13. Describe the structure of the following withthe help of labelled diagrams.
(i) Nucleus (ii) Centrosome
Solution:
(i) Nucleus: Nucleus is double membrane bound principle cell organelle which contains all genetic information for controlling cellular metabolism and transmission of genetic information.
Nucleus is differentiated into following four parts:
(a) Nuclear envelope: It is a double membrane bound envelope that surround the nucleus and separates the latter from the cytoplasm.
(b) Nucleoplasm: Itis clear, non-staining, fluid material present in the nucleus, which contains raw materials (nucleotides), enzymes (DNA/RNA polymerases) and metal ions for the synthesis of RNAs and DNA. The nuclear matrix or the nucleoplasm is composed of nucleolus and chromatin.
(c) Nucleolus: It is a naked, round and slightly irregular structure, which is attached to the chromatin at a specific region. It is a site for active ribosomal RNA synthesis.
(d) Chromatin : It has the ability to get stained with certain basic dyes. It is known to be the hereditary DNA protein fibrillar complex. The chromatin fibres are distributed throughout the nucleoplasm.

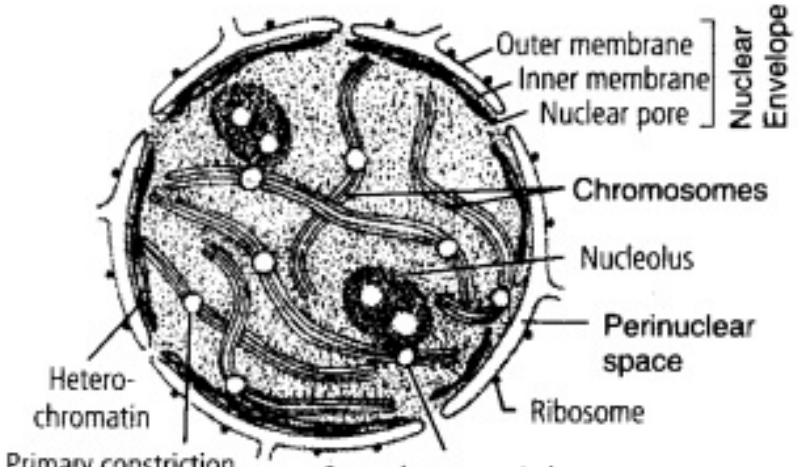

Fig : Nucleus

(ii) Centrosome: Centrosome is an organelle usually containing two cylindrical structures called centrioles. They are surrounded by amorphous pericentriolar materials. Both the centrioles in a centrosome lie perpendicular to each other. They are made up of nine evenly spaced peripheral fibrils of tubulin protein. Each of the peripheral fibril is a triplet. The adjacent triplets are also linked. The hub of centriole is connected with tubules of the peripheral triplets by radial spokes made of protein.

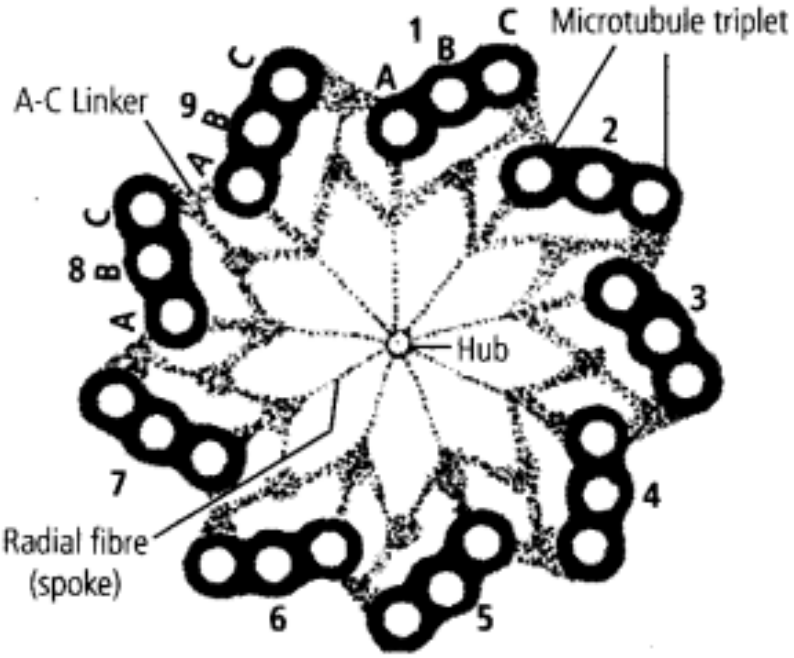

Fig : T. S. of centriole

14. What is a centromere? How does the position of centromere form the basis of classification of chromosomes. Support your answer with a diagram showing the position of centromere on different types of chromosomes.

Solution: A chromosome consists of two identical halves, the chromatids held together at one point called the centromere. The centromere is also called as primary constriction. On its side a disc shaped structure called kinetochore is present. Chromosomes are classified into four types according to position of centromere on the chromosome.

(i) Metacentric chromosome: In this chromosome, centromere is in the middle and the two arms are almost equal in length.

(ii) Submetacentric chromosome: The centromere is slightly away from middle point so one arm is slightly shorter than the other.

(iii) Acrocentric chromosome: The centromere is near the end and one arm is extremely short and other arm is extremely long.

(iv)Telocentric chromosome: Centromere is at the tip of chromosome. These chromosomes are not present in humans.

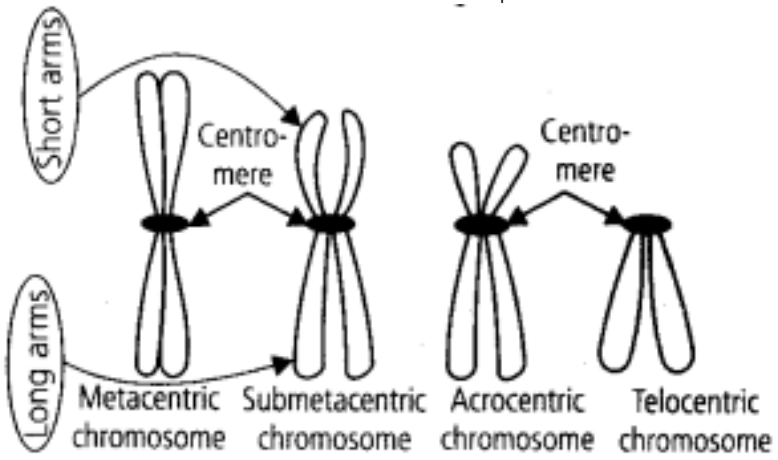

Fig : Types of chromosomes

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