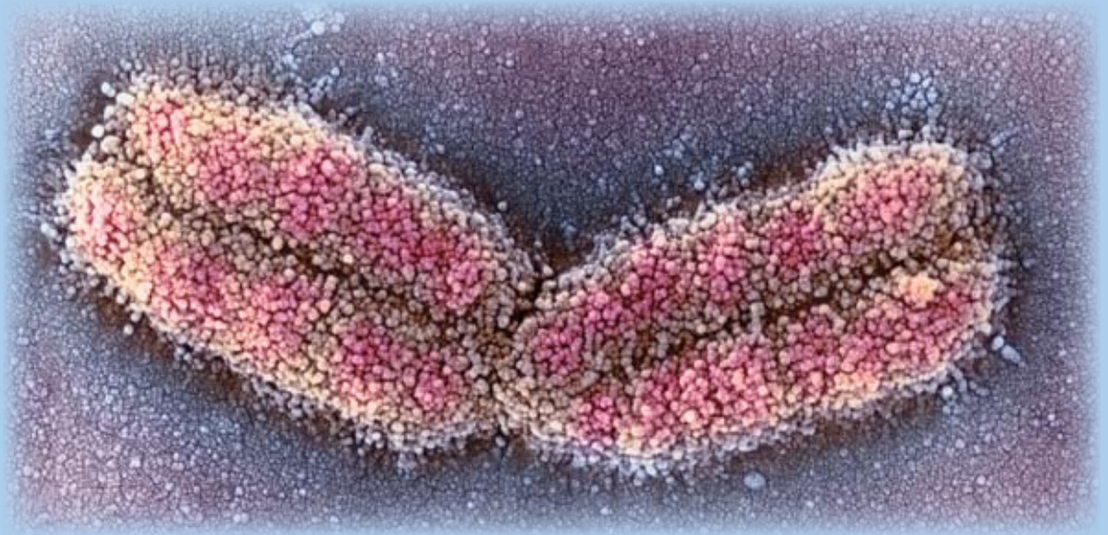
Chromosomes and Inheritance

Sutton

Scientists knew how cells made new cells. They knew that cells followed instructions on the chromosomes. What they didn't know was where a new organism got its instructions from.

A baby's cells worked a lot like its parents' cells. Blonde parents would have blonde children. Whole families would all have the same kind of nose or shoulders. How did they all get similar instructions?

In 1903, Walter Sutton developed a theory. It was the Chromosome Theory of Inheritance. It said that parents pass chromosomes to their offspring.



Chromosomes are so small that they can only be seen when they bunch together like this.

A normal cell contains a full set of chromosomes. A full set has 23 pairs. Each pair has one chromosome from the mother and one from the father. If the father was blonde and the mother was blonde, the chromosomes they gave the baby would have blonde alleles. Then the baby would be blonde.

Sometimes the mother and father do not have the same alleles. Then the baby gets chromosomes with different alleles on them. The father's chromosome may have the attached earlobe allele. The mother's chromosome may have the unattached earlobe allele. The baby's cells follow both sets of instructions at the same time. What kind of earlobes will the baby have?

Mixing Chromosomes

During the process of meiosis, the chromosomes can get mixed up. They can recombine in a number of new ways. These new combinations give a variety of genetic possibilities for the offspring.

More About Sutton

Sutton was born in New York. He moved to Kansas when he was 10. He lived on a ranch. He went to college to become an engineer. One summer, though, he took care of his family. They were all very ill. They had typhoid fever. One of his brothers died. At this point, Sutton decided to study biology. He wanted to be a doctor. The world is very glad he did!

