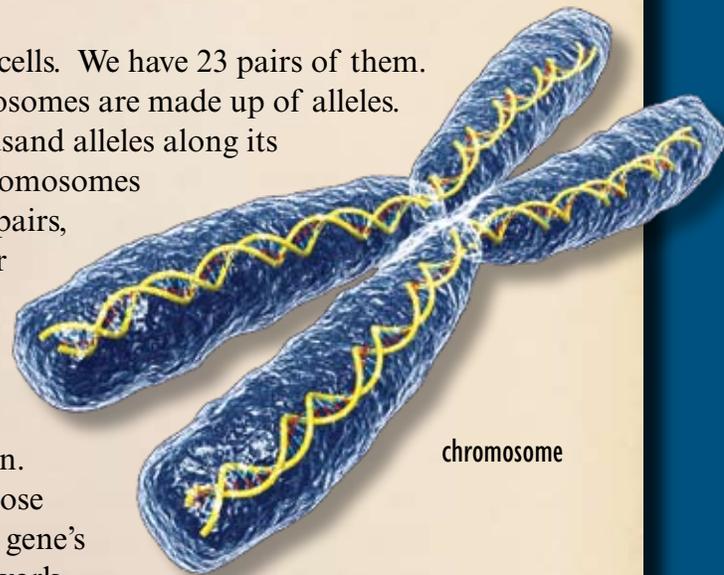


Genetics

A baby's cells work a lot like its parents' cells. Blond parents tend to have blond children. Whole families all have the same kind of nose. How do they all get the same traits? Walter Sutton worked on the question. He came up with a theory. It was the Chromosome Theory of Inheritance. It said that parents pass traits to their children through chromosomes.

Chromosomes

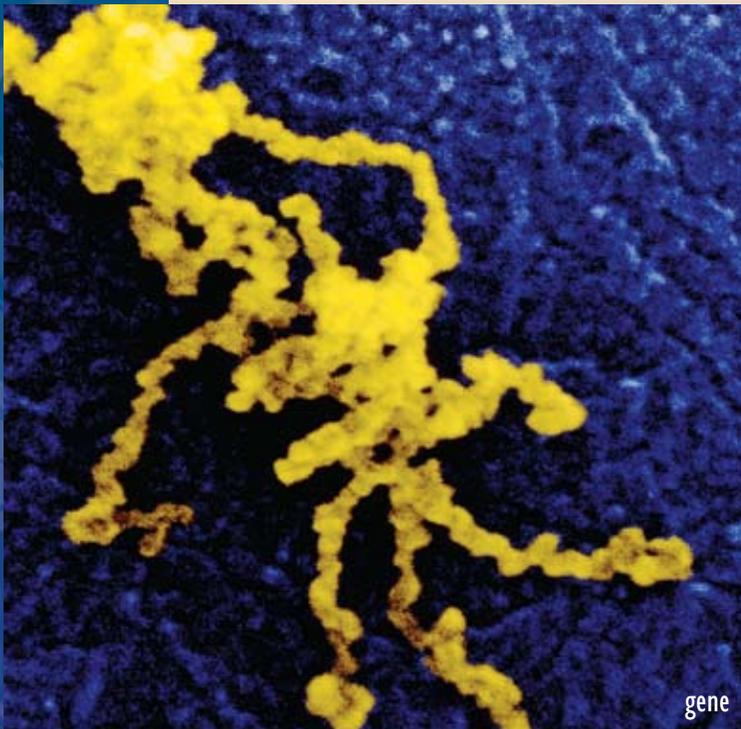
Chromosomes are found in each of our cells. We have 23 pairs of them. That means each cell has 46 in all. Chromosomes are made up of alleles. Each chromosome has more than two thousand alleles along its length. Alleles are directions for cells. Chromosomes come in pairs. That means alleles come in pairs, too. Each cell has two sets of directions for how the cell works. A pair of alleles that work at the same time make a gene. A zebra's genes give it stripes. A bird's genes give it wings. Our genes give us fingers and all the other things that make us human. Stripes, wings, and fingers are all traits. Those traits start in the cells. Each cell follows its gene's instructions on how to work. All the cells work side by side to make stripes or wings or fingers.



chromosome

A normal cell has a full set of chromosomes. A full set has 23 pairs. Each pair has one from the mother. The other one comes from the father. The father could be blond. The mother could have blond hair, too. The chromosomes they gave the baby would have blond alleles. Then the baby would be blond.

