

باسمه تعالی
جزوه جانورشناسی 2

گردآورنده:

مصطفی قاسمی-استاد دانشگاه پردیس شهید باهنر اصفهان

Chordata: Urochordata and Cephalochordata

Michelle Sit and Paul Riviere

What is a Chordata

- Chordata are fishes, amphibians, reptiles, birds, mammals, tunicates (Urochordata), and lancelets (Cephalochordata)

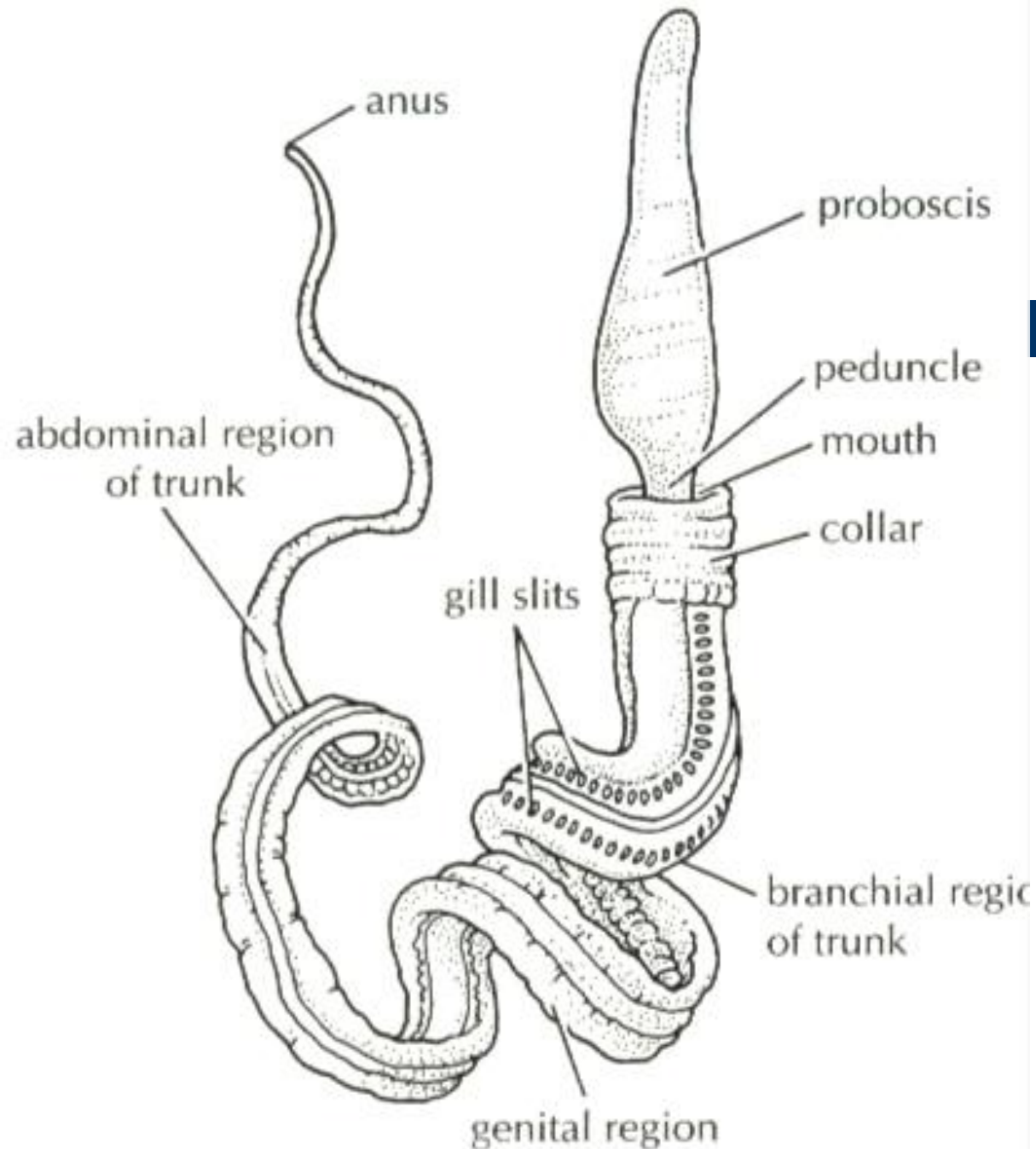
Intro to chordates

- 4 defining characteristics of chordata:
- Notochord
 - Flexible rod that is between digestive track and nervous system.
- Hollow nerve cord (later becomes CNS)
- Have a tail: some lose tail after development
- Pharyngeal slits or clefts
 - Grooves in the pharynx that develop into gills or a filter to capture food with

