

# Difference Between Acrocentric and Telocentric Chromosomes

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## Key Difference - Acrocentric vs Telocentric Chromosomes

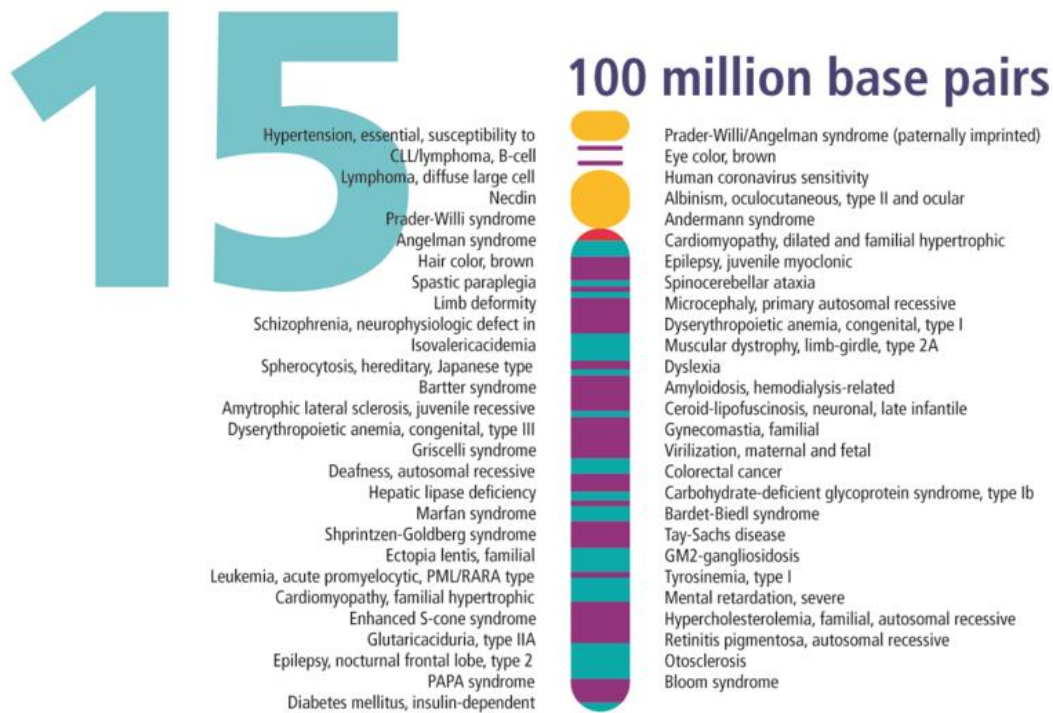
A [chromosome](#) is a thread like structure that is found in the [nucleus](#) of the [eukaryotic](#) cell. Chromosomes are composed of well organized, compactly arranged [deoxyribose nucleic acid \(DNA\)](#) molecules and contain [genes](#) that are responsible for the production of different [proteins](#). There are 23 pairs of chromosomes in humans, where 22 pairs are referred to as autosomes and 1 pair of sex chromosome. Chromosomes can be categorized based on different criteria. When chromosomes are categorized based on the position of the centromere, there are 4 types of chromosomes. They are; Acrocentric chromosomes, Telocentric chromosomes, Metacentric Chromosomes and Sub-metacentric Chromosomes. Acrocentric chromosomes are the chromosomes in which the centromere is placed away from the centre thereby giving rise to one very long part and one very short part in the p and q arms. Telocentric chromosomes are the chromosomes in which the centromere is placed at the very end of the chromosome, and not found in many species. The **key difference** between the acrocentric and the telocentric chromosomes are based on the positioning of the centromere in the chromosome. **In Acrocentric chromosomes, the centromere is placed away from the midpoint giving rise to a very short and a very long part respectively whereas, in telocentric chromosomes, the centromere is positioned at the very end of the chromosome, making the two arms hard to be distinguished.**

## What are Acrocentric Chromosomes?

Acrocentric chromosomes are the chromosomes in which the centromere of the chromosome is placed towards one end of the chromosome, and away from the middle point of the chromosome. This positioning of the centromere will give rise to an exceptionally short part and an extremely long part of the chromosome.

