

Echinodermata



DR SANJAY KUMAR SRIVASTAVA

Assistant Professor

DEPARTMENT OF ZOOLOGY

UDAI PRATAP COLLEGE, VARANASI

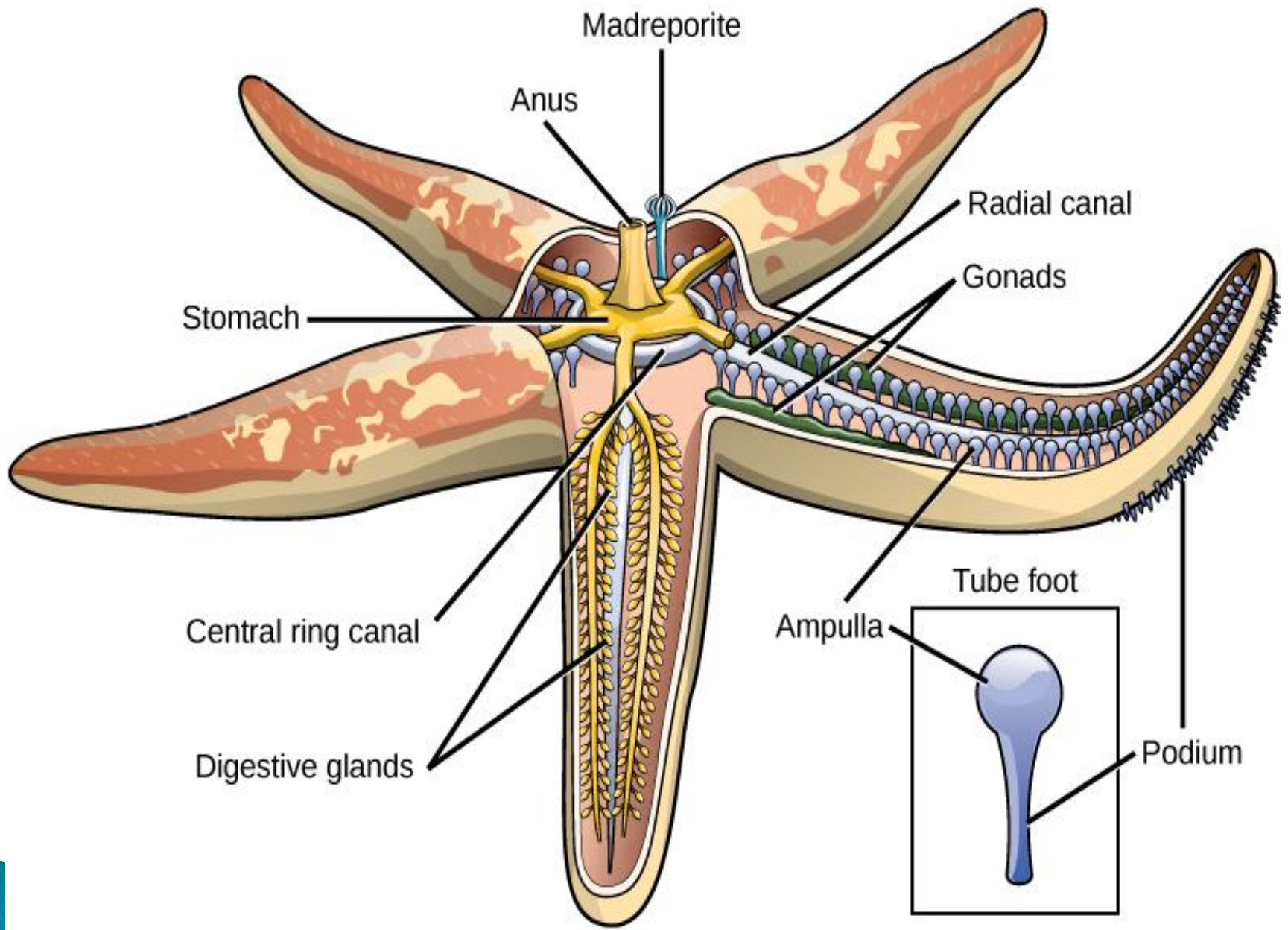
E-mail : drsanjay70@gmail.com

Echinodermata (from Ancient Greek, echinos means "hedgehog" and derma means "skin") of marine animals.

