TOPIC: OBELIA:MORPHOLOGY AND LIFE HISTORY-III

LECTURE NO:15

B.SC PART 1

ZOOLOGY(HONS.)-PAPER I-GROUP A

CHAPTER 5

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AUTHOR-DR.NIRMAL KUMARI

Nutrition:

Medusae are carnivorous and the processes of their nutrition are essentially the same as in the polyp. The food consists of living animals or bodies of animals.

Digestion is both extracellular and intracellular. Extracellular digestion occurs in the main part of the gastro vascular cavity and is purely proteolytic. Hyman (1940) has shown that although food particles are distributed throughout the gastro vascular cavity, most intracellular digestion takes place in the manubrium, in the stomach and in tentacular bulbs.

The digested food is distributed to the entire medusa through the system of radial and circular canals.

Muscular system:

The muscular system of medusa is somewhat more specialised than in the polyp. The gastro dermal cells lack contractile extensions, and the muscular system is, thus, restricted to the epidermal layer. Furthermore, the muscular system is best developed around the bell margin and sub umbrella surface where the fibres form a radial and circular system.

Some of the epitheliomuscular cells of the velum have their contractile extensions oriented to form a powerful circular band of fibres which are striated. The contractions of the muscular system, particularly of circular fibres produce pulsation of the bell.

The swimming movement of the medusa is dependent base on these pulsations and is largely vertical in lamella direction. Horizontal movement is dependent upon water currents.

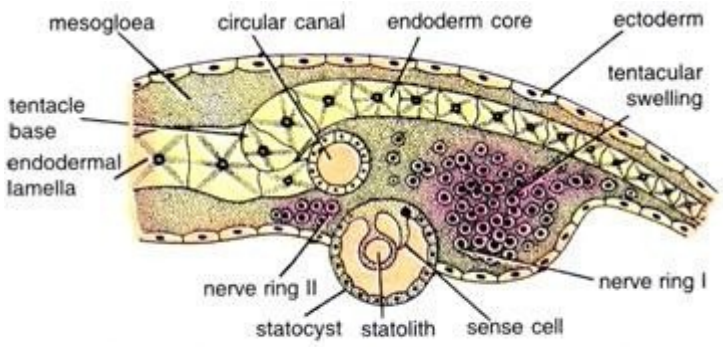

Fig. 32.9. *Obelia*. L.S. of the base of an adradial tentacle of medusa.

Nervous system:

The nervous system of medusa is more highly specialised than that of the polyp. In the margin of the bell, the epidermal nerve cells are usually organised and concentrated into two nerve rings, one above and one below the attachment of the velum.

The nerve rings connect with fibres innervating the tentacles, the musculature, and the sense organs. Fibres also interconnect the two rings. The lower ring is the centre of rhythmic pulsations, i.e., it contains the pacemakers. Pulsation will continue in the bell as long as any portion of the ring is intact. It is with the lower ring that the statocysts are connected.

Sense organs:

The bell margin is richly supplied with sensory cells and also contains two types of true sense organs, viz., light sensitive ocelli and statocysts. The ocelli consist of patches of pigment and photoreceptor cells organised either within a flat disc or a pit. The ocelli are typically located on the side of the tentacular bulbs.

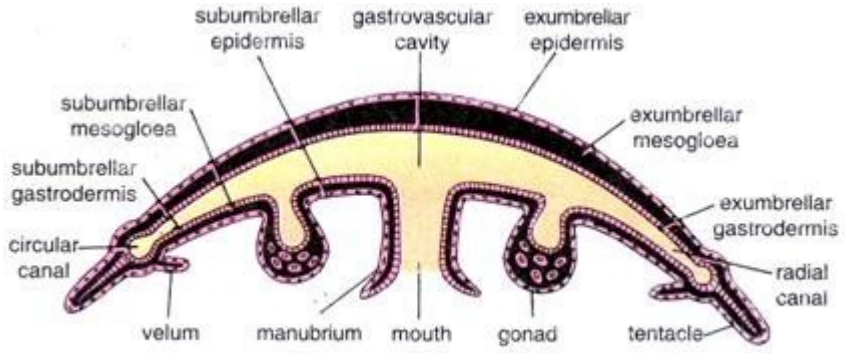

Fig. 32.10. *Obelia*. V.S. of medusa showing gonads.

Statocysts are located between the tentacles or associated with the tentacular bulb at the tentacle base. They may be either in the form of pits or closed vesicles but in both cases, the walls contain sensory cells with bristles projecting into the lumen. Attached to the bristles are from a few to many calcareous concretions known as statoliths.

The statocysts act as organs of equilibrium. When the bell tilts, the statoliths respond to the pull of gravity and stimulate the sensory bristles to which they are attached. The animal may then respond by muscular contractions to bring itself back into a horizontal position.

Reproductive organs:

The medusae are sexual or reproductive zooids possessing gonads. The medusae are dioecious, they have either four testes or four ovaries in the sub-umbrella just below the radial canals. A gonad has an outer ectoderm and inner endoderm with

mesogloea between the two layers. The gonad has a small diverticulum of the radial canal.

The germ cells of Obelia do not arise in the gonads, they arise from interstitial cells of the ectoderm of the blastostyle where they may be seen in various stages of maturation, then they migrate into the medusa, then through the radial canals they take up their position in the ectoderm of the gonads. When germ cells mature, the gonads rupture and spermatozoa and ova are discharged externally into water.