LAMP BRUSH CHROMOSOME

Lampbrush chromosomes were first discovered in Salamander egg cells (Amblystoma maculatum) by Flemming in 1882. Ruckert in 1982 introduced the term lampbrush chromosome ~~into~~ in Shark egg cells. lampbrush chromosomes are a special form of chromosome found in the growing oocytes (immature egg) of most animal, except mammals.

Chromosomes transform into the lampbrush form during the diplotene stage of meiotic prophase due to an active transcription of many genes. They are highly extended meiotic bivalents, each consisting of 2 sister chromatids. lampbrush chromosomes are clearly visible even in the light microscope where they are seen to be organized into a series of chromomeres chromomeres with large chromatin loops extended laterally. Each lateral loop contains one or several transcription units with polarized RNP matrix coating the DNA axis of the loop.

Giant chromosomes in the lampbrush form are useful model for studying chromosome organization, genome function and gene expression during meiotic prophase, since they allow the individual transcription units to be visualized. Here over lampbrush chromosomes are widely used for high resolution mapping of DNA sequences and construction of detail cytological maps of individual chromosomes. Exciting prospects are offered by the possibility of using LBC's in studies of cytogenetic investigation of Karyotypes evolution and genome mapping.

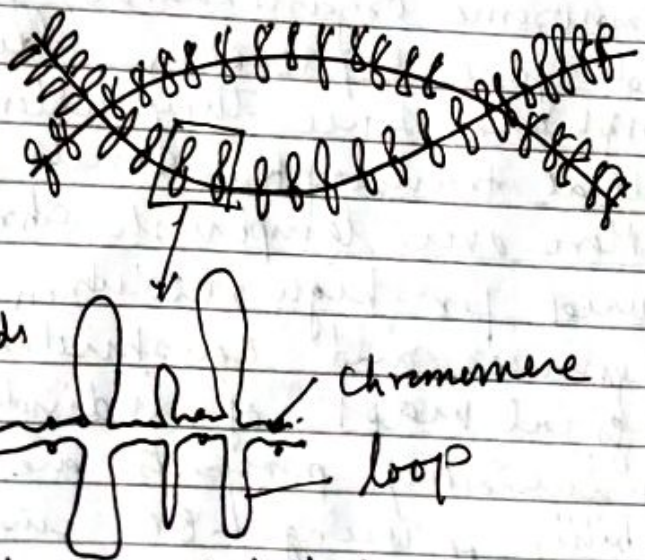
Structure of lampbrush Chromosomes

In the early prophase, a LBC is a bivalent that consists of two pairs of conjugating homologous, forming a tetrad. Each chromatid is composed of alternatively positioned regions of condensed inactive chromatin and side loops of decondensed chromatin. In the homologous sections of the bivalent, chromatin is condensed (Spirally twisted) or decondensed in the form of side loops - two per each chromosome and pairs at the level of the bivalent. The loop constitutes the part of the chromosome axis. It is extensible as well as contractible. The contractibility of the loop results in the contraction and dilation of the chromosome (Angelier et al 1994)

In terms of transcriptional activity, there are two basic loop types

1/ Complex loops - (loop forms) have a matrix with a very complicated morphological structure they are also called marker loops that enable chromosome identification or side loops

2/ Plain loops - They constitute the majority of chromosome loops and have a delicate fibrous matrix



by showing detailed structure of lampbrush.

Function of Lampbrush chromosome -

Lampbrush forms are useful model for studying chromosome organisation, genome function and gene expression during meiotic prophase. Since they allow the individual transcription units to be visualised. They are also used for high resolution mapping of DNA sequences and construction of detailed cytological maps of individual chromosomes.

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