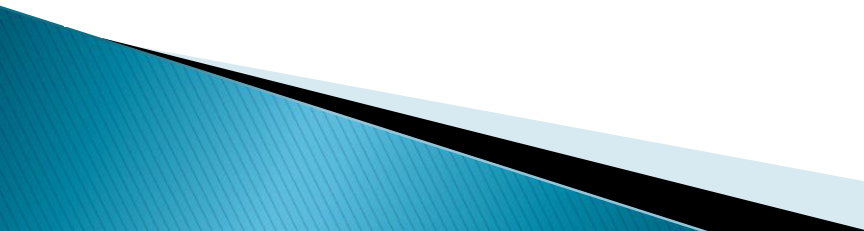
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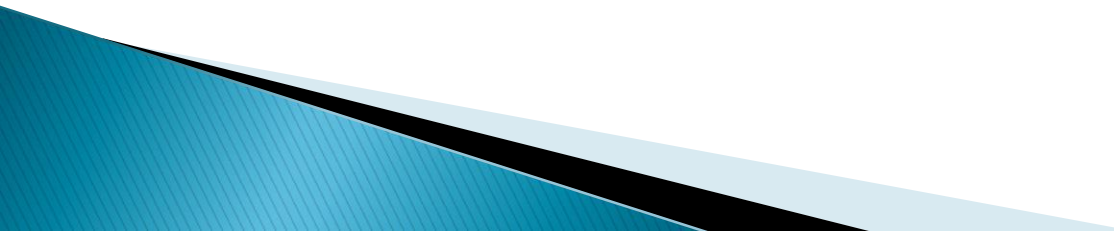
Echinodermata are so named owing to their spiny skin (from the Greek “echinos” meaning “spiny” and “dermos” meaning “skin”),

The Name Echinodermata given by **Bruguiere, in 1791** this phylum is a collection of about 7,000 described living species. Echinodermata are exclusively marine organisms. Because of the **echinoderm skeleton** is on the inside, it is called an endoskeleton. **Echinoderms** seem little more than a skeleton of tiny plates and water. **Echinoderms** don't use large muscles working on body parts like many other animals. Instead, they move, feed and breathe with a unique water-vascular system. They are a phylum of marine invertebrates which includes starfishes, sea urchins, brittlestars, crinoids, and sea cucumbers. They have fivefold radial symmetry, a calcareous skeleton, and tube feet operated by fluid pressure. **There is no freshwater or terrestrial echinoderms are known.** **Sea stars, sea cucumbers, sea urchins, sand dollars, and brittle stars are all examples of echinoderms.**