The mother and father do not always have the same alleles. Then the baby gets alleles that are not the same. The father's allele may be for attached earlobes. The mother's may be for hanging earlobes. The baby's cells get both alleles. What kind of earlobes will the baby have?



gene

Dominant and Recessive

Some alleles are strong, or dominant. Some are weak, or recessive. If a strong allele is part of the pair, the strong allele's trait will show up. So if the pair is two strong alleles, that trait will show up. Sometimes the pair has one strong and one weak allele. Then the strong allele's trait will still show up. Sometimes the pair has two weak alleles. Then the weak allele's trait will show up.

Alleles are passed down from parent to child. The father may have attached earlobes. He would have two weak alleles for that trait. The mother may have one of each allele. She would have one strong allele for hanging earlobes. She would also have a weak allele for attached earlobes. She would have hanging earlobes.



The baby would get one of the father's alleles. The allele would be weak. The baby would get one of the mother's alleles, too. The baby might get the strong allele. Then it would have hanging earlobes. The baby might get the weak allele. Then it would have attached earlobes.

Comprehension Question

What do chromosomes do?

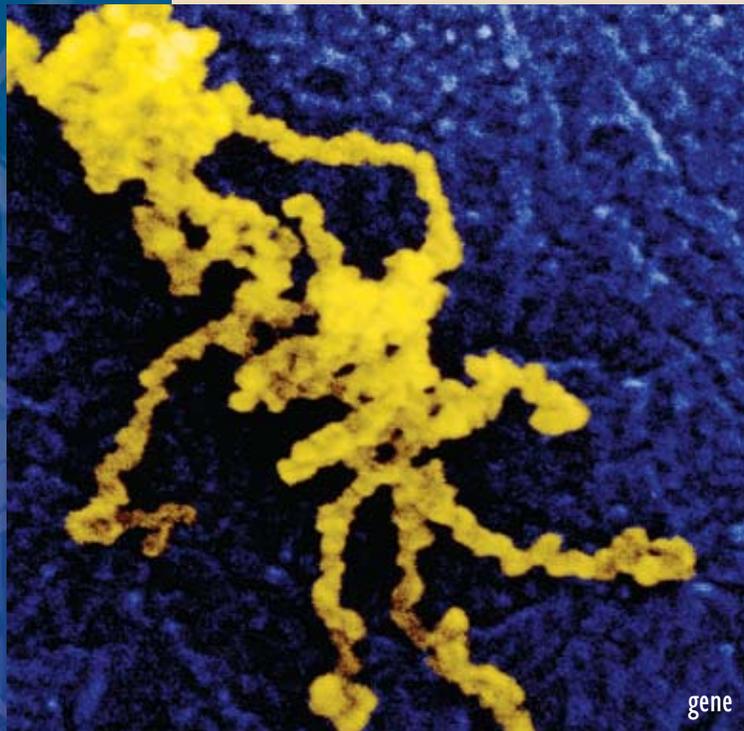
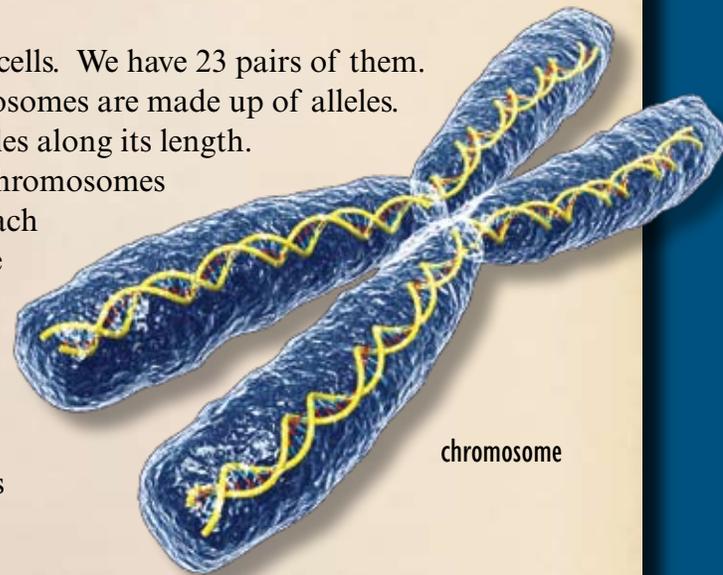
Genetics

