

Lecture 04 - Anatomy: Inner Body Tube

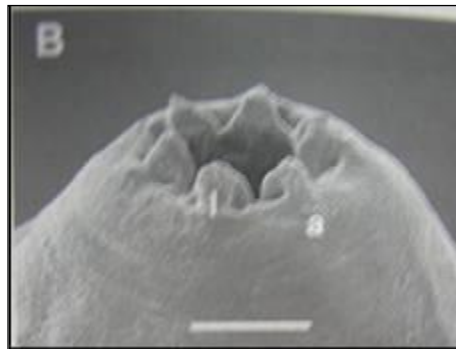
Digestive system

The digestive system of nematodes includes the stoma, oesophagus, intestine and posterior gut. The inner body tube is divided into 3 main regions.

1. Stomodeum : which constitute the stoma, oesophagus and cardia
2. Mesenteron : which constitute the intestine
3. Proctodeum : which is the posterior –most region comprising rectum and anal opening.

1. Stomodeum

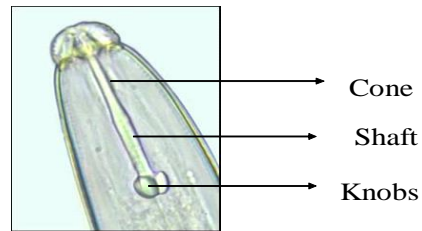
Stoma is the portion of the inner body tube lying between the oral opening and oesophagus. The stomatal opening is small and slit like and is surrounded by six lips.



