

# Hair: Curly or Straight?

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The grass on the other side always looks greener. Girls often care about their appearances, especially their hair. All of those girls who have curly hair desire for their hair to be straight, and vice versa. You may wonder what components make you who you are, and I am here to tell you just that. Genetics are all about the study of heredity, which is the passing down of physical characteristics (traits), from the parents to the offspring. Genes are basically small parts of every single organism's DNA, which is the genetic material found in the nucleus of a cell. DNA is made up of the information about an organism, which is then passed down from the parental generation, to the offspring. These characteristics include things such as eye color, hair type, height, weight, etc. Your genes and DNA make you who you are!

The DNA molecule is organized with chromosomes creating a gene. While the DNA is the actual set of information and instructions, the chromosomes are tightly yet precisely wrapped DNA ready for reproduction. The chromosomes are the "rungs" of the DNA "ladder", and when combined are in the shape of a twisted ladder (the double helix). The chromosomes bond according to their chemical makeup. Chromosomes containing Adenine and Thymine bond, and chromosomes containing Cytosine and Guanine bond. Every human being contains 23 pairs of chromosomes. While chromosomes always come in pairs, you can consider that you have 46 individual chromosomes. Every organism receives their chromosomes from their parents. Each parent gives you 50% of their DNA, or in other words, 23 chromosomes; the egg cell donates 23 chromosomes, and the sperm cell also donates 23 chromosomes. The 23rd chromosome is the chromosome which decides whether the offspring is a girl or a boy. Females always donate an X chromosome to their offspring. While this is the case, males either donate an X or a Y chromosome. If the offspring receives both X chromosomes, then the offspring will be a girl. However, if the offspring receives one X and one Y chromosome, it will be a boy. Chromosomes decide your gender, but they can also be passed down with accompanying alleles. Every X chromosome is accompanied with either a dominant or recessive allele. While this is the case, the Y chromosome is not accompanied by any allele. When one chromosome from each parent is donated, your gender is decided, as well as a trait which you will contain. If the offspring receives both a dominant and recessive gene, they will be known as a carrier of the gene, although physically the trait will not be present. These traits are known as sex-linked traits.

Chromosomes and DNA may sound very different, but they really aren't. Just remember that every chromosome contains pieces of DNA. Now let's talk about genes. Genes carry the instructions (DNA) for creating many different traits. These genes create your physical

appearance. Every human being is made up of about 20,000 to 30,000 genes. These genes decide everything from your hair color and eye color, to the accuracy of your vision, and the diseases that you might develop. Every gene is made up of two alleles. Alleles can also be known as just different forms of a gene. For every trait that you have, each parent donates one allele, in order to form your gene for that specific trait. There are two different types of alleles that can be donated, dominant, and recessive. Dominant alleles are alleles that cause the trait to show up in the organism, and are written with a capital letter when using a Punnett Square. Recessive alleles are alleles that the organism possesses, but whose trait is not affected by if a dominant allele is present. But if two recessive alleles are present, the recessive trait is guaranteed to show up, as there is no dominant allele to mask the recessive allele.

Although this is usually the case, there are also some exceptions. When there are two alleles, both of which are dominant but representing different traits, codominance occurs. When both alleles are dominant, neither one can mask the other, causing both of the traits to show up in the offspring. At other times, a recessive allele and an incomplete dominant allele join together, causing incomplete dominance. When an allele isn't completely dominant, it isn't able to mask the recessive allele, causing the offspring to have a blend of both the traits. While in codominance the offspring contains both distinct traits, incomplete dominance causes the offspring to have a blend of the two traits. Let's take flowers as an example. If one parent flower is red in color, and the other is white, both of which are dominant, codominance will occur. So the offspring would have alternating petals of each color. Now let's use this example but apply incomplete dominance. Since red and white result in the color pink, the offspring (flower) would be pink in color, if red flowers were partially dominant, and white flowers were recessive. This can also be applied to hair type. If one parent has straight hair, and the other has curly, it would result in incomplete dominance. So the offspring (son/daughter) would have wavy hair. Genes, Alleles, DNA, Chromosomes, and Punnett squares may all sound confusing at first. You may think that I'm speaking a different language. But the truth is that this language is talking all about you, your personality, your appearance, everything that makes you who you are, a unique individual!