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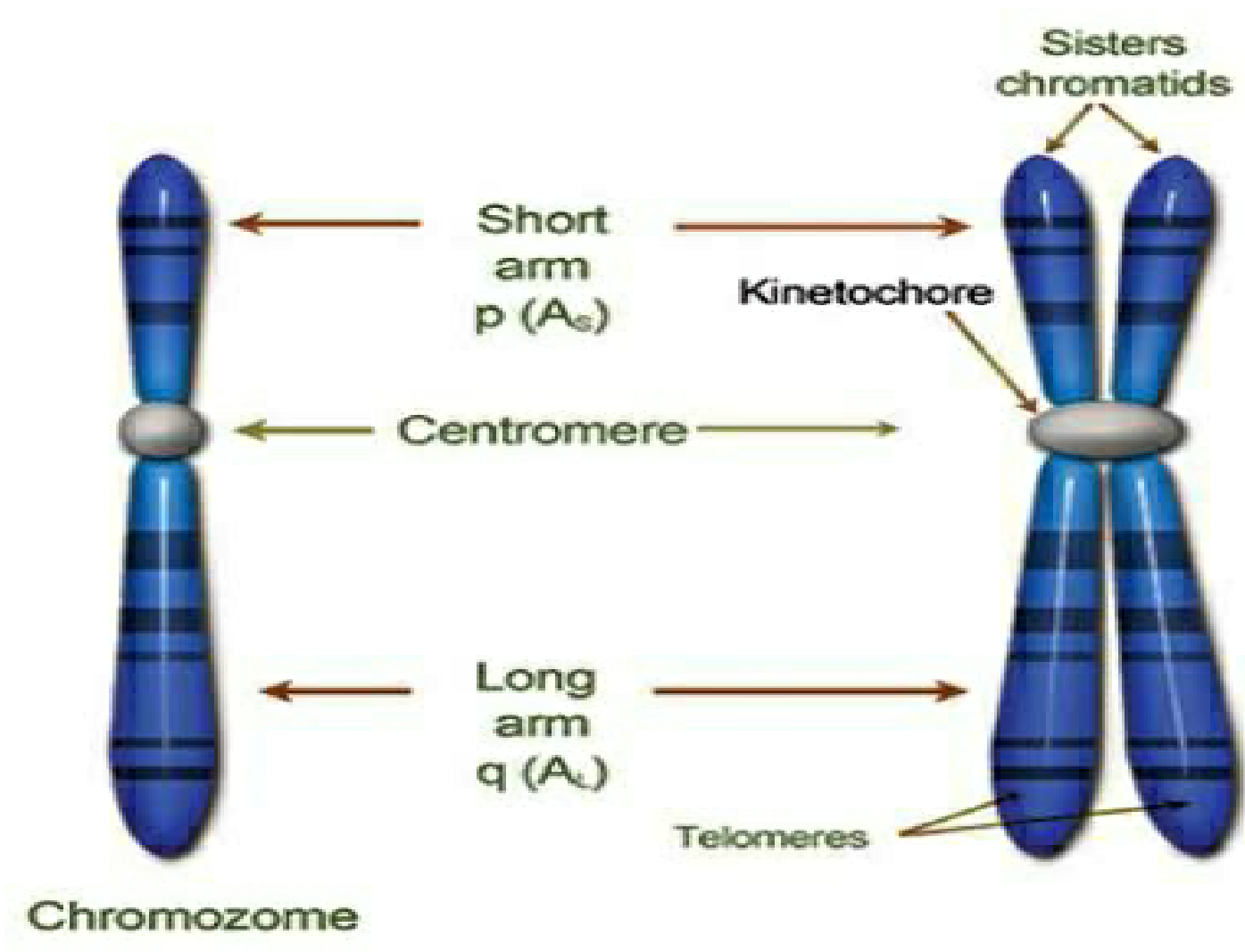
Date: 11th April, 2020

CORE CONCEPT OF

PART 1 SUBSIDIARY / GENERAL

CELL BIOLOGY

STRUCTURE OF CHROMOSOME



INTRODUCTION - Initially the term **CHROMATIN** was introduced by Fleming 1879 for deeply stain material of the nucleus. Waldeyer in the year 1888 proposed the name chromosome for thread like structure noticed



during nuclear division. They are made up of nucleoprotein i.e nucleic acid (DNA and RNA) and proteins. The chromosomes are the carriers of genes (DNA) and hence constitute the physical basis of heredity.

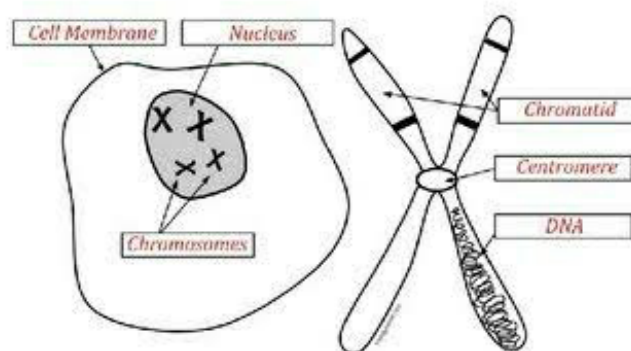
CHROMOSOME NUMBER

The different species of plants and animals have specific number of chromosomes. The somatic cell contain two sets of chromosomes (diploid, $2n$). The gametes usually contain only one set of chromosomes (haploid, n). Among the animals, lowest number reported from *Ascaris* ($n=1$) and highest from *Radiolaria* ($n= 800$) Among the plants lowest number has been, found in *haplopappus* ($n=2$) and highest in *Ohioglossum reticulatum* ($n = 630$).

