Characteristic Features of Phylum Hemichordata

Hemichordata is bilaterally symmetrical and triploblastic animal.

They are exclusively marine animals.

They can be solitary or in colonies.

Hemichordata have a true body cavity or coelom.

The digestive tract is complete with an anus and can be in the form of a U shaped tube or straight.

A buccal diverticulum is present in the proboscis.

Body is divided into three regions – Proboscis, Collar and Trunk.

Circulatory system in open type.

Respiration occurs through gills.

The proboscis has a glomerulus, which is the excretory organ.

A primitive nervous system is present.

Sexes are separate or united.

Reproduction is mostly sexual reproduction.

Fertilization is external.

Development is mostly indirect. But a few species exhibit direct development.

Classification of Phylum Hemichordata

Phylum Hemichordata is again divided into two classes:

Enteropneusta: This class includes acorn worms. They have a vermiform body and are found on sandy beaches near seas in warm climates.

Examples:

Balanoglossus, Saccoglossus (= Dolichoglossus), Ptychodera.

Class 2. Pterobranchia:

1. Sedentary, solitary or colonial, tubicolous marine animals.
2. Proboscis with ciliated tentacles to produce ciliary feeding currents of water.
3. Collar with two or more tentaculated arms bearing tentacles.
4. One pair of gill-slits or none, never U- shaped.
5. Alimentary canal U-shaped with dorsal anus situated near the mouth at the same end.
6. Sexes separate or united; single or one pair of gonads.
7. Development direct, may or may not include a free swimming larval stag
8. Asexual reproduction by budding in some.

Hemichordata refers to a phylum which contains worm-like marine animals with a proboscis as an outgrowth of the pharyngeal wall	Chordata refers to an animal phylum which contains a notochord, dorsally situated central nervous system, and gill slits
Mostly lives in marine habitats	Lives in marine, freshwater, and terrestrial habitats
Contains an epidermal nervous system	Contains a central nervous system
Does not contain a notochord	Contains a dorsal, tubular notochord
Lacks a post-anal tail	Contains a post-anal tail
Contains an open circulatory system with dorsal and ventral blood vessels	Contains a closed circulatory system
Contains a stomochord	Lacks a stomochord
Lacks blood pigments	Contains blood pigments
Transportation of respiratory gases and metabolic wastes occurs through the body wall	Transportation of respiratory gases and metabolic wastes occurs via blood

State the similarities and differences between echinoderms and hemichordates.

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Ambulacraria, comprising Hemichordata and Echinodermata , is closely related to Chordata, making it integral to understanding chordate origins and polarizing chordate molecular and morphological characters . Unfortunately, relationships within Hemichordata and Echinodermata have remained unresolved , compromising our ability to extrapolate findings from the most closely related molecular and developmental models outside of Chordata (e.g., the acorn worms *Saccoglossus kowalevskii* and *Ptychodera flava* and the sea urchin *Strongylocentrotus purpuratus*). To resolve long-standing phylogenetic issues within Ambulacraria, we sequenced transcriptomes for 14 hemichordates as well as 8 echinoderms and complemented these with existing data for a total of 33 ambulacrarian operational taxonomic units (OTUs). Examination of leaf stability values revealed rhabdopleurid pterobranchs and the enteropneust *Stereobalanus canadensis* were unstable in placement; therefore, analyses were also run without these taxa. Analyses of 185 genes resulted in reciprocal monophyly of Enteropneusta and Pterobranchia, placed the deep-sea family Torquaratoridae within Ptychoderidae, and confirmed the position of ophiuroid brittle stars as sister to asteroid sea stars (the Asterozoa hypothesis). These results are consistent with earlier perspectives concerning plesiomorphies of Ambulacraria, including pharyngeal gill slits, a single axocoel, and paired hydrocoels and somatocoels . The resolved ambulacrarian phylogeny will help clarify the early evolution of chordate characteristics and has implications for our understanding of major fossil groups, including graptolites and somasteroideans.