

Quadrant II – Transcript and Related Materials

Programme: Bachelor of Science (First Year)

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Paper Title: Diversity of Non-Chordates and Cell Biology

Unit: 3

Module Name: Phylum Cnidaria- General Characters (Part- II)

Module No: 11

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General characters of Phylum Cnidaria: (Cont.)

Cnidarians exhibit the phenomenon of polymorphism with very few exceptions.

Polymorphism refers to the occurrence of structurally and functionally more than two different types of individuals within the same organism.

Animals in this phylum display two distinct morphological body plans: polyp and medusa. An example of the polyp form is *Hydra* spp.; perhaps the most well-known medusoid animals are the jellies (jellyfish).

The polyp is asexual form which is tubular and usually remains fixed to the aboral end and the free end (mouth) of the polyp possesses a conical elevation, called hypostome with tentacles surrounding it.

The free-swimming medusa is sexual form which is bell-shaped or saucer-shaped with dorsal convex ex-umbrellar surface and a ventral concave sub-umbrellar surface with the mouth and tentacles hanging in downward direction.

Skeleton is either exoskeleton or endoskeleton. In medusae the only supporting structure is the mesoglea. In some colonial polyps, a chitinous periderm gives support and some protection to the connecting sections and to the lower parts of individual polyps. Stony corals secrete massive calcium carbonate exoskeletons.

Cnidarians are usually carnivorous.

Digestion is extracellular as well as intracellular and anus is not found. Once the food is in the digestive cavity, gland cells in the gastroderm release enzymes that reduce the prey to slurry.

This circulates through the digestive cavity and in colonial cnidarians, through the connecting tunnels, so that gastroderm cells can absorb the nutrients.

The circulation of nutrients is driven by water currents produced by cilia in the gastroderm or by muscular movements or both, so that nutrients reach all parts of the digestive cavity. Nutrients reach the outer cell layer by diffusion.

There are no respiratory organs, and both cell layers absorb oxygen from and expel carbon dioxide into the surrounding water.

Excretory system is absent so the indigestible remains of prey are expelled through the mouth. The main waste product of cells internal processes is ammonia, which is removed by the external and internal water currents.

Nervous system consists of one or more networks or nerve-cells and neurites located in the ectoderm and endoderm. Besides nerve nets, medusae have nerve rings and ganglia around the margin of the bell.

Sensory structures like statocysts occur in the medusoid form. Medusa can sense tilt and acceleration by means of statocysts, chambers lined with hairs which detect the movements of internal mineral grains called statoliths. If the body tilts in the wrong direction, the animal rights itself by increasing the strength of the swimming movements on the side that is too low.

Most species have ocelli ("simple eyes"), which can detect sources of light.

All cnidarians can regenerate, allowing them to recover from injury and to reproduce asexually. Medusae have limited ability to regenerate, but polyps can do so from small pieces or even collections of separated cells.

Cnidarians are generally unisexual but some are bisexual.

Reproduction is by both asexual and sexual methods. Asexual reproduction occurs by budding, fission and fragmentation. Sexual reproduction occurs by formation of sperm and ova by male and female medusa.

The male and female gametes then join through external fertilization to produce zygote.

Cleavage may be complete or incomplete and usually radial.

Development is indirect and includes a free swimming ciliated larval stage called planula.

The life history exhibits the phenomena of alternation of generations which is also known as metagenesis in species having polyp and medusa phase. In this the asexual polypoid, sessile generation alternates with sexual medusoid, free-swimming generation.