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Chromosomes

Chromosomes are found in each of our cells. We have 23 pairs of them. That means each cell has 46 in all. Chromosomes are made up of alleles. Each one has more than two thousand alleles along its length. Alleles are instructions for cells. Because chromosomes come in pairs, alleles come in pairs, too. Each cell has two sets of instructions for how the cell works. Two paired alleles working at the same time make a gene.

A zebra's genes give it stripes. A bird's genes give it wings. Our genes give us fingers and everything else that makes us human. Stripes, wings, and fingers are all traits. Those traits start in the cells. Each cell follows its gene's instructions on how to



develop and work. All the cells work together to make stripes or wings or fingers.

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

Sometimes the mother and father do not have the same alleles. Then the baby gets alleles that are not the same. The father's allele may be for attached earlobes. The mother's allele may be for hanging earlobes. The baby's cells use both sets of instructions at the same time. What kind of earlobes will the baby have?

Dominant and Recessive

Some alleles are dominant. Some are recessive. If a dominant allele is part of the pair, that trait will show up. So, if the pair is two dominant alleles, that dominant trait will show up. Sometimes the pair has one dominant and one recessive allele. Then the dominant allele will still show up. Sometimes the pair has two recessive alleles. Then that recessive trait will show up.

Alleles are passed down from parent to child. The father may have attached earlobes. He would have two recessive alleles for that trait. The mother may have one of each allele. She would have one dominant allele for hanging earlobes. She would also have a recessive allele for attached earlobes. She would have hanging earlobes.



The baby would get one of the father's alleles. It would be recessive. The baby would get one of the mother's alleles, too. The baby might get the dominant allele. Then it would have hanging earlobes. The baby might get the recessive allele. Then it would have attached earlobes.

Comprehension Question

How do chromosomes and alleles give us our genes?

