

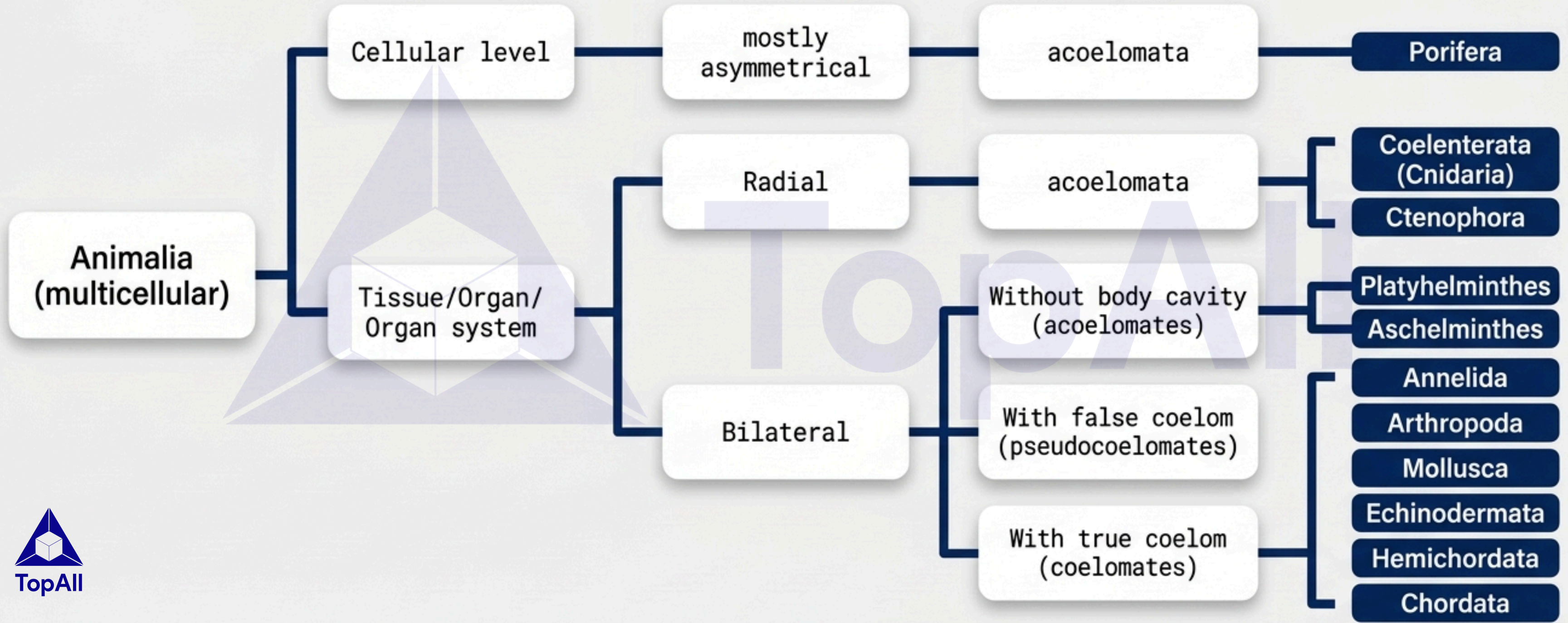


ANIMAL ANIMAL KINGDOM IN ONE TREE

Decoding the broad classification of
Animalia based on fundamental
anatomical features.

The Broad Classification of Kingdom Animalia

Over a million species categorized by cellular arrangement, symmetry, and body cavity.



Step 1: Levels of Organisation



All animals are multicellular, but their cells cooperate at different tiers of complexity.

Cellular Level

Loose cell aggregates. Some division of labor occurs, but cells do not form coordinated tissues.

Porifera

Tissue Level

Cells performing the same function are arranged together into complex, coordinated tissues.

Coelenterata

Ctenophora

Organ & Organ-System Level

Tissues grouped into functional organs. In higher phyla, organs associate to form systems with specific physiological functions.

