

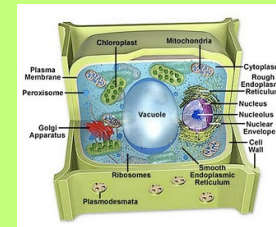
Our bodies are made up of millions of cells. Our hair, our eyeballs, our toenails, our bones, our skin, everything about us is made up of **cells.**

In fact, all living things are made up of cells that look much like ours.

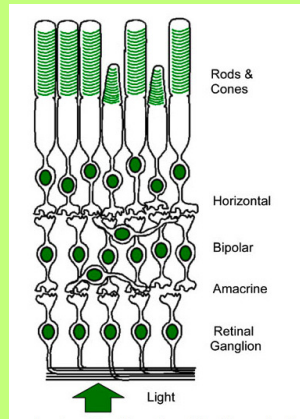
Amoeba (one-celled creature)



Plant cell

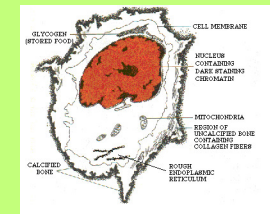


Eyeball cells

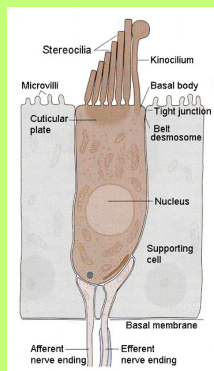


There are many kinds of cells

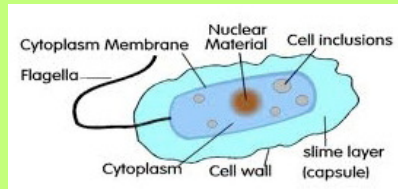
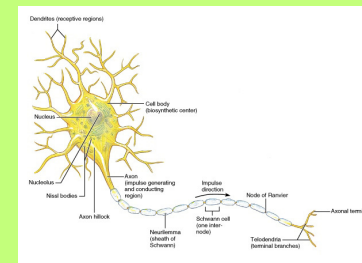
Bone cell



Hair cell



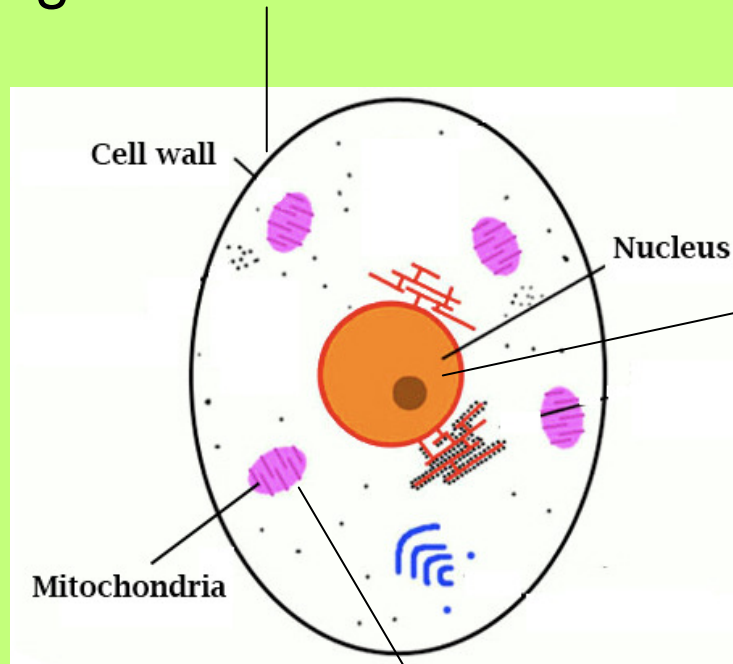
Nerve cell



Bacterium (one-celled creature)

# But all cells share some of the same basic structures

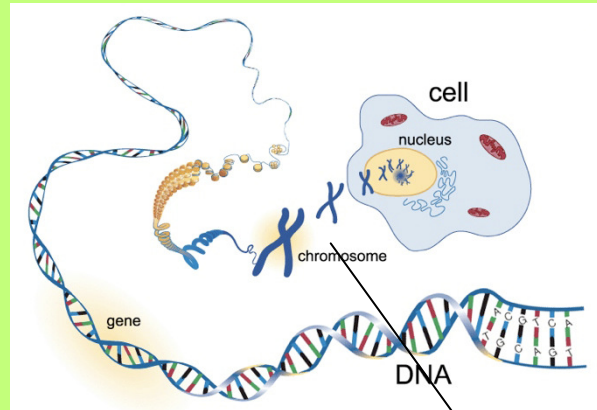
- All cells have a cell wall. This holds them together and defines their shape.



- All true cells have a nucleus, that holds the main information.

- Most cells have mitochondria, that provide energy.

# How does the nucleus store its information?



Inside the nucleus are structures called chromosomes.