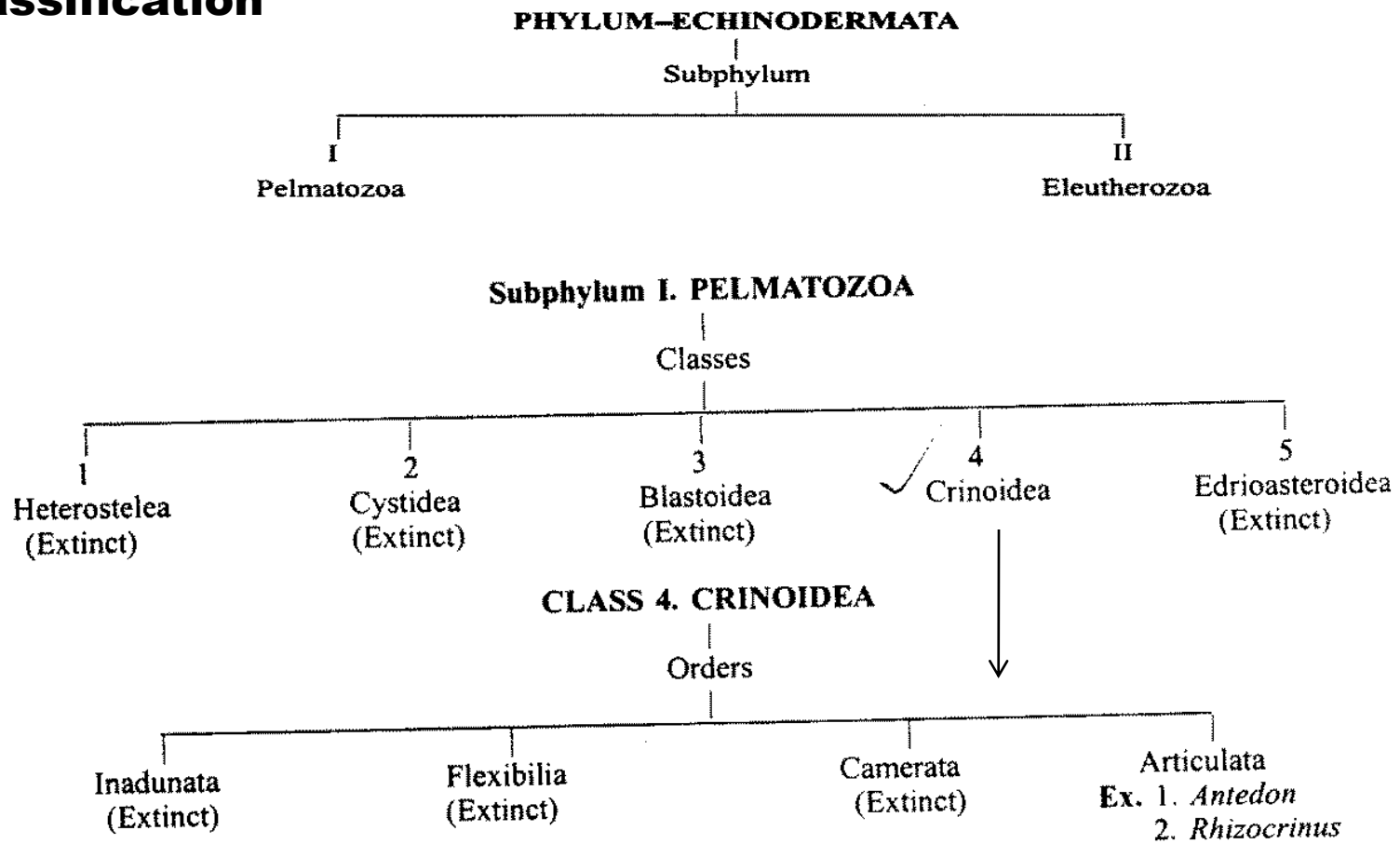


Characteristic Features of Phylum Echinodermata

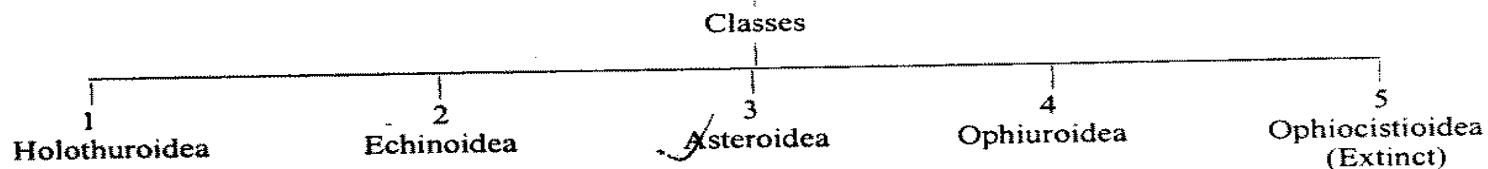
- ❖ These are exclusively marine animals.
 - ❖ The larval forms show bilateral symmetry and adult forms show radial symmetry.
 - ❖ They are triploblastic.
 - ❖ It exhibits organ system grade of organisation.
 - ❖ Presence of water vascular system
 - ❖ Mouth is present on ventral side while anus is present on dorsal side
 - ❖ They have a true coelom.
 - ❖ The body is uniquely shaped. It can star like, elongated or spherical.
 - ❖ The body is unsegmented without a head.
 - ❖ The body surface is covered with calcareous spicules.
 - ❖ Body cavity has the distinguishing water vascular system.
 - ❖ Tube feet help in locomotion.