Platyhelminthes to Chordata

Note: The digestive system in Platyhelminthes is considered 'incomplete' as a single opening serves as both mouth and anus. Higher phyla develop a complete system with two distinct openings.



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Step 2: Body Symmetry



Categorizing organisms based on the planes that divide them into identical halves.

Asymmetrical

Sponges are mostly asymmetrical; no central plane divides them into equal halves.

Radial Symmetry

Any plane passing through the central axis divides the organism into identical halves.

Coelenterata

Ctenophora

Echinodermata (adults)

Bilateral Symmetry

The body can be divided into identical left and right halves in only ONE specific plane.

Annelida to Chordata

Step 3: Nature of the Coelom

The presence or absence of a mesoderm-lined cavity between the body wall and gut wall.

Mesoderm: The middle embryonic layer present in triploblastic animals.

No Cavity

Acoelomates

The body cavity is entirely absent.

Platyhelminthes

False Cavity

Pseudocoelomates

Cavity exists but is not lined by mesoderm; instead, mesoderm is present as scattered pouches between the ectoderm and endoderm.

Aschelminthes

True Cavity

Coelomates

Possess a true body cavity fully lined by mesoderm.

Annelida

Arthropoda

Mollusca

Echinodermata

Hemichordata

Chordata

The Non-Chordate Phyla

Invertebrate animals lacking a notochord during embryonic development.

Porifera

- Water canal system, pores (ostia), spongocoel.

Coelenterata

- Cnidoblasts (stinging cells), tentacles.
- Polyp and medusa forms.

Ctenophora

- Ciliated comb plates for locomotion.
- Bioluminescence

Platyhelminthes

- Dorso-ventrally flattened.
- Hooks/suckers in parasitic forms.

Aschelminthes

- Circular cross-section (roundworms).
- Complete alimentary canal.

Annelida

- Metameric segmentation (rings).
- Closed circulatory system.

Arthropoda

- Largest animal phylum.
- Jointed appendages, chitinous exoskeleton.

Mollusca

- Second largest phylum.
- Calcareous shell, muscular foot, visceral hump.

Echinodermata

- Spiny skin (calcareous ossicles).
- Unique water vascular system.

Hemichordata

- Worm-like, rudimentary stomochord.
- Proboscis, collar, and trunk.

Phylum Chordata Deep Dive

Fundamentally characterized by a notochord, dorsal hollow nerve cord, and paired pharyngeal gill slits.



- Notochord
- Dorsal hollow nerve cord
- Paired pharyngeal gill slits
- Post-anal tail

Urochordata

Notochord is present only in the larval tail.

Cephalochordata

Notochord extends from head to tail and persists throughout life.

Vertebrata

Notochord is present during embryonic period, replaced by a cartilaginous or bony vertebral column in adults.

All vertebrates are chordates, but not all chordates are vertebrates.

Animalia Synthesis Matrix



A consolidated comparison of salient features across all phyla.

Phylum	Level of Org	Symmetry	Coelom	Segmentation	Distinctive Features
Porifera	Cellular	Various	Absent	Absent	Pores and canals
Coelenterata	Tissue	Radial	Absent	Absent	Cnidoblasts
Ctenophora	Tissue	Radial	Absent	Absent	Comb plates
Platyhelminthes	Organ/System	Bilateral	Absent	Absent	Flat body, suckers
Aschelminthes	Organ-system	Bilateral	Pseudocoelomate	Absent	Worm-shaped
Annelida	Organ-system	Bilateral	Coelomate	Present	Metameric rings
Arthropoda	Organ-system	Bilateral	Coelomate	Present	Exoskeleton, jointed appendages
Mollusca	Organ-system	Bilateral	Coelomate	Absent	Shell, mantle
Echinodermata	Organ-system	Radial (adult)	Coelomate	Absent	Water vascular system
Hemichordata	Organ-system	Bilateral	Coelomate	Absent	Proboscis, collar, trunk
Chordata	Organ-system	Bilateral	Coelomate	Present	Notochord, nerve cord

Classification provides a systematic framework to assign a reliable biological position to newly described species among the 1+ million already identified.



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