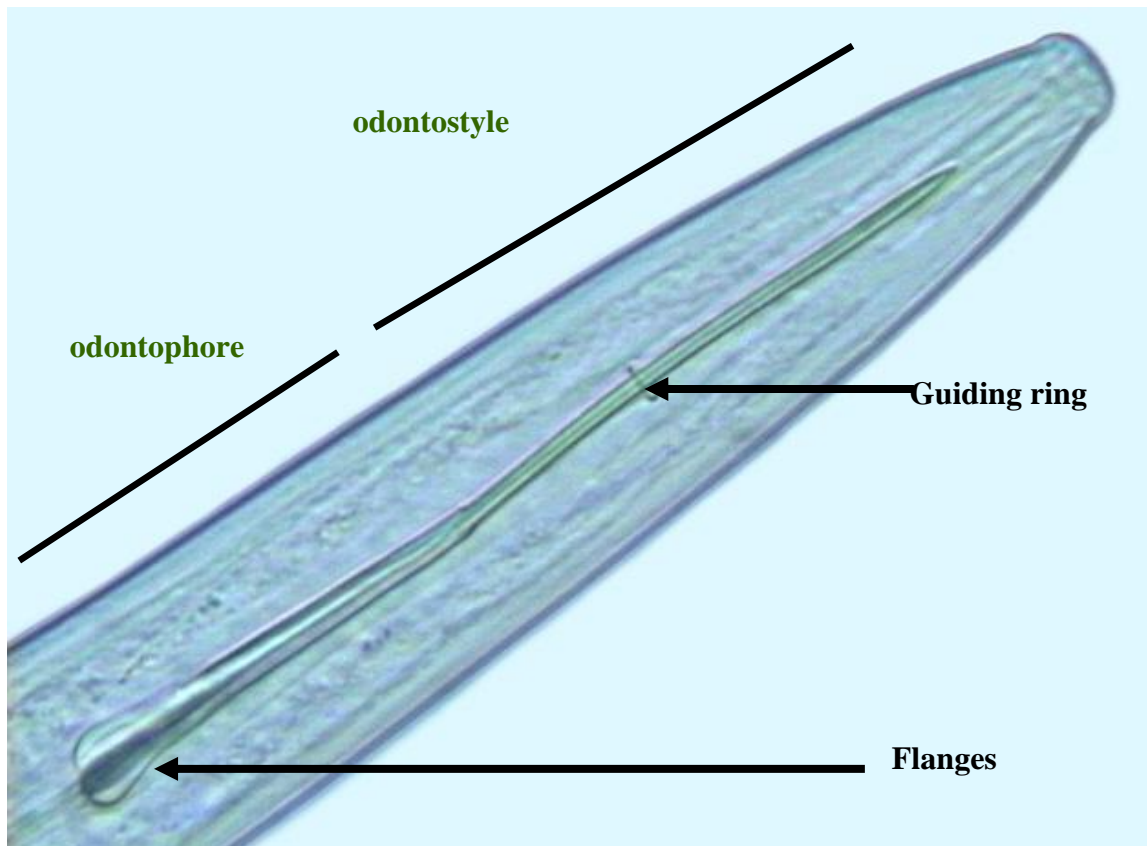
Stomatal opening

Two subdorsal, two subventral and two lateral. Plant parasitic nematodes are armed with a protrusible stylet which is usually hollow and functions like a hypodermic needle. In Secernentea, the stylet is thought to be derived from fusion of the stomatal lining and therefore called as stomatostylet. The stomatostylet consists of an anterior cone, a cylindrical shaft and three rounded basal knobs. In Adenophrea, the stylet is thought to be derived from a tooth and, therefore, it is called as odontostylet. The flanges that serve as points of attachment for the stylet protractor muscles. In some plant parasitic nematodes like Trichodorus and Paratrichodorus the odontostylet is distinctly curved ventrally, lacks flanges and it is not hollow. In function to pierce the cell wall of the root. The nematode secretes a hollow tube out of its stoma that connects it with the plant. This feeding tube serves as the interface between the nematode and the plant.

Stomatostylet- Eg. *Hoplolaimus*



Odontostylet – Eg. *Xiphinema*

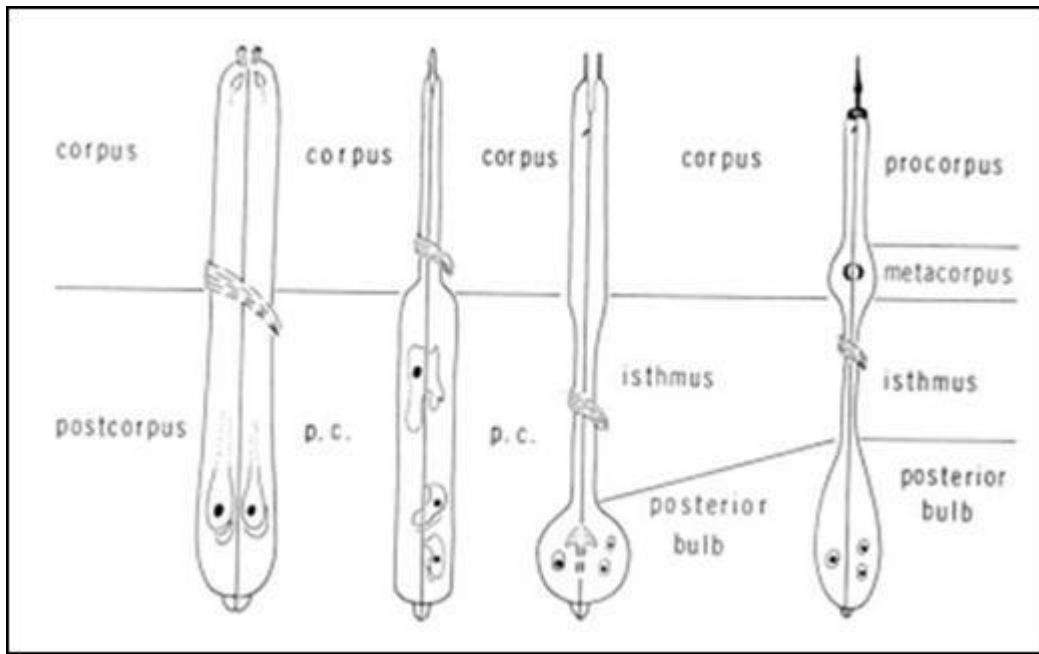


Oesophagus or pharynx

The oesophagus is a muscular pumping organ attached to the posterior portion of the stylet and lined with cuticle. In Adenophorea, the oesophagus is divided into a narrow anterior

procorpus and a broad posterior corpus. Three to five oesophageal gland cell empty into the lumen (one dorsal and two to four subventral in position in Secernentea the oesophagus is divided into distinct regions, such as narrow procorpus, followed by a broad muscular median bulb or pump, a narrow isthmus and gland lobe. The gland lobe may overlap the intestine in some genera and contain three to six gland cells (One dorsal and two sub-ventral). The oesophagus has valve (cordia) at the posterior end which prevents the regurgitation of food.