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- ❖ The brain is absent but a nervous system is present with a nerve ring and radial nerve cords.
 - ❖ Respiration occurs through tube feet and gills. Respiration: by papule, gills or cloacal respiratory tree.
 - ❖ Sense organs are poorly developed and include tactile organs, chemoreceptors, terminal tentacles etc
 - ❖ Nervous system: absent, they are brainless organism.
 - ❖ Circulatory system: is reduced, heart is absent
 - ❖ Blood has no pigment.
 - ❖ Digestive system: complete
 - ❖ Excretory system: absent
 - ❖ Sexes are separate. Sexes: mostly dioecious, rarely monocious
 - ❖ Fertilisation is external.
 - ❖ Lost parts can be regenerated.
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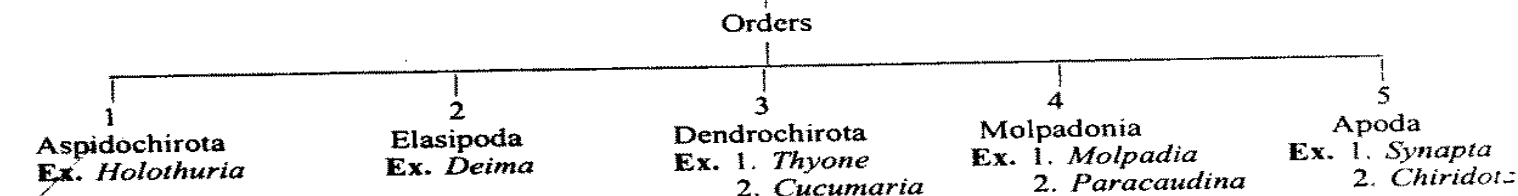
Classification



