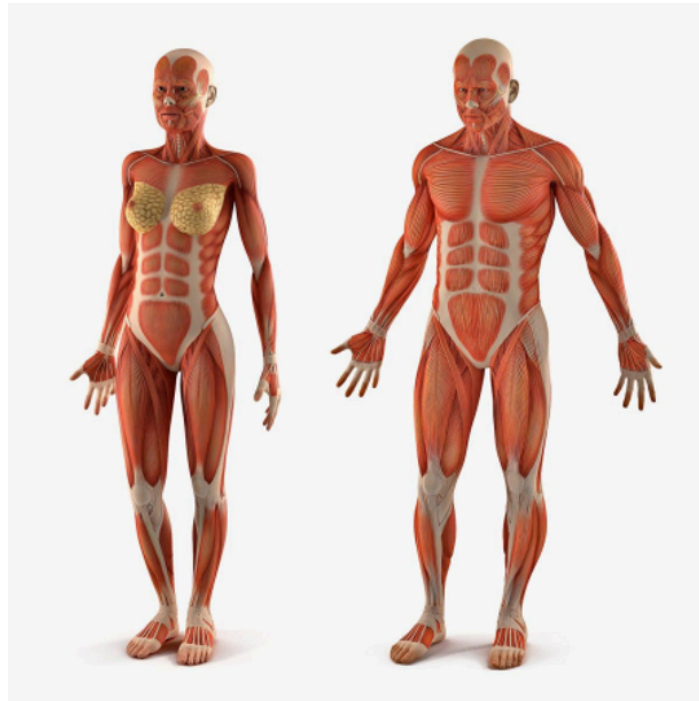




The Differences Between Male & Female Bodies in Humans



Muscular system of female (left) vs. male (right) human | Image credit: Turbosquid

Male and female bodies have some distinct differences in terms of their anatomy, physiology, and genetic makeup. These differences manifest in various ways and are evident in the physical appearance, physiological functioning, reproductive systems, and overall health of both sexes. Understanding these differences can help us appreciate the uniqueness of each sex and how their bodies function.

Anatomical Differences

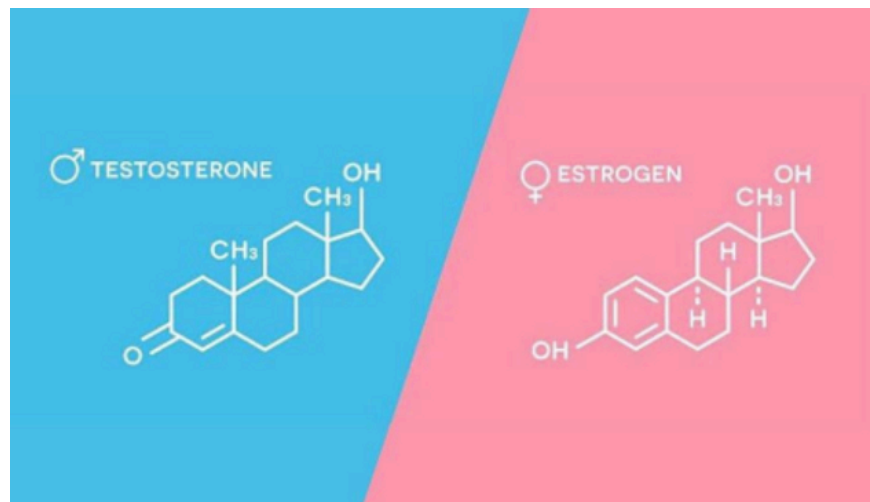
The anatomical differences between males and females are significant and encompass a range of physical features and structures. These differences are the result of variations in hormonal levels, genetics, and developmental processes. The overall body shape is one of the most apparent anatomical differences between males and females. Males tend to be taller (average height in males is 5'9" vs. 5'4" in females), with a more muscular build, and broader shoulders. Females, on the other hand, tend to be shorter with a higher percentage of body fat and wider hips.

The skeletal system of males and females differs in a few significant ways. Males tend to have larger and denser bones, particularly in the skull, jaw, and brow ridge. They also tend to have longer and thicker limbs and more pronounced muscle attachments. Females, meanwhile, have a smaller and lighter skeletal structure, particularly in the hips and pelvic area, to accommodate pregnancy and childbirth. The female pelvis is wider and more shallow than the male pelvis, which allows for the passage of the baby's head during birth.