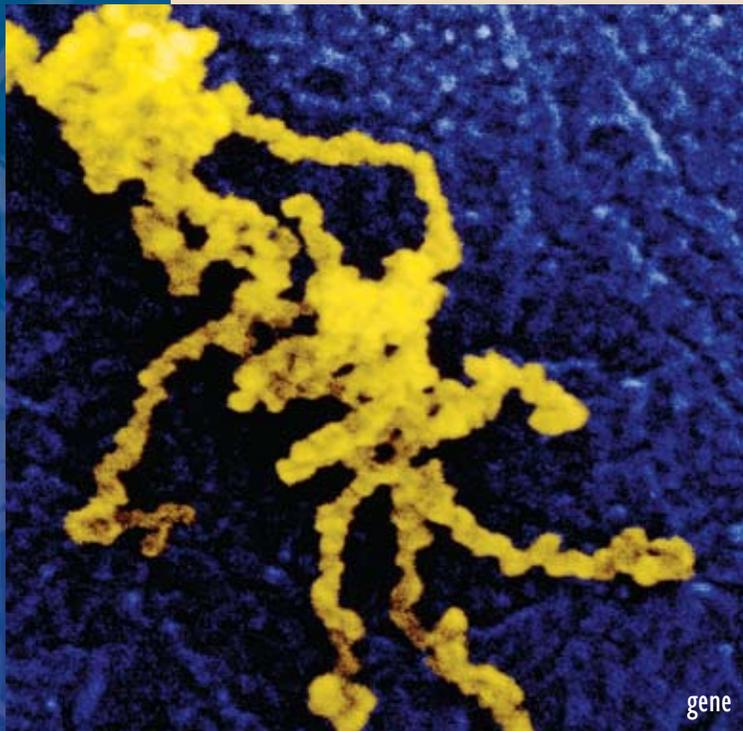
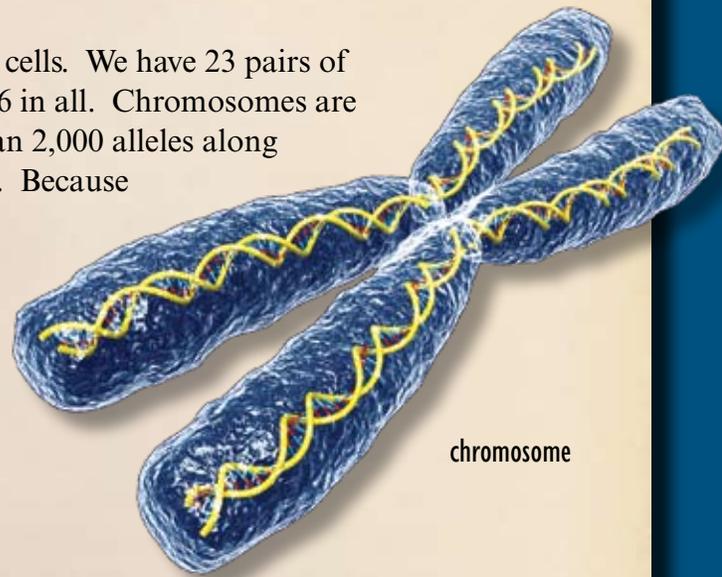
Genetics

A baby's cells work a lot like its parents' cells. Blond parents often have blond children. Whole families all have the same kind of nose or shoulders. How do 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

Chromosomes are found in each of our cells. We have 23 pairs of chromosomes. That means each cell has 46 in all. Chromosomes are made up of alleles. Each one has more than 2,000 alleles along its length. Alleles are instructions for cells. Because chromosomes come in pairs, alleles come in pairs, too. Each cell has two sets of instructions for everything. Two paired alleles work together to make a gene.

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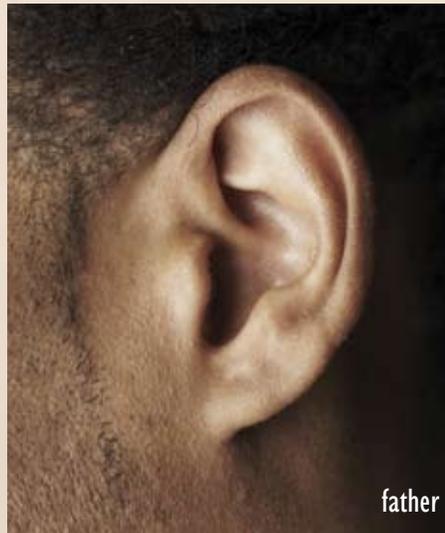
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Sometimes the mother and father do not have the same alleles. Then the baby gets chromosomes with different alleles on them. The father's chromosome may have the attached earlobe allele. The mother's chromosome may have the hanging earlobe allele.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

Dominant and Recessive

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. The father may have two recessive alleles for attached earlobes. He would have attached earlobes. The mother may have gotten a dominant allele for hanging earlobes and a recessive allele for attached earlobes. She would have hanging earlobes.



The baby would get one of the father's recessive alleles. The baby would get one of the mother's alleles, too. If the baby got the dominant allele, it would have hanging earlobes. If the baby got the recessive allele, it would have attached earlobes.

Comprehension Question

How are chromosomes, alleles, and genes related?