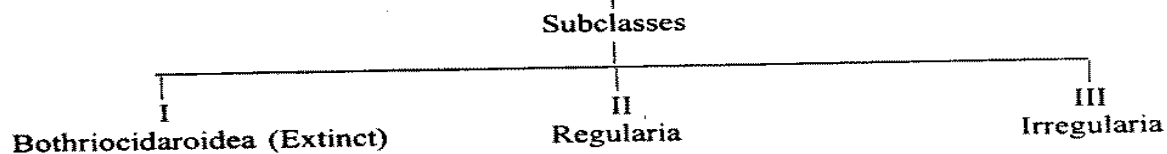
Subphylum II. ELEUTHEROZOA



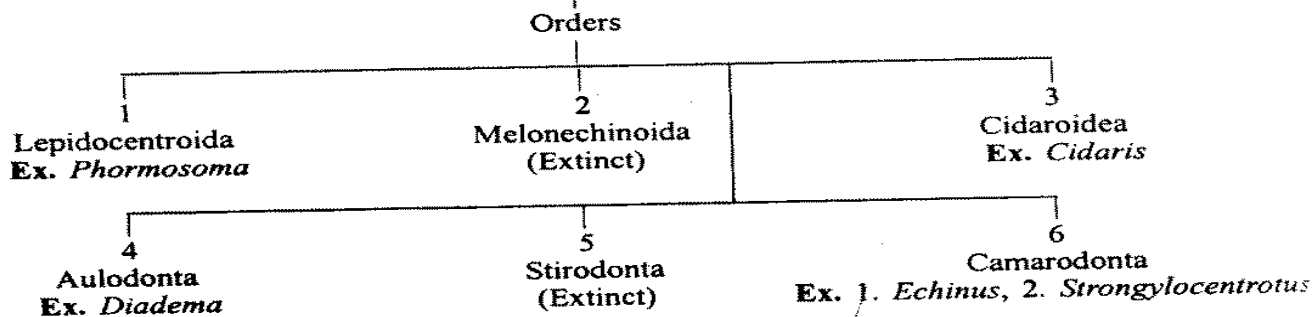
CLASS 1. HOLOTHUROIDEA



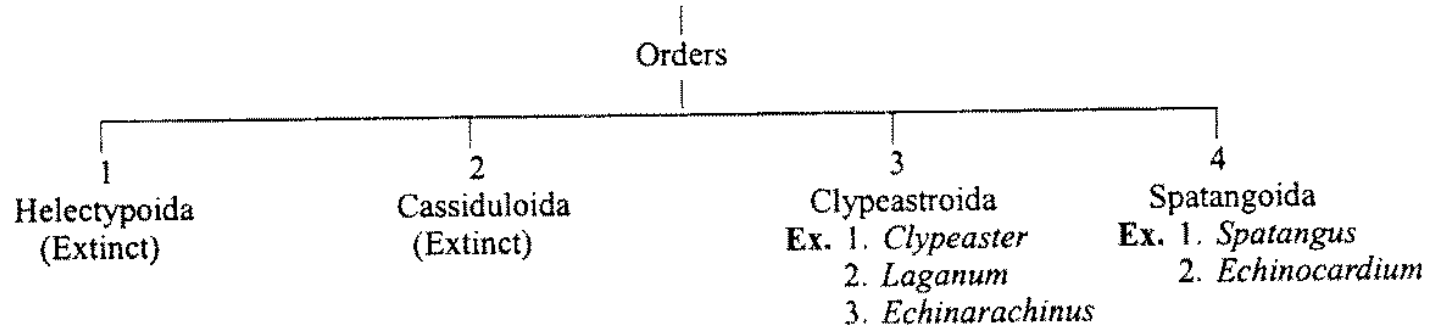
CLASS 2. ECHINOIDEA



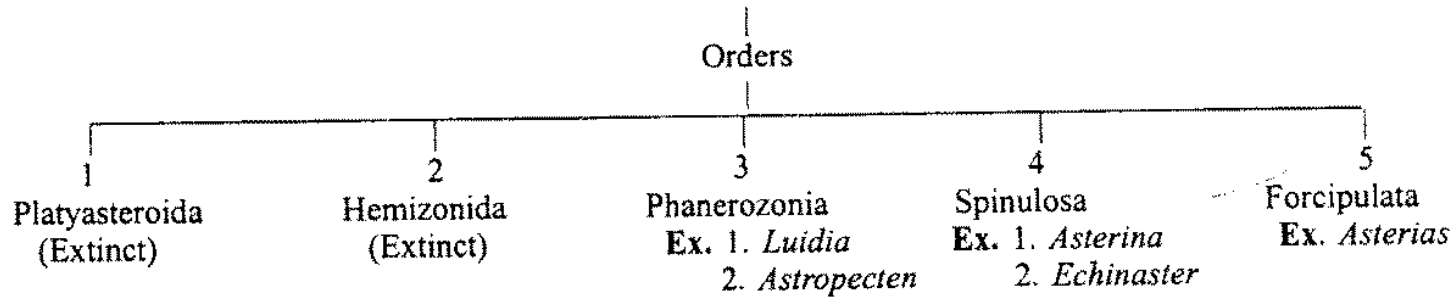
Subclass II. REGULARIA



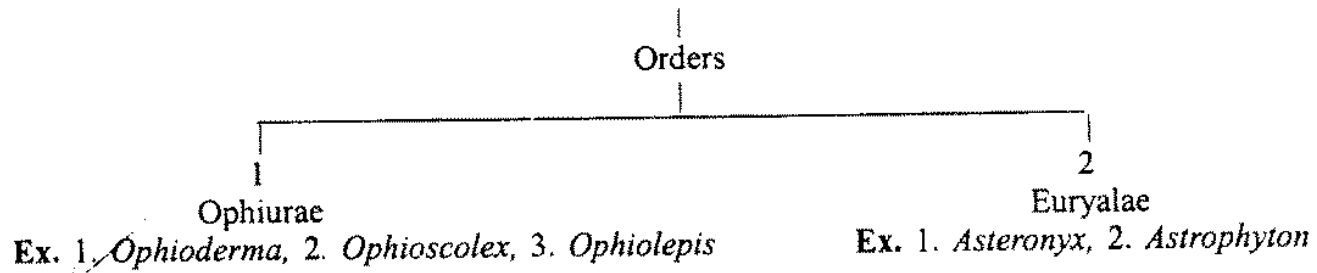
Subclass III. IRREGULARIA



CLASS 3. ASTEROIDEA



CLASS 4. OPHIUROIDEA



Note : The classification is adopted from Hyman L.H. (1955).

Class 1 Asteroidea

- Body is flattened star shaped with five arms
- They possess tube feet with a sucker
- Presence of calcareous plates and movable spines.
- Respiratory organ: papulae
- Examples: *Asterias* (Star fish), *Astropecten*, *Zoraster*, *Oreaster*

Class 2 Ophiuroidea

- Body is flat with pentamerous disc
- They possess a long arm which is sharply demarcated from the central disc.
- They possess tube feet without sucker
- Anus and intestine are absent
- Respiratory organ: Bursae
- Examples: *Ophiderma*, *ophiothrix*, *Astrophyton*, *Amphuria*, etc

Class 3 Echinoidea

- Body is disc-like hemi-spherical
- They are devoid of arms or free-rays.
- They possess tube feet with a sucker.
- They possess compact skeleton and movable spines.
- Examples: *Echinus* (Sea urchin), *Cidaris*, *Arbacia*, *Echinocardium*, *Diadema*

Class 4 Holothuroidea

- Body is elongated in the oral-aboral axis and it is like cucumber.
