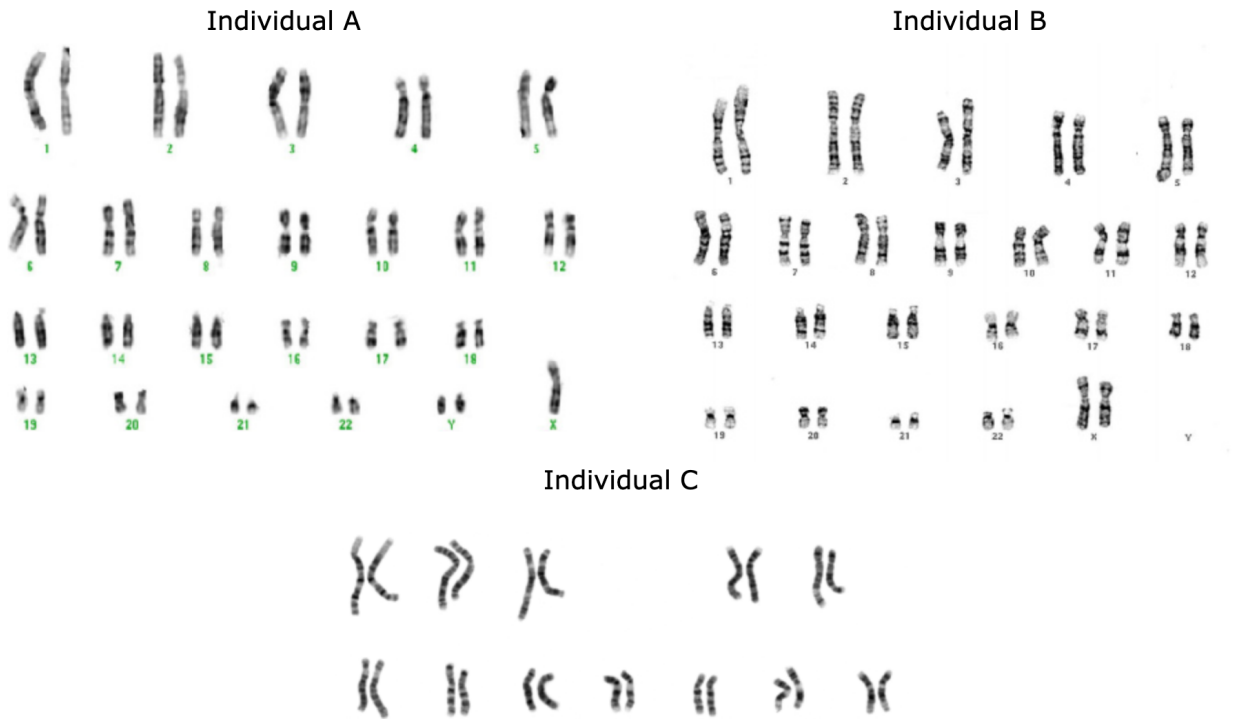
It results from an extra 21 chromosome. This is called Trisomy 21.

Tuner syndrome is a case where the individual will lose an entire sex chromosome or it is damaged/abnormal.



## Questions

1. Define a gene.
2. How is DNA packed in the nucleus?
3. As a detective you enter a crime scene. You notice blood splattered everywhere. On closer examination, you see pieces of dead skin cells on the floor. You speak to the wife and find out that her husband is missing and possibly dead. After talking to her, you find out that they had recently adopted a child as he was infertile. Once you take the samples to the lab, you realise that there are 3 Karyotypes.



4. Using your knowledge of karyograms and genetic disorders, find out the murderer, the wife and the husband. Give the reasons for your answer.