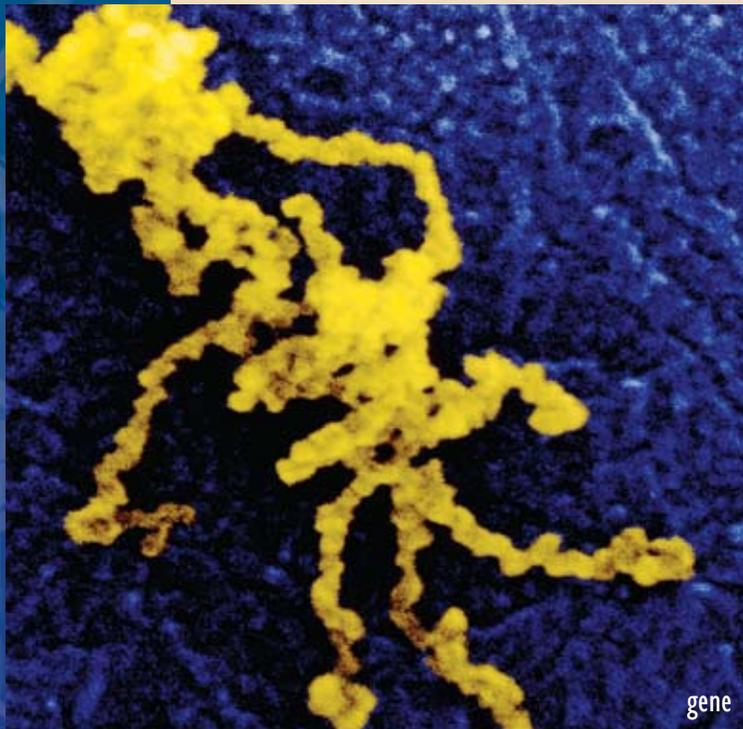
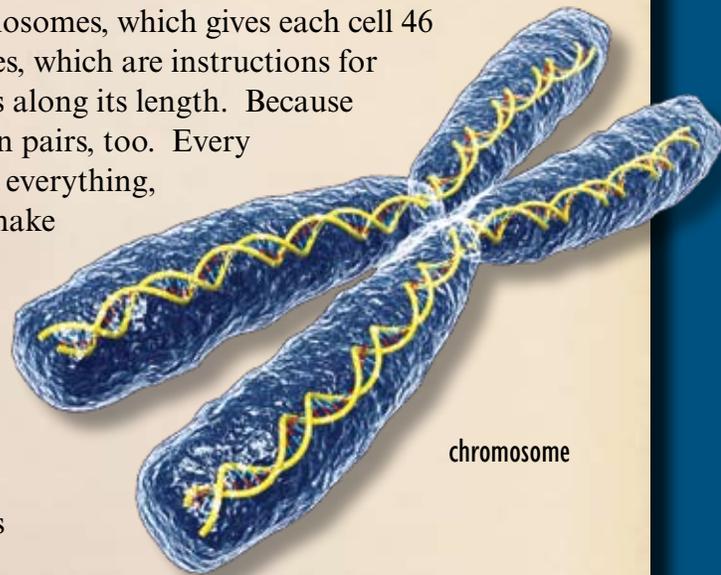
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A zebra's genes give it camouflage stripes; an albatross's genes give it wings. Our genes give us fingers and everything else that makes us human. Camouflage, wings, and fingers are all traits, and those traits start in the cells. Each cell follows its instructions on how to develop, function, and behave, and all those cells work



together to make camouflage or wings or fingers.

A normal cell contains a full set of chromosomes: 23 pairs. Each pair has one chromosome contributed by the mother and one contributed by the father. If both the father and the mother were blond, the chromosomes they contribute to the baby would include blond alleles. The baby would be blond.

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 while the mother's chromosome may have the hanging earlobe allele. The baby's cells follow both sets of instructions at the same time. What kind of earlobes will the baby have?

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The baby would get one of the father's recessive alleles. The baby would get one of the mother's alleles, too. If the baby got the dominant allele, it would have hanging earlobes. If the baby got the recessive allele, it would have attached earlobes.

Comprehension Question

How does the structure of our chromosomes result in our physical traits?