- They have no arms, spines and pedicellariae.
- The tube feet are sucking type which is modified into tentacles and form a circle around mouth.
- Respiratory organ: cloacal respiratory tree
- Examples: *Cucumaria* (Sea cucumber), *Holothuria*, *Mesothuria*, etc

Class 5 Crinoidea

- Body is star shaped
- Some of the forms were extinct and living forms.
- Arms bifurcated, with two pinnules.
- They have tube feet without suckers
- Examples: *Neometra*, *Antedon*, *Rhizocrinus*, etc

Asterias or Star Fish

❖ Asterias is found in shallow water in North Temperate Sea and North Atlantic coast in India and U.S.A.

❖ It is commonly known as Star fish because having a thick, often spiny body with five arms extending from a central disk.

❖ Sea stars are characterized by radial symmetry, several arms (5 or multiplied by 5) radiating from a central body.

❖ Mouth and anus are close together on the underside, the anus is at the center of the disc together with the water intake (madreporite).

❖ Five ambulacral groove arises from five corners of mouth broadened by two or three rows of ambulacral spines.

❖ Madreporite is a thick circular plate situated in between the bases of two arms on aboral surface.

❖ Pedicellariae are very small scattered all over the body

❖ Water vascular system is well developed.

❖ Sexes are separate. Development includes a free swimming bipinnate larva.

