

Lingulida

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An order of inarticulated brachiopods consisting of an exclusively marine group of lophophorate animals (i.e., animals with a tentacular food-gathering, respiratory, and protective organ): sessile benthic suspension-feeders possessing a chitino-phosphatic shell. Representatives occur throughout the Phanerozoic Era (from the Early Cambrian to the present). Three superfamilies are recognized: Linguloidea, with the family Lingulidae, extends from the Middle Ordovician to the present; Discinoidea, with the family Discinidae, extends from the Early Ordovician to the present; and Acrotheloidea, known from the Early Cambrian to the Early Ordovician. See also: [Brachiopoda \(/content/brachiopoda/093000\)](#); [Inarticulata \(/content/inarticulata/339700\)](#)

General morphology

Shells are tongue-shaped (linguliform) to circular in outline. The valves are separate and lack articulation but possess a complex arrangement of muscles formed by paired anterior adductor muscles and single or paired posterior adductor muscles, and three or four pairs of oblique muscles. The pedicle emerges posteriorly between valves or through a foramen.

Lingulids are suspension feeders. The tentacular feeding organ (lophophore) occupies the mantle cavity. The digestive system consists of a mouth, pharynx, esophagus, stomach, digestive diverticula, pylorus, and intestine, and terminates in a functional anus. Four digestive diverticula open through ducts to the stomach. The excretory system consists of a pair of ciliated funnels (metanephridia) that act as gonoducts during spawning and allow the discharge of gametes from the coelom into the lophophoral cavity. Solid waste, enmeshed in mucus, is also ejected through the nephridiopores, while the excretory product ammonia is voided through the tissues of the mantle and lophophore.

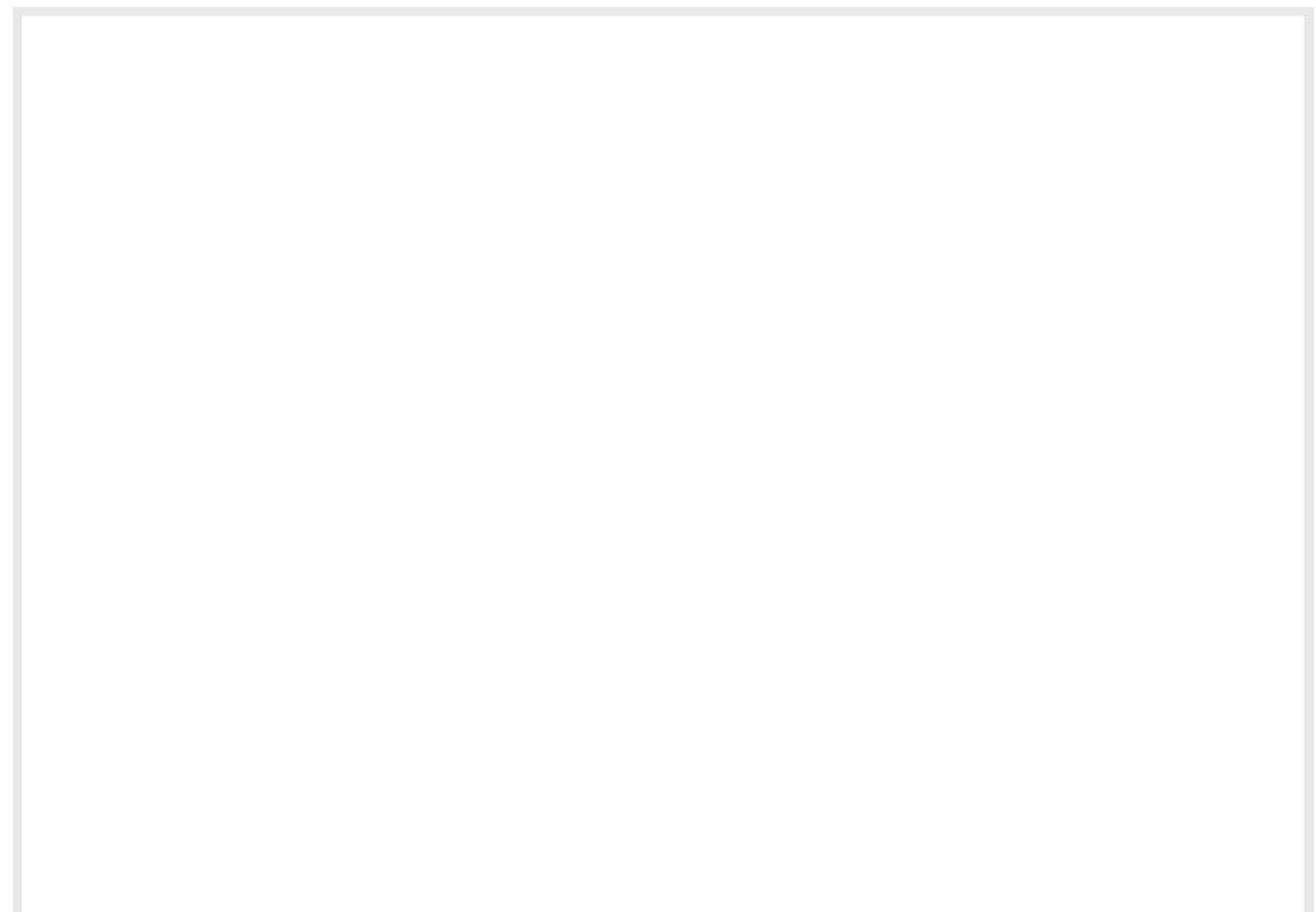
Lingulids possess an open circulatory system of blood vessels and coelomic canals containing a faintly pigmented fluid, which is coagulable and contains free cellular inclusions consisting of blood cells and coelomocytes. In *Lingula*, the blood cells are somewhat round in shape and contain a respiratory protein that consists of hemoerythrins.

