

Definition: **entoproct** from *Merriam-Webster's Collegiate(R) Dictionary*

 [pronunciation](#)

(1940) : any of a phylum (Entoprocta) of chiefly marine animals that are very similar to bryozoans but lack a true coelom and have the anus located near the mouth inside a crown of tentacles

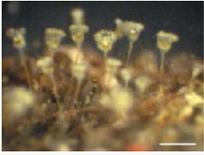


Image from: [Part of a colony of colonial entoprocts,...](#) in [Encyclopedias of the Natural World: Encyclopedia of Tidepools and Rocky Shores](#)

Summary Article: **Entoprocta**  
From *Encyclopedia of Life Sciences*

## Abstract

The entoprocta are a small phylum of minute, solitary or colonial, sessile, aquatic animals. About 150 species have been described worldwide, with only one species occurring in freshwater. The colonial species encrust stones, shells and algae, and species have been described from all oceans. The solitary species are mostly associated with water-current-producing hosts, such as polychaetes, sponges and bryozoans; these species are not conspicuous and most of the reported distributions reflect specialists' searches.

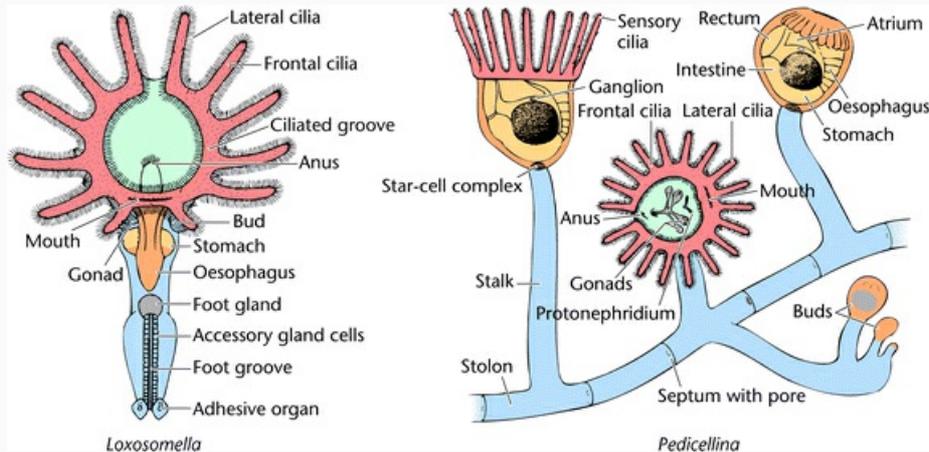
## keywords

budding  
cleavage  
colonies  
filter feeding  
larvae  
trochophore

## Basic Design

Solitary species, and the zooids of colonial species, consist of a globular to flattened body attached to the substratum or a stolon with a dorsal stalk (Figure 1). The ventral side of the body is a concave atrium, surrounded almost completely by a horseshoe of ciliated tentacles. The stalk of the solitary species ends basally in a muscular sucker, a flexible, elongate foot with two types of glands, or is cemented permanently to the substratum. The stolons are cylindrical with incomplete septa between sections with zooids and sections without zooids. The body wall is a one-layered epithelium with microvilli penetrating a layer of crossing collagenous filaments. The stalks and stolons of the colonial species have a thickened cuticle with chitin. The body contains a U-shaped, ciliated gut with a flattened, funnel-shaped oesophagus, a large stomach, a conical intestine and a tubular rectum. The mouth is situated at the base of the tentacles on the anterior side of the atrium and the anus on the opposite side, near the break in the row of tentacles. A band of compound cilia follows the rim of the atrium with a loop onto each tentacle; a field of separate cilia surrounds the mouth and forms a food groove along the tentacle bases with extensions on the atrial side of each tentacle. At the anal side of the atrium,

the band of compound cilia turns back and follows the food groove to the mouth. A dumbbell-shaped neural ganglion is situated at the upper side of the stomach near the oesophagus. Peripheral nerves extend to sensory cells and muscles in the tentacles, to sensory cells on the body and stalk, and to muscles in the stalk. Nervous connections between zooids have not been observed. Paired gonads and protonephridia are found just behind the ganglion. Most of the colonial species have a 'star-cell complex' at the narrow transition between body and stalk. It consists of a stack of star-shaped cells with the tips of the rays attached to the ectoderm; the cells contain myofilaments and are pulsating, probably creating movement in the narrow fluid-filled primary body cavity. There is no trace of a coelom (secondary body cavity).



*A solitary (Loxosomella) and a colonial (Pedicellina) entoproct. The diagram shows the stalk, foot and stolon (blue); the body (orange); the tentacle crown (red) and the atrium (green). (Modified from Nielsen C and Jespersen Å (1997) Entoprocta. In: Harrison FW (ed.) Microscopic Anatomy of Invertebrates, vol. 13, pp. 13-43. New York: Wiley-Liss. Reprinted by permission of Wiley-Liss Inc.)*

## Diversity and Lifestyles

Four families are recognized. Loxosomatidae comprise solitary species, and Loxokalypodidae comprise a colonial species with zooids arising from a small basal plate. These two families lack the star-cell complex. Pedicellinidae and Barentsiidae are colonial with stolons and possess the star-cell complex. Pedicellinidae have stalks with continuous longitudinal musculature, whereas Barentsiidae have stalks with stiff segments and muscular joints.

