

# **STRUCTURE AND FUNCTION OF CHROMOSOMES**

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# DEFINITION OF CHROMOSOME

It is a combination of two words, i.e., “**Chroma**”-means ‘**colour**’ and “**Somes**”-means ‘**body**’.

So the coloured thread like bodies present in the nucleoplasm of the living cells, which helps in the inheritance (transmission) of characters in form of Genes from generation to generation are known as **CHROMOSOMES**.



# NUMBER OF CHROMOSOMES

The number of chromosomes per organism is always a definite number, Which is said as Diploid (2n) no., but gametes, sperms, ova etc. carry Haploid (n) number. Some examples are given below.

Name of the <u>organism</u>	Diploid No. <u>(2n)</u>	Name of the <u>organism</u>	Diploid No. <u>(2n)</u>
Human beings	---- 46	Onions	----- 16
Cat	---- 38	Corn	----- 20



# PHYSICAL STRUCTURE

❖ Size varies from 1 to 30 micron in length and diameter from 0.2 to 2 micron.

❖ **CENTROMERE:-** The non-stainable part of the chromosome making a primary constriction.

❖ **CHROMATIDS:-** Two chromatids join at the centromere to form a chromosome.

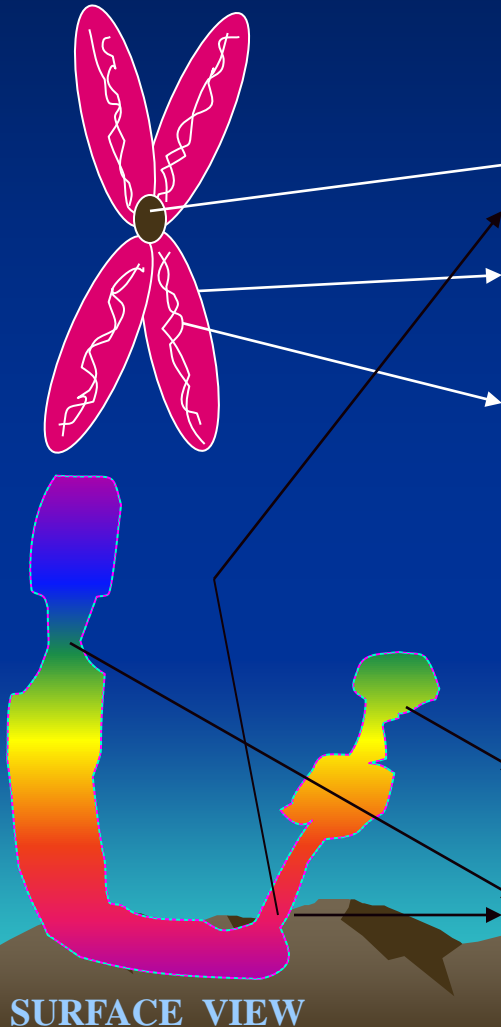
❖ **CHROMONEMA:-** In each chromatid, there are two longitudinal chromonemata coiled with each other.

❖ **CHROMOMERES:-** In each chromonemata, there are “bead” like chromomeres present through out the coil.

❖ **GENES:-** Each chromomeres contains genes, the unit of inheritance of character.

❖ **SATELLITE:-** In some chromosomes a round and elongated satellite is present.

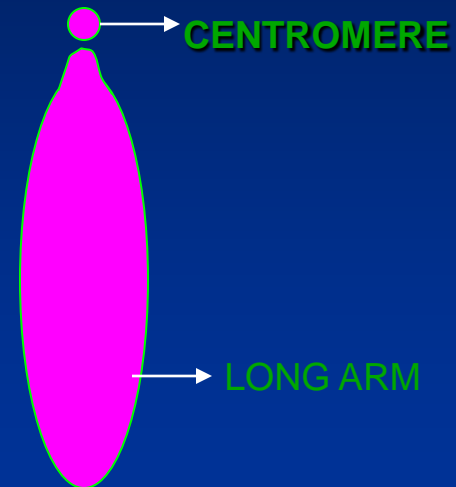
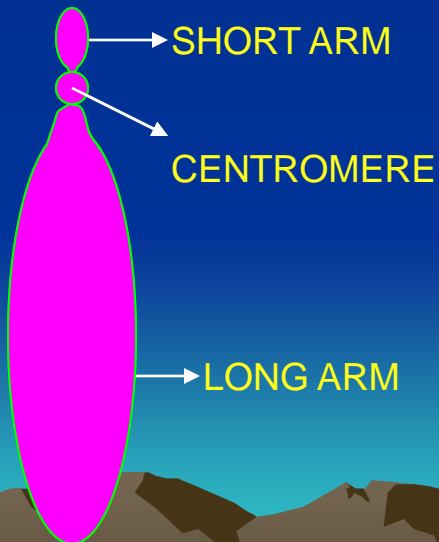
❖ **CONSTRICTION:-** Presence of centromere shows the primary constriction. But in some cases there is an additional Secondary Constriction