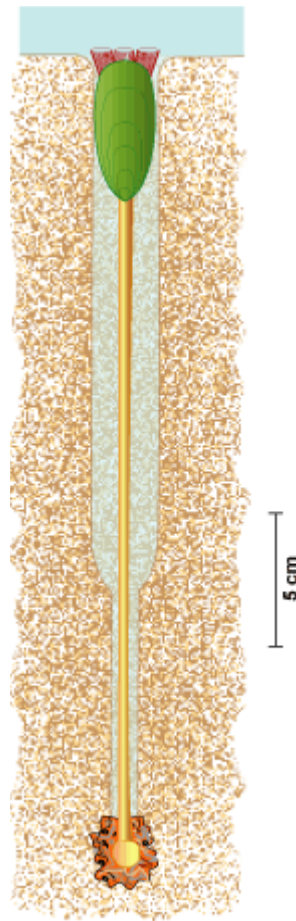
Lingulids have a central nervous system containing unsheathed nerves with no obviously differentiated sense organs, although statocysts have been reported in Lingulidae.

All extant members of this order are dioecious (that is, male and female reproductive organs are on separate individuals) and their larval development is planktotrophic. They extend generally from inshore waters, mainly subtidal, to the bathyal zone.

Linguloidea

Shells are linguliform to circular in outline and are generally biconvex. The two extant genera belong to the family Lingulidae: *Lingula*, wrongly considered as “living fossils” from the Paleozoic, and *Glottidia*. Both genera originated at the beginning of the Tertiary. They have a long, fleshy extensible pedicle and burrow in soft sediments (see **illustration**). Their complex arrangement of muscles consists of two pairs of anterior and one single posterior adductor muscles, unpaired oblique muscles (three pairs and a single additional one), and a longitudinal lateral muscle, which help with movement of the valves.





View of living *Lingula anatina* in its burrow. (Courtesy of C. C. Emig)

Discinoidea and Acrotheloidea

Most shells are circular or subcircular in outline. The dorsal valve is usually larger than the ventral valve, and is convex and often conical. The ventral valve is flattened and disklike. Paired anterior and posterior adductor muscles and three pairs of oblique muscles make up the complex arrangement of muscles. A short pedicle in the postlarval stage emerges through a foramen in the ventral valve, but the adults lack a pedicle notch and pedicle.

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