CHROMOSOME SIZE - Except some special types, the chromosome size normally varies from as short as 0.25μ in fungi and birds to as long as 30μ in some plants like *Trillium* (longest chromosome in plant Kingdom). The largest ones are the lampbrush chromosomes (more than 5900μ long).

CHROMOSOME STRUCTURE -

1. Morphologically each chromosome consists of two chromatids held together at the kineto chore (Centromere).
2. The centromere appears as a contraction in the chromosome called primary constriction to which spindle fibres get attached.
3. The regions of the chromosomes just adjacent to the centromere are called "chromocentres".
4. Each chromosomes has a membranous covering called "pellicle".
5. The number of centromere / chromosome may vary from one to two or many (monocentric or dicentric or polycentric).
6. The Terminal ends of the chromosomes are called telomeres.
7. The chromosomes which loose their centromeres are called acentric.
8. Normally each set of genome at has at least one dicentric chromosome with a secondary constriction. This region is called "nucleolar organiser" because it is necessary for the formation of nucleolus.
9. A chromosome, on the basis of position of centromere i.e. the relative length of the two arms may be -
(A) **Isobrachial** - Centromere in the middle, both arms equal, also called metacentric.





(B)

Heterobracheal -

Centromere not in middle, both arms unequal, These again may be -

1. Submetacentric

- Centromere slightly away from middle. One arm slightly longer than the other.

2. Aerocentric -

Centromere much away from middle. One arm very long and other very short.

3. Telocentric -

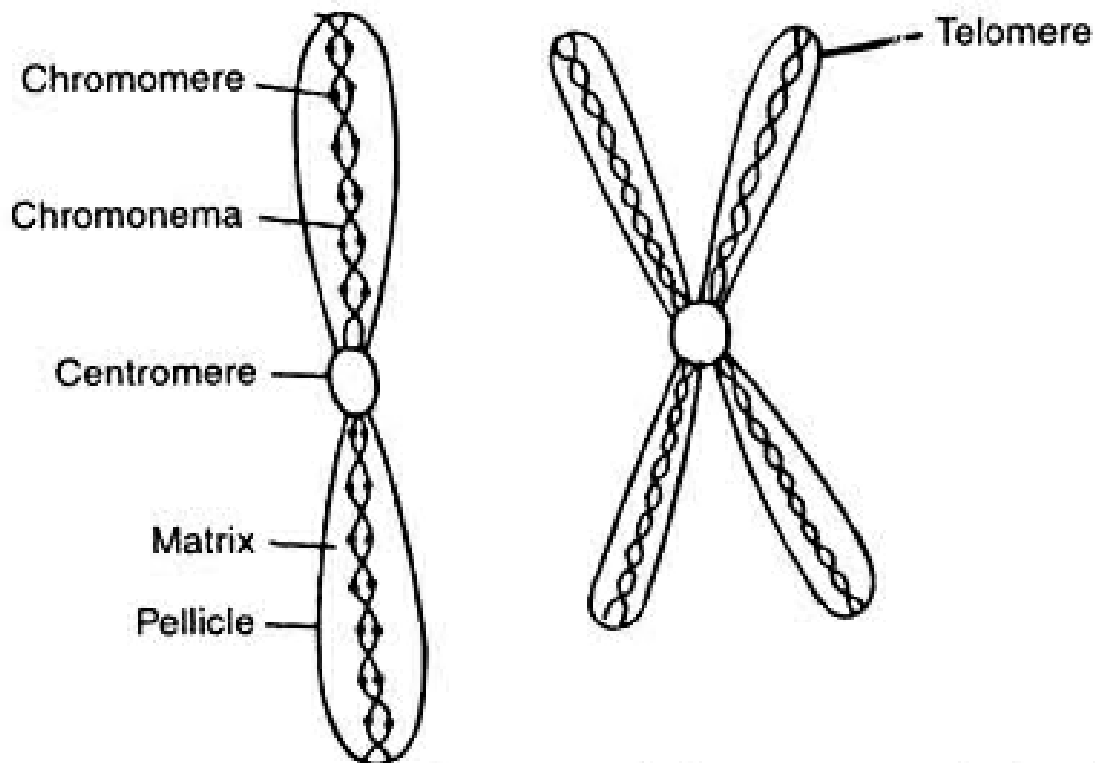
Centromere approaching the end.

10. The two chromatids all along their length contain dense bead like Swellings called chromomeres.

HETEROPYCNOSIS - It is the process of differential coiling in which certain chromosomes or parts of a chromosome are more condensed than the other. The chromosome may be -

(I) **Paranemic**

(II) **Plectonemic**



A simplified structure of chromosome and chromatid.