Each chromosome consists of two strands of DNA wound around each other



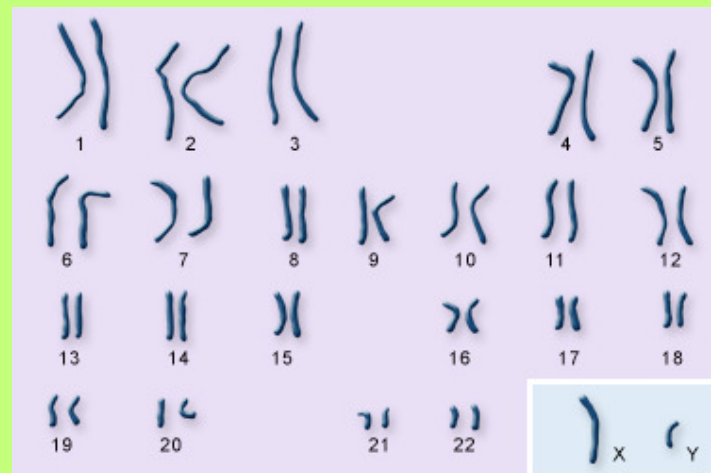
Sections of these DNA strands are called genes



Each gene is responsible for putting together one of the building blocks of the body

# Chromosomes come in pairs:

One from each of your pairs comes from your father,  
the other from your mother.



There are 22 main pairs, and then a very special pair: the XY pair.

Why is the XY pair so special? Because it determines whether you're a girl or a boy.



This is what the X chromosome looks like. Everyone has one of those. (Girls have two.)

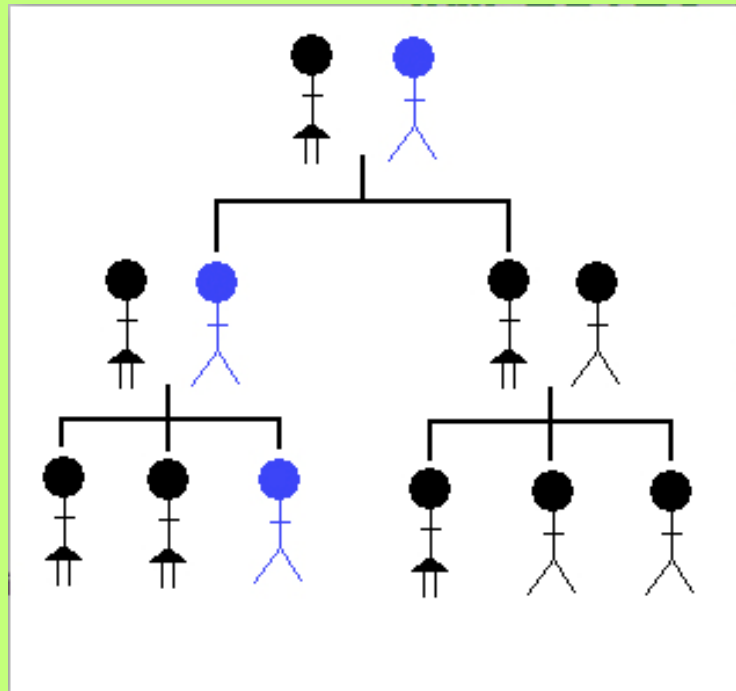


This is what the Y chromosome looks like. Only boys have one!