Entoprocts are filter feeders, with the compound cilia of the tentacles forming downstream-collecting ciliary bands. The captured particles are transported along the frontal side of the tentacles to the food groove, which carries them to the mouth.

Most species are hermaphroditic, and the fertilized eggs are retained in the atrium until the larva is fully formed. Cleavage is spiral with mesoderm originating from the 4d cell. The larvae are almost diagrammatic trochophores in a few species, but most species have larvae with a large ciliated, ventral foot. The released larvae have a shorter or longer planktonic phase and most of the larvae are planktotrophic. Some species of the solitary *Loxosomella* have a planktotrophic trochophore which settles with glandular cells around the frontal organ; their metamorphosis comprises a retraction of the foot, a constriction of the prototroch, and subsequently a reopening of the atrium surrounded by small, new tentacles. Other species of *Loxosomella* and species of *Loxosoma* have modified life cycles where one or two buds develop from the larval epithelium above the prototroch. When fully grown, the buds detach from the larval body, which disintegrates. The trochophores of pedicellinids and barentsiids

retract the ventral side at settling and attach by secretions from glandular cells above the contracted prototroch. The internal organs rotate 180° with the mouth in front, and the atrium opens surrounded by a series of small tentacles.

Asexual reproduction through budding occurs in all species. Gut and atrial epithelium are formed from ectodermal invaginations, and ganglion and protonephridia develop from the ectoderm of the bottom of the atrium. In the solitary species the buds are formed from an area in front of the stomach and detach when all organs are fully formed. *Loxokalypus* has budding from a small basal plate. In the other colonial species the buds develop at the tips of stolons and remain attached as zooids in a growing colony.

Some of the colonial species make resting bodies (hibernacula), which are thick-walled mono- or multilocular cysts at the ends of short stolons. At germination, a new zooid is formed through a process similar to the normal budding.

## Fossil History and Phylogeny

Specimens strongly resembling Recent species of the colonial genus *Barentsia* have been found in Jurassic deposits, where they have been preserved through bioimmuration, i.e. as moulds in calcareous matter secreted by cemented bivalves or tube-building polychaetes. See also Fossil Record, and Fossils and Fossilization

The ancestral entoproct life cycle is probably represented by the species of the solitary *Loxosomella* which settle with the frontal organ and carry through an uncomplicated metamorphosis. The solitary species with larval budding and the colonial species appear derived.

The phylogenetic affinities of the Entoprocta are revealed by their spiral cleavage and trochophore larvae, which indicate that the phylum is closely related to other protostomes, such as annelids, molluscs, sipunculans, platyhelminths and nemertines. The relationships with the Bryozoa (Ectoprocta) is more uncertain. Molecular evidence is still inconclusive. See also Cyclophora, Annelida (Segmented Worms), Mollusca (Molluscs), Platyhelminthes (Flatworms), and Molecular Phylogeny Reconstruction

## Further Reading

- Nielsen, C (1989) Entoprocta. Synopses of the British Fauna (New Series) no. 41. Leiden, The Netherlands: Brill.
- Ruppert, EE and Barnes, RD (1994) Entoprocta. Invertebrate Zoology, 6th edn, pp 1021-1025, 1039. Fort Worth, TX: Saunders College.

## Glossary

### Atrium

Concave ventral side of a zooid, surrounded by the tentacles.

### Bioimmuration

Fossilization of soft organisms as moulds in calcareous matter secreted by cemented bivalves or tube-building polychaetes.

### 4 d cell

See spiral cleavage.

### **Hibernaculum**

Small resting body consisting of an inner mass of cells, usually with much yolk, surrounded by a thick chitinous wall.

### **Myofilament**

Filaments involved in cellular contraction.

### **Protonephridium**

Excretory organ with one or more interdigitating terminal cell(s), which form a weir used in ultrafiltration from the fluid in a body cavity, one or more duct cells and a pore cell.

### **Planktotrophic larva**

Larva feeding in the plankton.

### **Spiral cleavage**

Special cleavage pattern found in species of annelids, molluscs, sipunculans, entoprocts, platyhelminths and nemertines; characterized by alternating directions of the mitotic spindles, and further by characteristic fates of blastomeres, for example with mesoderm originating from the 4d cell.

### **Stolon**

Slender, tubular, branching 'roots' from which the zooids are budded.

### **Trochophore**

Larval type found in species of annelids, molluscs, sipunculans and entoprocts, and possibly in a modified form in platyhelminths and nemertines; planktotrophic forms characterized by a feeding structure consisting of two opposed bands of compound cilia, prototroch and metatroch, nonplanktotrophic forms have only the prototroch.

### **Zooid**

Individual in a colony.

Claus Nielsen  
Zoologisk MuseumCopenhagen, Denmark

### **APA**

Chicago

Harvard

MLA

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Nielsen, C. (2007). Entoprocta. In *Encyclopedia of Life Sciences*. Hoboken, NJ: Wiley. Retrieved from <https://search.credoreference.com/content/topic/entoprocta>

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## APA

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## MLA

Nielsen, Claus. "Entoprocta." *Encyclopedia of Life Sciences*, Wiley, 1st edition, 2007. *Credo Reference*, <https://search.credoreference.com/content/topic/entoprocta>. Accessed 18 Sep. 2019.