The muscular system of males and females also differs significantly. Males tend to have more muscle mass, particularly in the upper body, which gives them a more pronounced "V-shape" physique. Females, on the other hand, have a higher percentage of body fat, which gives them a curvier, more rounded appearance (often known as the "hourglass figure"). The differences in muscle mass are due to variations in testosterone levels, which promote muscle growth in males.

The reproductive system is perhaps the most significant anatomical difference between males and females. Males have external genitalia, including the penis and scrotum (testicles), while females have internal genitalia, including the vagina, uterus, and ovaries. The testes in males produce sperm, while the ovaries in females produce eggs. Fertilization occurs in the female reproductive system, where a fertilized egg implants in the uterus and eventually develops into a fetus. Additionally, females have breasts, which males do not have.

The endocrine system, which produces and regulates hormones, differs between males and females. Males produce higher levels of testosterone, which promotes muscle growth, deepens the voice, and promotes the growth of facial and body hair. Females produce higher levels of estrogen and progesterone, which regulate menstrual cycles, promote breast/uterus development, and maintain pregnancy.



Chemical structures of testosterone and estrogen. | Image credit: GenderGP

The digestive system of males and females also differs slightly. Females tend to have a longer digestive tract, which means that food takes longer to pass through their system. This can make them more susceptible to constipation and other digestive problems. Additionally, females tend to have a more sensitive digestive system, which can lead to nausea and vomiting during pregnancy.

Physiological Differences

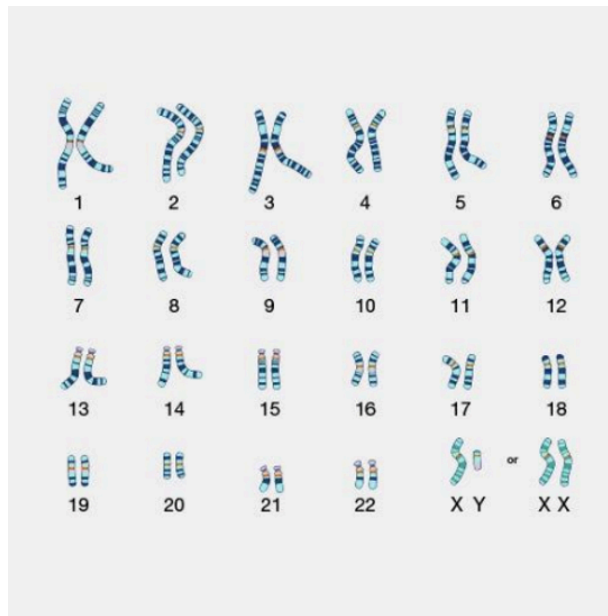
The physiologies of males and females also differs significantly and are primarily determined by the different reproductive roles the two sexes play in the continuation of the human species. Hormones play a critical role in these differences. Once again, males produce higher levels of testosterone, while females produce higher levels of estrogen and progesterone. These hormones are primarily responsible for the differences in a wide range of physiological functions between the two sexes. A few of these significant physiological differences are explained below.

When it comes to energy production, males and females differ in terms of their metabolism. Men typically have a higher basal metabolic rate than women, which means they burn more calories at rest. This is partly due to the fact that men tend to have more muscle mass than women. Women, on the other hand, tend to have a higher percentage of body fat, which can impact their metabolism and overall health.

In terms of the cardiovascular system, males tend to have larger hearts and blood vessels than females, which means they can pump more blood and oxygen to their muscles. This can give them a performance advantage in certain types of physical activities, such as running and weightlifting. However, females tend to have lower blood pressure and higher levels of HDL (high-density lipoprotein) — good cholesterol — which means that they have a lower risk of cardiovascular disease than males. Another reason for this is the hormone estrogen, which is known to have protective effects on the heart as it helps to improve the function of the inner lining of blood vessels, known as endothelial cells. This can lead to improved blood flow and decreased inflammation in the arteries, which also contributes to a lower risk of cardiovascular disease in females. After menopause, however, when estrogen levels decline, this protective effect diminishes and a female's risk of cardiovascular disease rises exponentially.