Types of oesophagus



Enoplid Dorylaimid Rhabditid Tylenchid

Mesenteron or intestine

The nematode intestine is a simple, hollow, straight tube consisting of a single layer of epithelial cells. The intestine is generally divided anterior or ventricular region, the midintestinal region and the posterior or prerectal region. The microvilli are finger like projection of the plasma membrane projecting in to the intestinal regions. They increase the

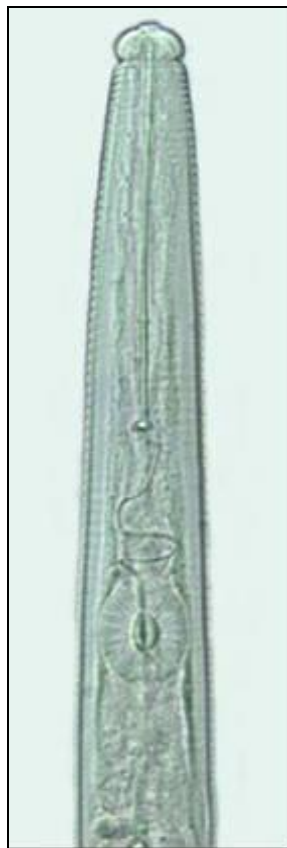
surface area of the intestine and are both secretory and absorptive in function. The whole intestine is separated from the pseudocoelom by a basement membrane.

The food moves in the intestine by the ingestion of more food and also by locomotory activity of the nematode.

Dorylaimid



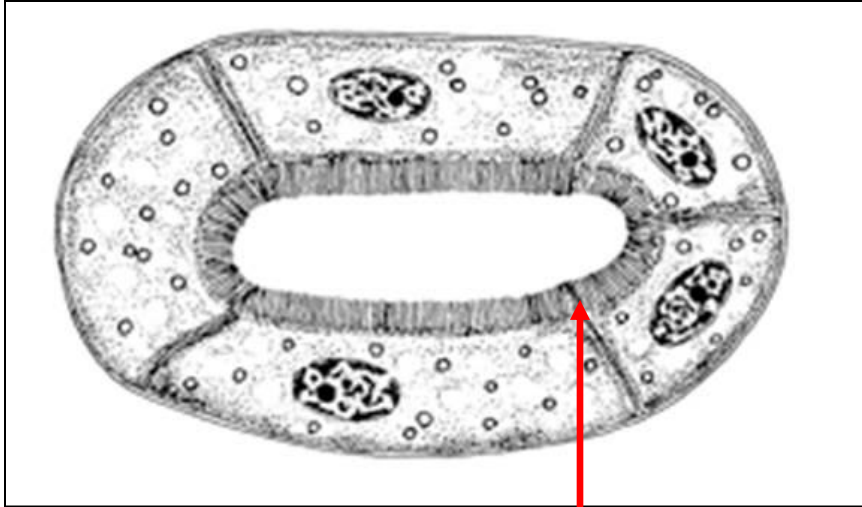
Tylenchid



Aphelenchid



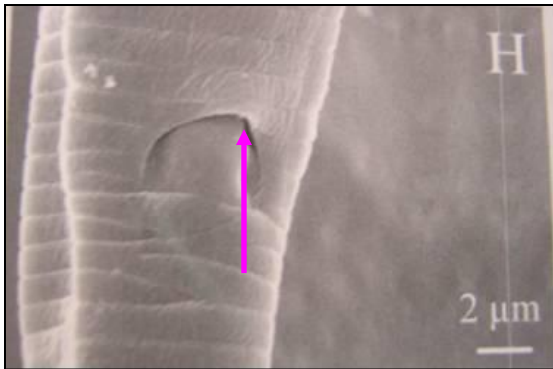
C.S. of intestine



Microvilli seen on the inner lining

Protodeum

Proctodeum comprises rectum and anus. The intestinal tube is connected with a narrow small tube at the posterior end, through a valve known as rectum. It regulates the flow of undigested food material which is to be passed outside the nematode body through a ventrally located aperture known as anus.



Anal opening

In male nematode, the rectum joins with the hind part of the testis forming a common opening known as cloaca. In female, there is a separate opening.

Glands

Oesophageal and rectal glands are present in nematodes. The oesophageal gland enter the stomodeum and rectal gland enter proctodeum.