SURFACE VIEW

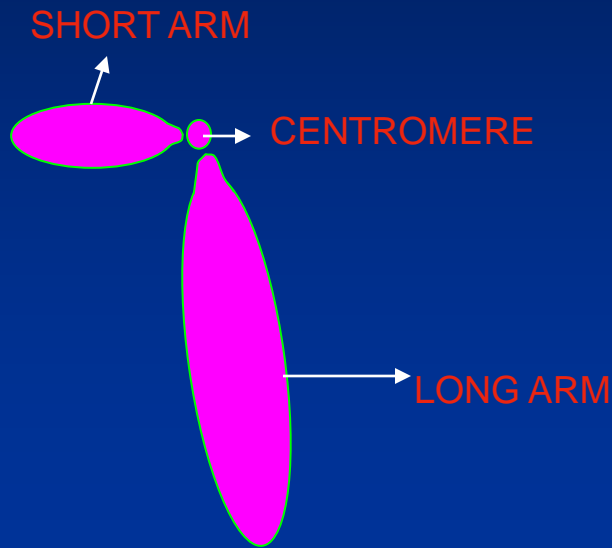
# TYPES OF CHROMOSOMES

1. **TELOCENTRIC**:- The centromere is present at the end of the chromosomes.



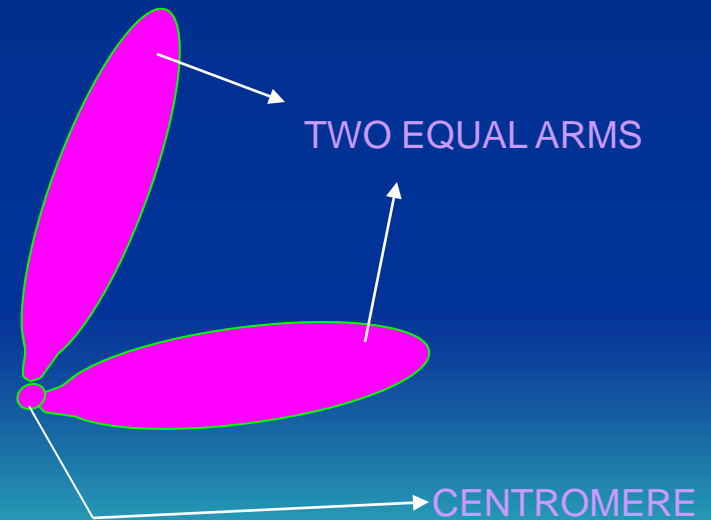
2. **ACROCENTRIC**:-The centromere is almost terminal. It has one large and another very small arm.

# TYPES OF CHROMOSOMES



3. **SUB-METACENTRIC**:- Here the centromere is not at the middle position of the chromosomes. So the arms are unequal and it is 'L-Shaped' in appearance.

4. **METACENTRIC**:- The centromere is at the middle position. So the arms are equal and it is 'V-Shaped' in appearance.



# CHEMICAL STRUCTURE

**Chemically the chromosomes are made of proteins and nucleic acids.**


**PROTEINS** → It is mainly Protamines, Histones and smaller amount of acidic proteins.

**NUCLEIC ACIDS** → It is de-oxy ribose Nucleic Acids (DNA). Genes are nothing but the segments of DNA.

# FUNCTION OF CHROMOSOMES



➤ The chromosomes are capable of self-duplication. During duplication process the DNA strands unwind. As unwinding starts, each template of DNA forms its complementary strand in double-helix nature. The conversion of the old DNA molecule into two new molecules, helps in duplicating the chromosomes.





# Function of chromosomes (continued)...



- They help in expression of different characters in an organism by synthesizing proteins in cells. A definite protein is accumulated to produce a definite character.



➤ **They transmit characters from generation to generation , i.e. parents to offspring.**

➤ **The chromosomes control the physiological and biochemical processes in the body of the organism.**

