

# Difference Between Repetitive DNA and Satellite DNA

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## Key Difference – Repetitive DNA vs Satellite DNA

Genomic DNA is mainly composed of coding DNA and noncoding DNA. Coding sequences are known as genes. Thousands of genes are located on chromosomes. Repetitive DNA, introns and regulatory sequences are considered as noncoding DNA in the genome. Repetitive DNA is the nucleotide sequences repeating over and over again in the genome of the organisms. Repetitive DNA accounts for a significant fraction of genomic DNA and is categorized into three main types named tandem repeats, terminal repeats, and interspersed repeats. Tandem repeats are highly repetitive in the genome. One type of tandem repeats is satellite DNA. The key difference between repetitive DNA and satellite DNA is that **repetitive DNA is the repeated sequences of DNA in the genome** while **satellite DNA is a type of repetitive DNA which is highly repeated and located mostly in the heterochromatic region around the centromere**.

## What is Repetitive DNA?

Repetitive DNA has repeated nucleotide sequences over and over again. Repetitive DNA is also known as **repetitive elements** or **repeats**. Repetitive DNA occupies a significant fraction of the total genome of many organisms. The human genome contains more than a two-thirds sequence of repetitive DNA. These do not code proteins and belong to the category of noncoding DNA of the genome.

There are three **major types of repetitive DNA** named terminal repeats, tandem repeats and interspersed repeats. **Tandem repeats** are the highly repeated sequences which lie adjacent to each other. There are three types of tandem repeats called satellite DNA, minisatellite DNA and microsatellite DNA. **Interspersed repetitive DNA** is repetitive sequence dispersed throughout the genome as single units with unique flanking sequences. There are two types of interspersed DNA named transposons and retrotransposons. They originate due to the ability of transposition within the

genome. Retrotransposons belong to the class 1 transposable elements and follow copy and paste mechanism to integrate into the genome. Transposons belong to class 2 transposable elements as they follow cut and paste mechanism to move along the genome.

Though repetitive DNA is not coded for proteins, they are important for different functions in the genome. Repetitive DNA is essential to format expression of unique coding sequences and to provide additional functions needed for genome [replication](#) and accurate transmission into daughter cells, etc. Repetitive DNA also provides a significant fraction of scaffolding or matrix attachment regions, showing its necessity in organizing the genome of organisms.

## **What is Satellite DNA?**

Satellite DNA is a type of repetitive DNA which is highly repeated. They belong to the category of repetitive DNA called tandem repeats. Satellite DNA are tandemly repeated and located in the [centromere](#) and telomere regions of chromosomes. One short repeating unit of satellite DNA ranges from 5 to 300 base pairs, depending on the species. They repeat normally  $10^5$  to  $10^6$  times in the genome. In mammalian genome, satellite DNA accounts for 10 – 20% fraction.

Satellite DNA does not code for proteins and does not convey functional genetic information. They contribute to the chromosomal organization as they serve the main component of the functional centromeres and as the main structural constituent of [heterochromatin](#).

Satellite DNA differs in density with the majority of DNA. Hence, it gives a separate band during ultracentrifugation. There are different types of satellite DNA known as alphoid DNA, beta, satellite 1, satellite 2, satellite 3 etc.

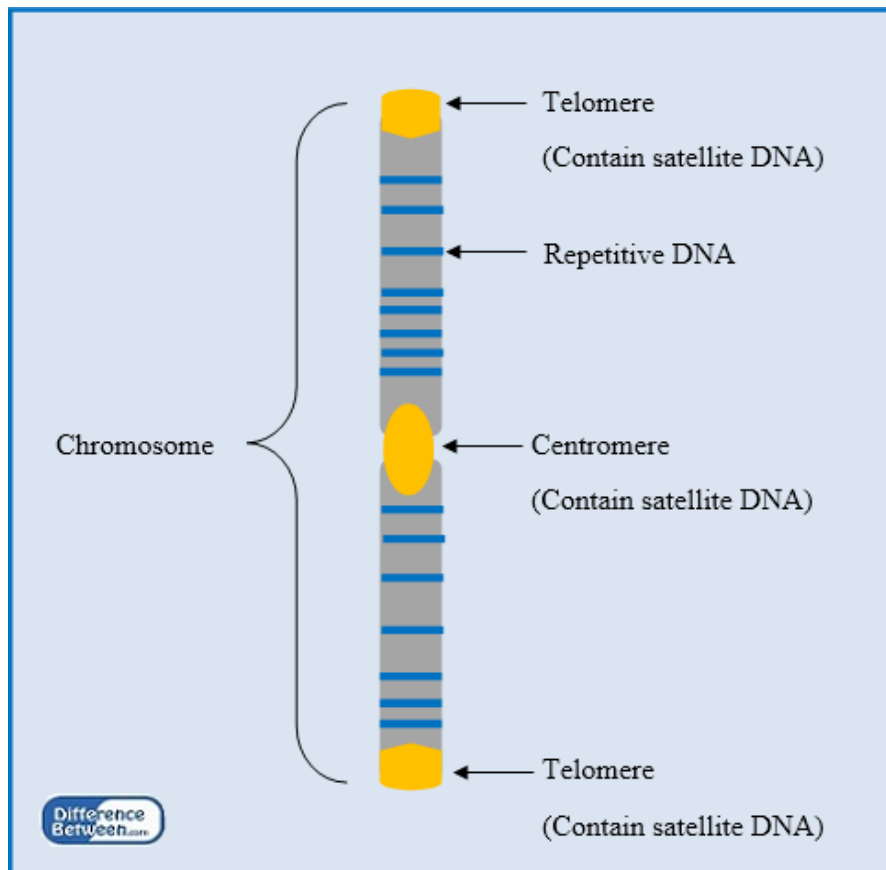


Figure 01: Repetitive DNA and satellite DNA

## What is the difference between Repetitive DNA and Satellite DNA?

Repetitive DNA vs Satellite DNA	
Repetitive DNA is the nucleotide sequences repeated many times in the genome of organisms.	Satellite DNA is one type of repetitive DNA that is repeated millions of times in the genome.
Types	
There are three main types such as terminal repeats, tandem repeats, and interspersed repeats.	Satellite DNA is classified into different types such as alphoid, beta, saterllite1, 2 and 3, etc.
Location	
Repetitive DNA is located throughout the genome.	Satellite DNA is located in centromere and telomere regions of the chromosome.

## Summary – Repetitive DNA vs Satellite DNA

Genomes are organized into different types of DNA. Coding sequences among them are stored with genetic information to synthesize proteins. Other non-coding sequences provide structural and additional functions for DNA replication, chromosome structure maintenance, etc. Repetitive DNA is a type of noncoding DNA which is repeated over and over again within the genome. Repetitive DNA have different types and satellite DNA, which are located in the centromere and telomere regions of the chromosomes, is one type of them. This is the difference between repetitive DNA and satellite DNA.

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