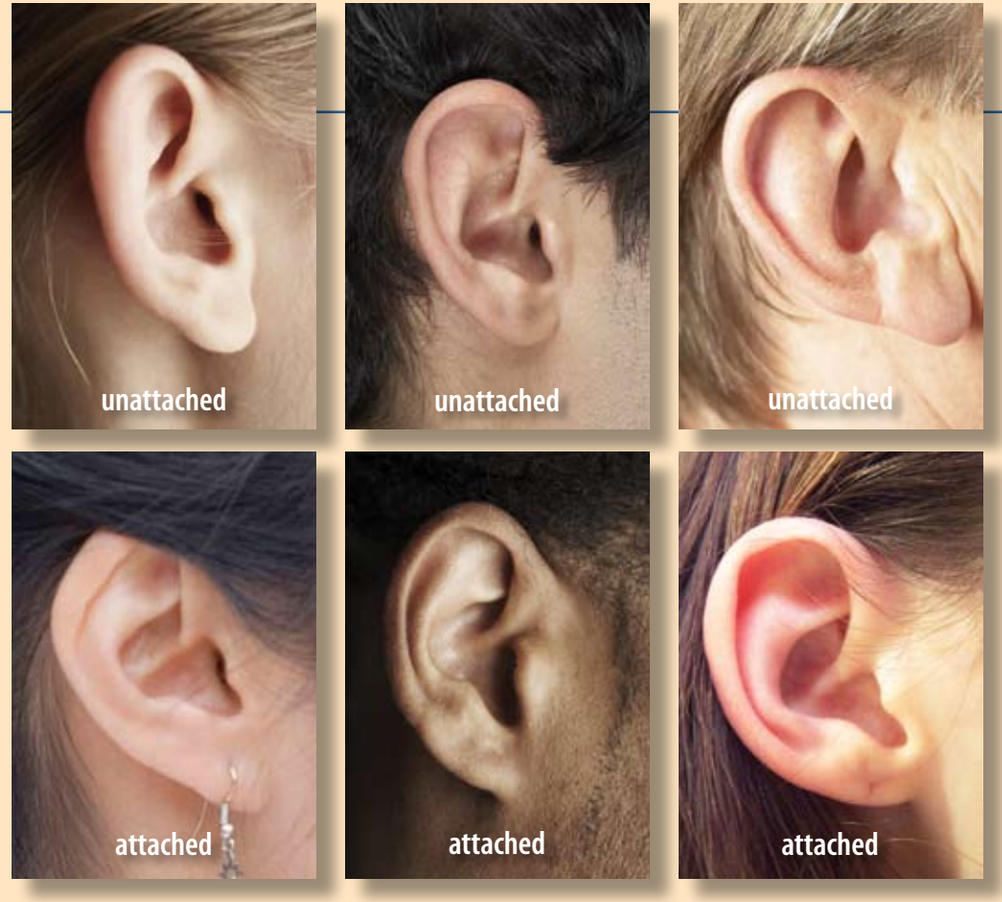
You got alleles from both your birth parents. This gave you two sets. Your cells follow both sets of instructions. What happens when the instructions aren't the same?

Some alleles are **dominant**. Others are **recessive**. If a dominant allele is present, that trait will show up. So, if two dominant alleles are present, the dominant trait will show up. When one dominant and one recessive allele are present, the dominant allele will still show up. However, if two recessive alleles are present, the recessive trait will show up.

Alleles are passed down over **generations**. Your mother may have two recessive alleles for attached earlobes. She would have attached earlobes. Your father may have gotten a dominant allele for unattached earlobes and a recessive allele for attached earlobes. He would have unattached earlobes. You would get one of your mother's recessive alleles. You would get one of your father's alleles, too. If you got the dominant allele, you would have unattached earlobes. If you got the recessive allele, you would have attached earlobes.

Black Fur Dominance

With many animals, black fur color is dominant. White is the recessive gene. Most litters of puppies will have many different combinations of alleles. Some will be black and some will be white. It all depends on which combination they got.



The following chart shows what happens with the earlobe alleles. The gene for unattached earlobes is dominant (*D*). The one for attached earlobes is recessive (*R*). So, to get attached earlobes, you must receive that gene from both your parents.

Mother passes		Father passes		Child has
unattached earlobe (*D*)	+	unattached earlobe (*D*)	=	unattached earlobe (*D*)
unnattached earlobe (*D*)	+	attached earlobe (*R*)	=	unattached earlobe (*D*)
attached earlobe (*R*)	+	attached earlobe (*R*)	=	attached earlobe (*R*)