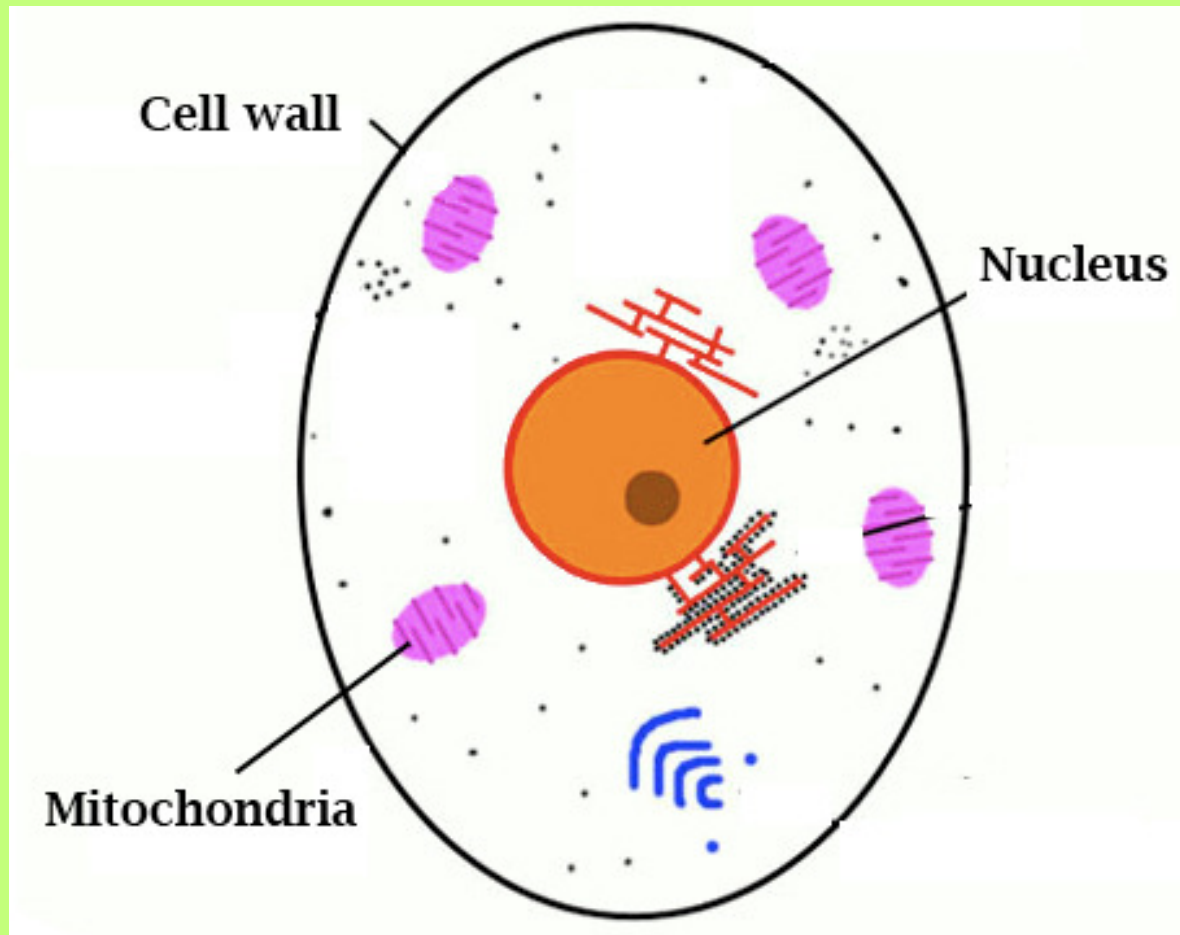
So the girl's pair is an X (from her mother) and another X (from her father),  
but the boy's pair is an X (from his mother) and a Y (from his father).

By studying special features of the Y chromosomes, we can see patterns handed on from father to son



By looking at Y-chromosomes of men today in places where Vikings settled, we can see roughly how many Viking men had sons whose descendants are living now.

Let's look at the cell structure again.

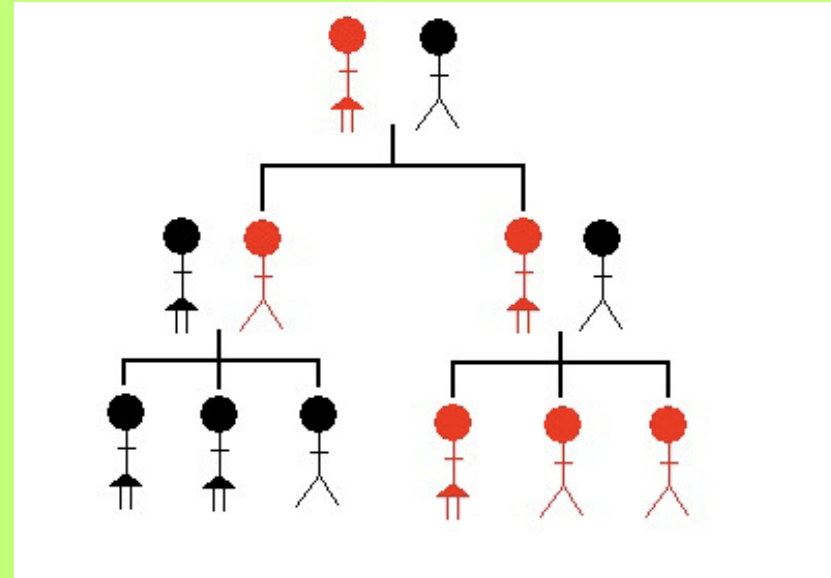


The mitochondria burns fuel to provide us with energy, remember?



ALL our mitochondria come directly from our mothers.

That means that by studying material in the mitochondria, we can figure out patterns of inheritance passed through the mothers.



By studying the mitochondria of men and women today, we can tell how many of them descended through daughters from a Viking woman.

Looking at genes we see that many Viking and men and women settled in Orkney and the Shetland Islands



But in the western isles of Scotland only half as many Viking women came.

And in Iceland, nearly all the men were Viking,  
but nearly all the women were from Ireland or Britain.

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nearly all the men  
were Vikings,  
but nearly all the  
women came from  
Britain or Ireland.



Your genes  
tell your own story of  
how your ancestors  
traveled about  
the world.