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What is a Lampbrush Chromosome :

The lampbrush chromosome is the largest type of chromosomes that especially occurs in the growing oocytes of vertebrates except for mammals and in some invertebrates. The cells with lampbrush chromosomes have a high volume in the nucleus and the cytoplasm. Generally, the detailed structure of the lampbrush chromosomes can be observed during the diplotene stage. These chromosomes are visible as large loops of DNA, resembling a lampbrush. Moreover, the lampbrush chromosomes are visible under the light microscope.

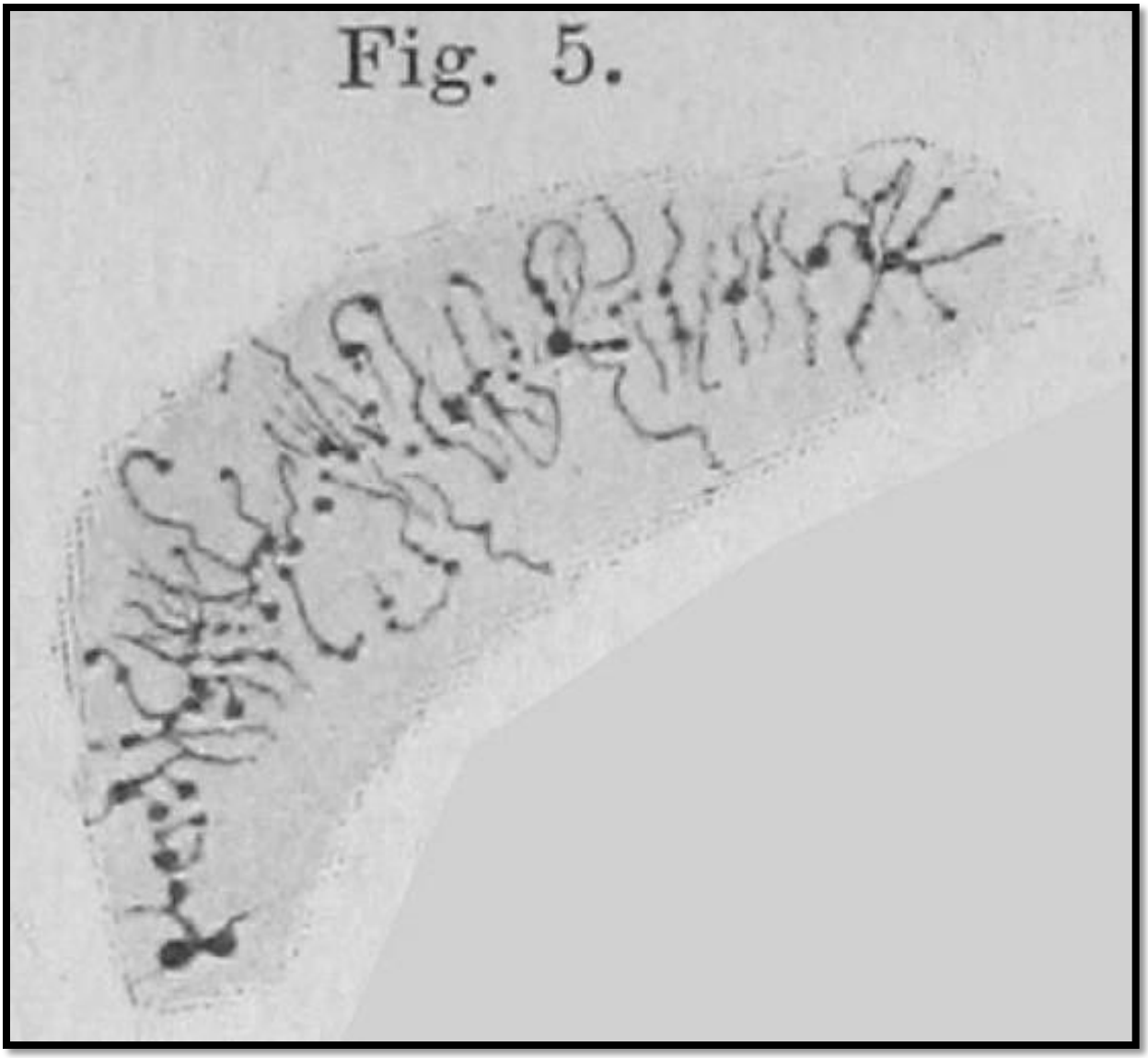

Figure 1 Lampbrush Chromosome from the Cell Nucleus of an Ovarian Egg from Triton, a Salamander Species

Furthermore the cells with lampbrush chromosomes have a High volume in the nucleus and the cytoplasm. Generally, the detailed structure of the lampbrush chromosomes can be observed during the diplotene stage. These chromosomes are visible as large loops of DNA, resembling a lampbrush. Also, the lampbrush chromosomes are visible under the light microscope. On the other hand, transcription in the lampbrush chromosome can occur along the whole loop. Therefore, one loop resembles a long operon with repetitive cistrons. Moreover, these chromosomes show a high level of gene expression.

Similarities Between Polytene and Lampbrush Chromosome

- Polytene and lampbrush chromosomes are two types of giant chromosomes.
- They decondense during the interphase.
- Moreover, they actively undergo transcription.
- During metaphase, they are very long and thick.

Fig.

Differencebetween Polyetene & Lampbrush Chromosome :

Polytene chromosome :

Polytene chromosome refers to a giant, cross-banded chromosome, which results from multiple replications of its genetic material with the duplicated chromatin strands remaining closely associated while lampbrush chromosome refers to a greatly enlarged diplotene chromosome, which has apparently filamentous granular loops extending from the chromomeres.

The polytene chromosome was discovered by E. G. Balbiani in 1881 while the lampbrush chromosome was first discovered by Walther Flemming in 1882.

Occurrence

Moreover, the place of occurrence is the main difference between polytene and lampbrush chromosome. That is; the polytene chromosomes occur in the salivary glands and other tissues of insects, while the lampbrush chromosomes occur in the oocytes of vertebrates except for mammals and some invertebrates.

Size

A polytene chromosome is smaller than the lampbrush chromosome, while the lampbrush chromosome is the largest type of chromosomes.

Visibility

Furthermore, another important difference between polytene and lampbrush chromosome is

that the polytene chromosomes are visible during the interphase and prophase of mitosis, while the lampbrush chromosomes are clearly visible during the diplotene stage of mitosis.

Microscope

Besides, the polytene chromosome is visible under the compound microscope while lampbrush chromosome is visible under the light microscope.

Appearance

While polytene chromosomes contain many longitudinal strands called chromomenta, lampbrush chromosomes contain a series of large, laterally extended loops.

Method of Transcription

The functional state of polytene chromosomes differs according to the development stage, while each loop of the lampbrush chromosome serves as a long operon.

Conclusion

A polytene chromosome is a type of giant chromosome that occurs in insects. It is clearly visible during the interphase and prophase. Also, these chromosomes contain many longitudinal strands. On the other hand, lampbrush chromosome is the largest type of chromosomes. However, it occurs in the oocytes of vertebrates except in mammals and in some invertebrates. In contrast, lampbrush chromosome contains

laterally-extended loops. However, both polytene and lampbrush chromosomes are two types of giant chromosomes, which are actively undergoing transcription. Hence, the main difference between polytene and lampbrush chromosome is their structure and occurrence.

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