

## Allosome

An allosome is a sex chromosome that differs from an ordinary autosome in form, size, and behavior.

-The human sex chromosomes are a typical pair of allosomes. These chromosomes determine the sex of an individual when reproducing.

-Allosomes are also referred to as sex chromosomes or idiosomes. Autosomes differ from allosomes because autosomes appear in pairs whose members have the same form but differ from other pairs in a diploid cell, whereas members of an allosome pair may differ from one another and thereby determine sex.

## Differentiation

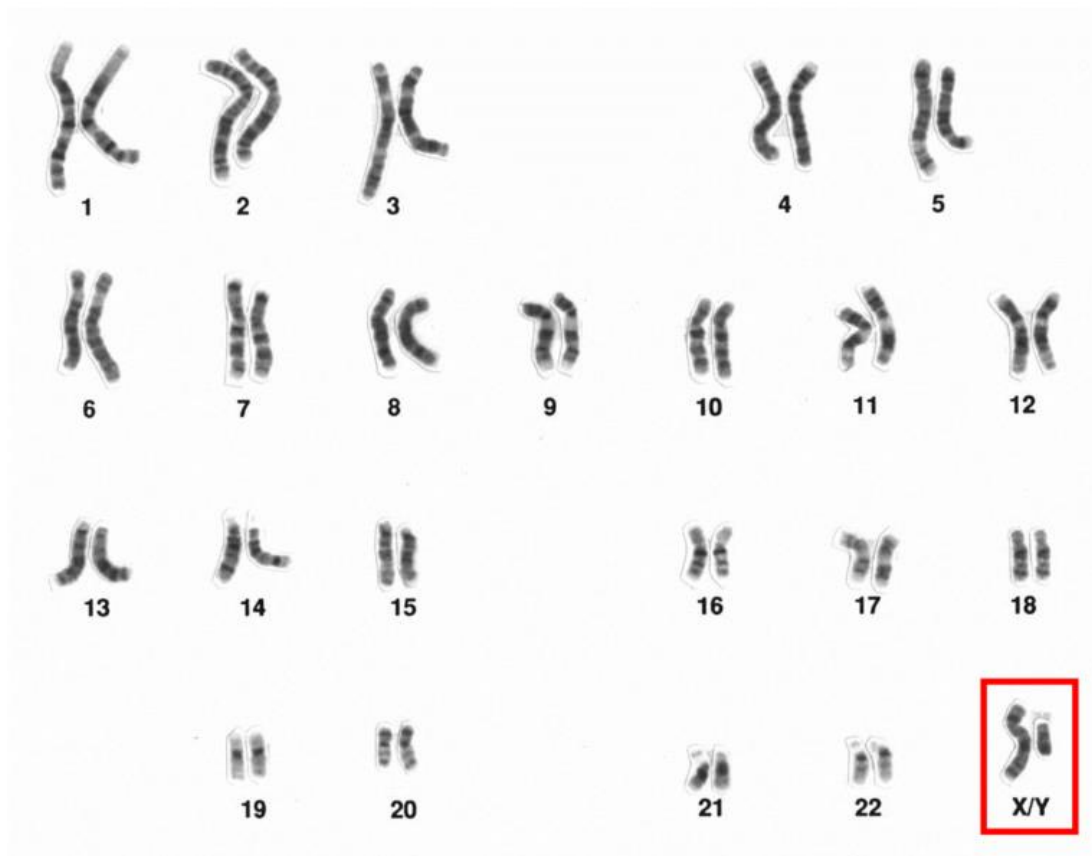
In humans, each cell nucleus contains 23 pairs of chromosomes, a total of 46 chromosomes. The first 22 pairs are called autosomes.

Autosomes are homologous chromosomes i.e. chromosomes which contain the same genes (regions of DNA) in the same order along their chromosomal arms.

The chromosomes of the 23rd pair are called allosomes consisting of two X chromosomes in most females, and an X chromosome and a Y chromosome in most males. Females therefore have 23 homologous chromosome pairs, while males have 22. The X and Y chromosomes have small regions of homology called pseudoautosomal regions.

## What are Sex Chromosomes?

Humans have 23 pairs of chromosomes. Among them, one pair is sex chromosomes. Other 22 are autosomes. Thus, sex chromosomes are of 2 types; X and Y. In these, Y is smaller. Hence, X and Y are partially homologous. However, they pair up and segregate into daughter cells during meiosis. Males have X and Y combination while females have X and X combination. Moreover, all female gametes carry only one X chromosome. Male gametes may carry either X or Y. The number carrying X is equal to the number carrying Y. If an ovum unites with a sperm carrying X, the result is a female XX. If an ovum fertilizes with a sperm carrying Y, the result is a male XY.



**Figure 02: Sex Chromosomes**

Sex-linked characters show deviations from Mendel's laws. All the genes carried by X chromosomes do not determine sexuality. Many of the genes have other functions similar to genes carried in autosomes. Sex-linked inheritance shown by genes carried with X chromosomes is not represented in Y chromosomes. These genes normally have recessive alleles, and they show recessive mutations. However, these defective alleles are very rare in the human population. Hence, they do not express in females as they carry 2X chromosomes. Heterozygous females are carriers, and they may pass these genes onto their sons. Then they will be expressed in males because they have only one X chromosome.

## What are the Similarities Between Autosomes and Sex Chromosomes?

- Autosomes and sex chromosomes contain DNA and proteins.
- They located in the human genome inside the nucleus.
- They have genes.
- Hence, they determine the characteristics of the organism.
- They exist as pairs.
- Both segregate during the cell division.

- They are responsible for inheritance.

## Autosomes vs Sex Chromosomes

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	Autosomes	Sex Chromosomes
DEFINITION	Autosomes are the chromosomes that determine all the characteristics other than the sex determinations.	Sex chromosomes are the chromosomes that determine the sex of the organisms.
HOMOLOGOUS NATURE	Autosomes are homologous chromosomal pairs.	Sex chromosomes are partially homologous chromosomal pairs.
DETERMINING SEX CHARACTERISTICS	Do not involve in sex determination.	Involved in sex determination.
HEIGHT OF THE HOMOLOGOUS PAIRS	In autosomal pairs both the chromosomes are of the same height.	In sex chromosomes, Y chromosome is shorter.
POSITION OF THE CENTROMERE	The position of the centromere is the same.	The position of the centromere may not be the same.
NUMBER OF PAIRS IN THE HUMAN GENOME	22 pairs	One pair
TOTAL NUMBER OF CHROMOSOMES IN THE HUMAN GENOME	44	2

## **Summary – Autosomes vs Sex Chromosomes**

Autosomes are the homologous pairs of chromosomes in the human genome that determine the somatic characteristics of an organism. Sex chromosomes determine the sex of the organism. They are partially homologous. Out of 23 pairs, 22 are autosomes while one pair is sex chromosomes. This is the difference between autosomes and sex chromosomes.