Physiological differences in the respiratory system are also present between males and females. Males tend to have larger lungs and a higher lung capacity than females, primarily due to their larger size and higher muscle mass. This, however, can make them more susceptible to respiratory diseases such as lung cancer and chronic obstructive pulmonary disease (COPD). The reason for this is not entirely unknown, but research suggests that it is most likely because the larger airways and lung capacity in males means that a greater volume of carcinogens present in the air (such as tobacco smoke) are inhaled over time. This, in turn, means that a greater surface area of lung tissue is exposed to such carcinogens in the long term, potentially leading to the aforementioned diseases.

Genetics



Karyotype shows the 23 pairs of chromosomes that humans possess. As can be seen on the bottom right, the 23rd pair is either XY or XX, which determines whether a human is biologically male or female. | Image credit: National Human Genome Research Institute

The genetic differences between males and females are fundamental and are determined by the sex chromosomes. Males have one X chromosome and one Y chromosome, while females have two X chromosomes. These genetic differences lead to differences in physical and behavioural traits, as well as the risk of certain genetic diseases.

Humans have 23 pairs of chromosomes, with one pair being the sex chromosomes. Males have an XY pair, while females have an XX pair. The Y chromosome carries the genes responsible for the development of male characteristics, while the X chromosome carries the genes responsible for the development of both male and female characteristics. Despite these basic genetic differences, since both genders contain the X chromosome, they share common anatomical and physiological characteristics most of the time.

The inheritance of sex chromosomes follows a specific pattern. Females inherit one X chromosome from each parent, while males inherit an X chromosome from their mother and a Y chromosome from their father. This means that if a genetic disorder is carried on the X chromosome, females are less likely to be affected because they have a backup X chromosome, while males are more likely to be affected because they only have one X chromosome.

The genetic differences between males and females result in differences in physical traits. As explained before, males tend to be larger in size and have more muscle mass due to their higher levels of testosterone and have deeper voices, more body hair, and a more prominent Adam's apple; females tend to have a more curvaceous body shape, higher body fat percentage, and a higher voice pitch.

The genetic differences between males and females also affect behavioural traits. Males tend to be more aggressive and competitive, which is thought to be linked to their higher levels of testosterone. They also tend to take more risks and have a stronger sex drive. Females, on the other hand, tend to be more nurturing and empathetic, which is thought to be linked to their higher levels of oxytocin (the "love hormone"). They also tend to be better at multitasking and have better verbal communication skills than males. I mean, that's a given when millions of studies have shown that women generally have higher focus than men.

Genetic Disorders

The genetic differences between males and females also lead to differences in the risk of acquiring certain genetic disorders. As mentioned earlier, males are more likely to be affected by genetic disorders carried on the X chromosome because they only have one X chromosome. Y chromosomes are about a third the size of X chromosomes and only have 55 genes compared to 900 genes on the X chromosome. Thus, they often can not compensate for a defective X chromosome. In females, however, a healthy X chromosome with non-mutated, dominant genes can mask the effects of the defective, recessive genes on the other X chromosome. For this reason, males are much more prone to diseases such as hemophilia, colour blindness, and Duchenne muscular dystrophy. These are known as sex-linked disorders as they tend to affect one sex much more than the other (risk for males >> risk for females). Males can only inherit them from their mother, who "contributes" the X chromosome. The only way that females can acquire the aforementioned sex-linked disorders is by contracting the defective gene on both X chromosomes, which is very rare.

The Undeniable Role of Evolution

The underlying cause of all the anatomical, physiological, and genetic differences between male and female bodies that have been discussed in this article is evolution. These differences have primarily been created with function in mind, and the distinct evolutionary roles that males and females have played throughout history. Nature purposefully designed wider hips for women to better accommodate childbirth and greater muscle mass/bone density for men, as in early humans males would depend on stronger bones and muscles to hunt. Therefore, the differences in sex that can be observed today in modern humans are no coincidence and are rather the product of nothing short of millions of years of evolution. For this reason, we should appreciate our sexual differences and celebrate the fact that we have ancient history embedded in us as we still bear some of the most prominent sex-defining characteristics of our earliest ancestors.

Citations

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