

BIOLOGY

MEDICAL

ANIMAL KINGDOM



BANSAL CLASSES

PRIVATE LIMITED

Ideal for Scholars

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SESSION
2021-22

ANIMAL KINGDOM

Animal Kingdom (Non-Chordata)

- Animal Kingdom covers about 35 phyla, of which 11 are considered to be major phyla. In major phyla, 10 are from Non-chordates and 1 from the chordates.

Table - Main Phyla of Animal Kingdom

Phylum	Protozoa (Single-celled)	<i>Euglena, Entamoeba, Amoeba, Paramecium, Trypanosomes, Plasmodium</i> (malarial parasite).
Phylum	Porifera (porous)	<i>Sycon</i> (Scypha), <i>Spongilla</i> (Fresh water sponge) and <i>Euspongia</i> (Bath sponge)
Phylum	Coelenterata (sac-like, two layers of cells separated by non-cellular mesogloea; stinging cells (nematoblasts)	<i>Physalia</i> (Portuguese man-of-war), <i>Adamsia</i> (Sea anemone), <i>Pennatula</i> (Sea-pen), <i>Gorgonia</i> (Sea-fan) and <i>Meandrina</i> (Brain coral), <i>Hydra</i> , <i>Aurelia</i> or Jelly fish, <i>Obelia</i>
Phylum	Ctenophora (sea walnuts or comb jellies)	<i>Pleurobrachia</i> and <i>Ctenoplana</i>
Phylum	Platyhelminthes (flatworm)	<i>Planaria, Taenia</i> (Tapeworm), <i>Fasciola</i> (Liver fluke)
Phylum	Aschelminthes (round worms) Nematoda	<i>Ascaris</i> (Round Worm), <i>Wuchereria</i> (Filaria worm), <i>Ancylostoma</i> (Hookworm)
Phylum	Annelida (Ringed worms, segmented)	<i>Nereis, Pheretima</i> (Earthworm) and <i>Hirudinaria</i> (Blood sucking leech)
Phylum	Arthropoda (jointed limbs, hard exoskeleton)	<i>Apis</i> (Honey bee), <i>Bombyx</i> (Silkworm), <i>Laccifer</i> (Lac insect), Vectors – <i>Anopheles</i> , <i>Culex</i> and <i>Aedes</i> (Mosquitoes), Gregarious pest – <i>Locusta</i> (Locust), Living fossil – <i>Limulus</i> (King crab)
Phylum	Mollusca (soft-bodied typically with shell)	<i>Pila</i> (Apple snail), <i>Pinctada</i> (Pearl oyster), <i>Sepia</i> (Cuttlefish), <i>Loligo</i> (Squid), <i>Octopus</i> (Devil fish), <i>Aplysia</i> (Seahare), <i>Dentalium</i> (Tusk shell) and <i>Chaetopleura</i> (Chiton)
Phylum	Echinodermata (Spiny-skinned, pentaradiate)	<i>Asterias</i> (Star fish), <i>Echinus</i> (Sea urchin), <i>Antedon</i> (Sea lily), <i>Cucumaria</i> (Sea cucumber) and <i>Ophiura</i> (Brittle star)
Phylum	Hemichordata	<i>Balanoglossus</i> and <i>Saccoglossus</i>
Phylum	Chordata	<i>Fishes, Frogs, Snakes, Birds & Humans</i>

1. LEVELS OF ORGANISATION

A. Cellular Level :

- Though all members of Animalia are multicellular, all of them do not exhibit the same pattern of organisation of cells.
- For example, in sponges, the cells are arranged as loose cell aggregates, i.e., they exhibit cellular level of organisation.
- Some division of labour (activities) occurs among the cells.

B. Tissue Level :

- In coelenterates and ctenophores, the arrangement of cells is more complex.
- Here the cells performing the same function are arranged into tissues, hence it is called **tissue level of organisation**.

C. Organ Level :

- A still higher level of organisation, *i.e.*, organ level is exhibited by members of Platyhelminthes and other higher phyla where tissues are grouped together to form organs, each specialised for a particular function.

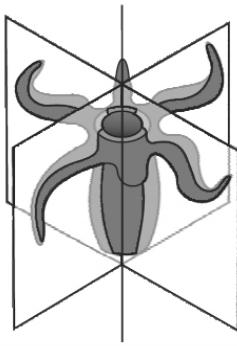
D. Organ system level of organisation.

- In animals like Annelids, Arthropods, Molluscs, Echinoderms and Chordates, organs have associated to form functional systems, each system concerned with a specific physiological function.
- Organ systems in different groups of animals exhibit various patterns of complexities.

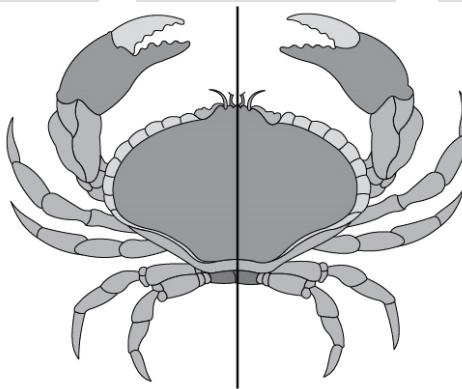
2. BODY SYMMETRY

The animals can be categorised on the basis of their body symmetry:

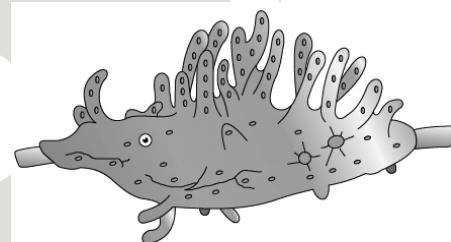
- (i) **Radial symmetry:** When any plane passing through the central axis of the body divides the organism into two identical halves, it is called radial symmetry. The animals with radial symmetry are put in the group **Radiata**. For example, cnidarians (hydra and jelly fish). Biradial symmetry is present in sea anemone, ctenophores.