The centromere of the chromosome plays an important role in maintaining the structure of the chromosome, as well as during the cell division process. The centromere is a region of DNA that holds the two sister chromatids together in place. It is also required during the spindle formation process in the cell division phase, either for [mitosis or meiosis](#).

The acrocentric chromosomes have either a combination of a very short p arm and a very long q arm or vice - versa. They also have a condensed DNA part at the end of the chromosome which forms a bulb at the end of the chromosome that is referred to as the 'sat - chromosome'. The sat - chromosome is a secondary constriction found in almost all acrocentric chromosomes.



**Figure 01: Acrocentric Chromosomes**

In humans, the chromosomes numbered 13, 15, 21 and 22 are in the confirmation as acrocentric chromosomes and are identified upon karyotyping using [Giemsa staining](#). Acrocentric chromosomes were first identified in the genus *Acrididae* (commonly referred to as ‘Grasshoppers’). Acrocentric chromosomes also participate in acrocentric translocations also referred to as Robertsonian translocation that leads to the development of a [mutation](#).

## What are Telocentric Chromosomes?

Telocentric chromosomes are the rarest type of chromosomes. They are not found commonly in humans. They can be found in very few species such as in mice etc. Telocentric chromosomes are the chromosomes where the centromere is placed at the extreme end or on the tip of the chromosome. Due to this positioning of the centromere, the telocentric chromosomes do not have the characteristic p and q arms of the chromosome structure. Therefore, telocentric chromosomes have only one arm and appear as a rod-like structure.

The name of the telocentric chromosome is derived from the fact that the centromere is situated in the telomeric regions of the chromosomes. The structure of the telocentric chromosome can be deduced by karyotyping after Giemsa staining.

# What are the Similarities Between Acrocentric and Telocentric Chromosomes?

- Both types are composed of highly compact DNA.
- Both structures are categorized based on the position of the centromere.
- Both structures can be identified by karyotyping using Giemsa
- Both structures can be subjected to different chromosomal aberrations or mutations leading to different health complications.

# What is the Difference Between Acrocentric and Telocentric Chromosomes?

Endocrine vs Exocrine	
Acrocentric chromosomes are the chromosomes in which the centromere is placed away from the centre thereby giving rise to one very long part and one very short part in the p and q arms.	Telocentric chromosomes are the chromosomes in which the centromere is placed at the very end of the chromosome, and not found in many species.
Structure	
An acrocentric chromosome is composed of one extremely short part and an extremely long part.	Telocentric chromosomes are rod-shaped.
Presence in Humans	
Acrocentric chromosomes are present in humans.	Telocentric chromosomes are absent in humans.
Presence of sat-Chromosomes	
Present in acrocentric chromosomes.	Absent in telocentric chromosomes.
Presence of p and q arms	
p and q arms can be observed; in some cases, the short arm can be barely observed in acrocentric chromosomes.	Only one arm is observed in telocentric chromosomes

# Summary - Acrocentric vs Telocentric Chromosomes

Chromosomes made up of DNA store the genetic information of an organism. Based on the placement of the centromere, chromosomes can be categorized into four main classes. Out of them, acrocentric and telocentric chromosomes are two types. Acrocentric chromosomes are found in humans, and the centromere is placed at the far end of the chromosome away from the midpoint. Thus, it results in one extremely short and one extremely long arm. Telocentric chromosomes are not present in humans, and the centromere is placed in the tip of one arm. Therefore, it does not have a distinct p and a q arm. This is the difference between acrocentric and telocentric chromosomes.

## Reference:

1. "Easy Biology Class." Easybiologyclass. [Available here](#)
2. "Types of Chromosomes." BiologyWise. [Available here](#)

## Image Courtesy:

1. 'Human chromosome 15 from Gene Gateway - with label' By Office of Biological and Environmental Research of the U.S. Department of Energy Office of Science, the Biological and Environmental Research Information System, Oak Ridge National Laboratory (Public Domain) via [Commons Wikimedia](#)

## How to Cite this Article?

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