Radial Symmetry



Bilateral Symmetry



Spongilla (Asymmetrical)

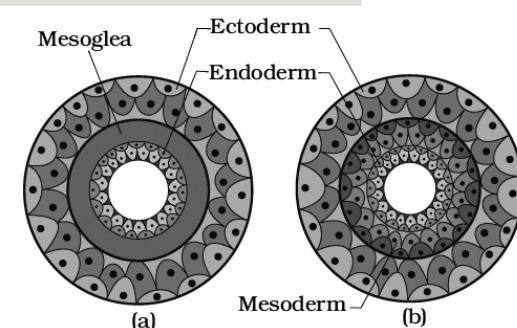
- (ii) **Bilateral symmetry:** The animals with bilateral symmetry are put in group **Bilateria**. The body can be divided into identical right and left halves in only one plane. For example, platyhelminthes, annelids, arthropods etc. (platyhelminthes to chordates).
- (iii) **Asymmetry:** Asymmetric organisms cannot be divided along any plane to produce two equivalent halves. Sponges are mostly asymmetrical.

3. GERM LAYERS

- Germ layers give rise to all the tissues/organs of the fully formed individuals. On the basis of number of germ layers animals can be

(i) **Diploblastic:** In diploblastic animals, the body cells are arranged in two layers—an outer ectoderm and an inner endoderm with an intervening undifferentiated mesoglea. *e.g.* Coelenterates.

(ii) **Triploblastic:** If the body wall in animals is made of three germ layers *i.e.* ectoderm, mesoderm and endoderm, they are called **triploblastic animals**. *e.g.*, Platyhelminthes to chordates.



Showing germinal layers :
(a) Diploblastic (b) Triploblastic

4. BODY PLAN

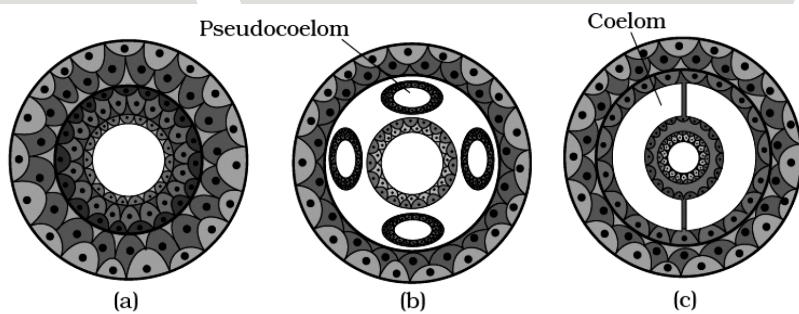
Though diverse in shape and size, animals have body that fits in one of the three basic plans:

- (i) **Cell aggregate** : Cell aggregate type of body plan is present in sponges. They are clusters of cells with a rudimentary division of labour among them. There are no tissues, or organs.
- (ii) **Blind sac** : Blind sac type of body plan is present in platyhelminthes and coelenterates where the alimentary canal has only one opening.
- (iii) **Tube within tube** : Tube-within tube type of body plan is present in Nemathelminthes, Annelida, Arthropoda, Mollusca, Echinodermata and Chordata. The digestive system is a continuous tube with an opening at both end.

5. BODY CAVITY OR COELOM

Presence or absence of cavity between the body wall and the gut wall is very important for classification.

- (i) **Acoelomate** : The animals in which the coelom is absent are called acoelomates, for example poriferans, coelenterates, ctenophores, flatworms. In flatworms, the spaces between various organs are filled with special tissue called **parenchyma**.
- (ii) **Pseudocoelomate** : The body cavity is not completely lined with mesoderm. Instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm. Such a body cavity is called **pseudocoelom** e.g. in roundworm.
- (iii) **Eucoelomate** : The true coelom is a body cavity which arises as a cavity in embryonic mesoderm. In this case, the mesoderm of the embryo provides a cellular lining, called **coelomic epithelium** or **peritoneum**, to the cavity. The coelom is filled with coelomic fluid secreted by the peritoneum. True coelom is found in annelids, echinoderms and chordates. True coelom is of two types:
 - (a) **Schizocoelom** : It develops by the splitting up of mesoderm. It is found in annelids, arthropods and molluscs. Body cavity of arthropods and non-cephalopod molluscs is called **haemocoel**.
 - (b) **Enterocoelom** : The mesoderm arises from the wall of the embryonic gut or enteron as hollow outgrowths or enterocoelomic pouches. It occurs in echinoderms and chordates.



Diagrammatic sectional view of : (a) Acoelomate (b) Pseudocoelomate (c) Coelomate

6. SEGMENTATION

- In some animals, the body is externally and internally divided into segments with a serial repetition of at least some organs.
- For example, in earthworm, the body shows this pattern called **metameric segmentation** and the phenomenon is known as **metamerism**.
- Metameric segmentation is present in annelids only.