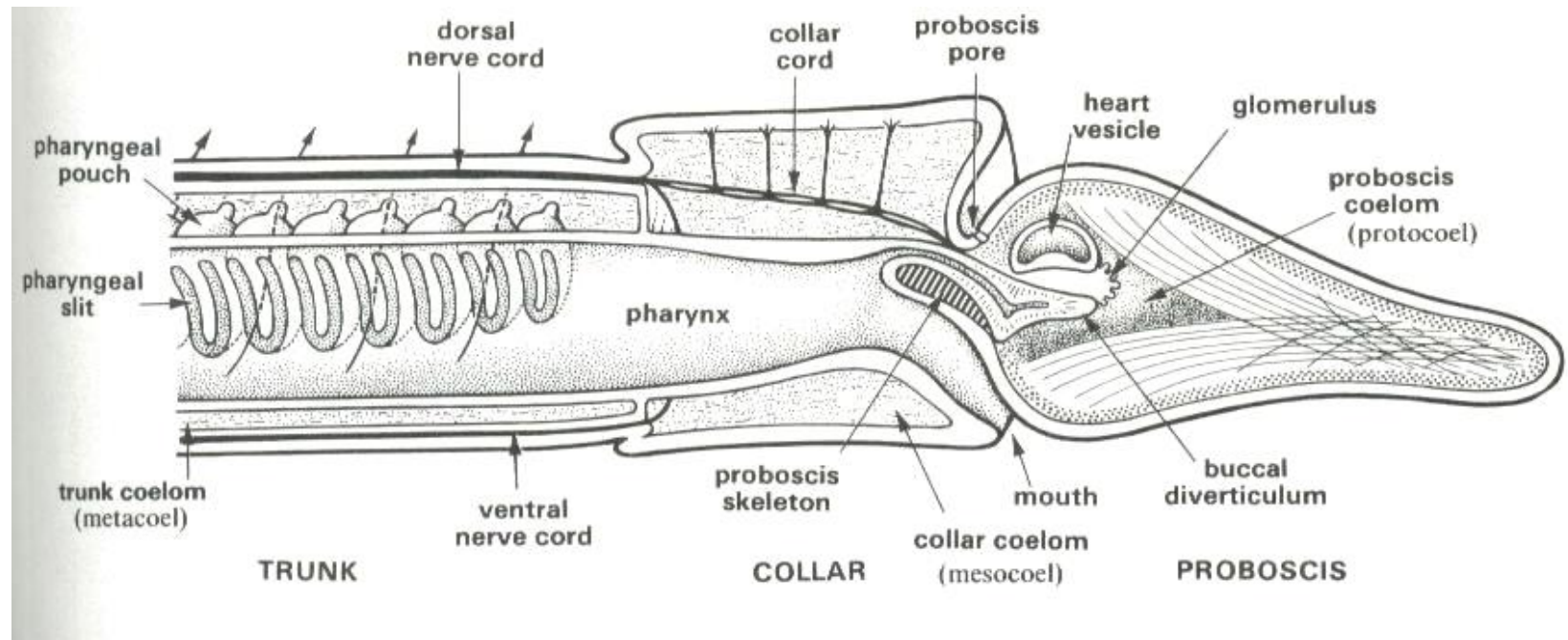
Subphylum Hemichordata

- حدود صد گونه از آنها در آبهاي شور يافت شده اند.
- اندازه بدن از يك ميليمتر تا 2.5 متر متغير است
- فسيل آنها از دوره كامبرين بدست آمده است.
- طناب پشتي کوتاه بوده و در ادامه روده ديده مي شود.
- بدن سه قسمتي مي باشد و شامل خرطوم – يقه و تنه مي باشد.
- پوست داراي سلولهاي مژكدار و ترشحي مي باشد.
- ماده ترشحي بودار بوده و احتمالا در ضد عفوني نقش دارد. (2-5 دي بروموفنل)
- جنس هاي نر و ماده جدا هستند.
- لقاح خارجي دارند. لاروي بنام تورناريا پديد مي آيد.

شكل ظاهري بدن



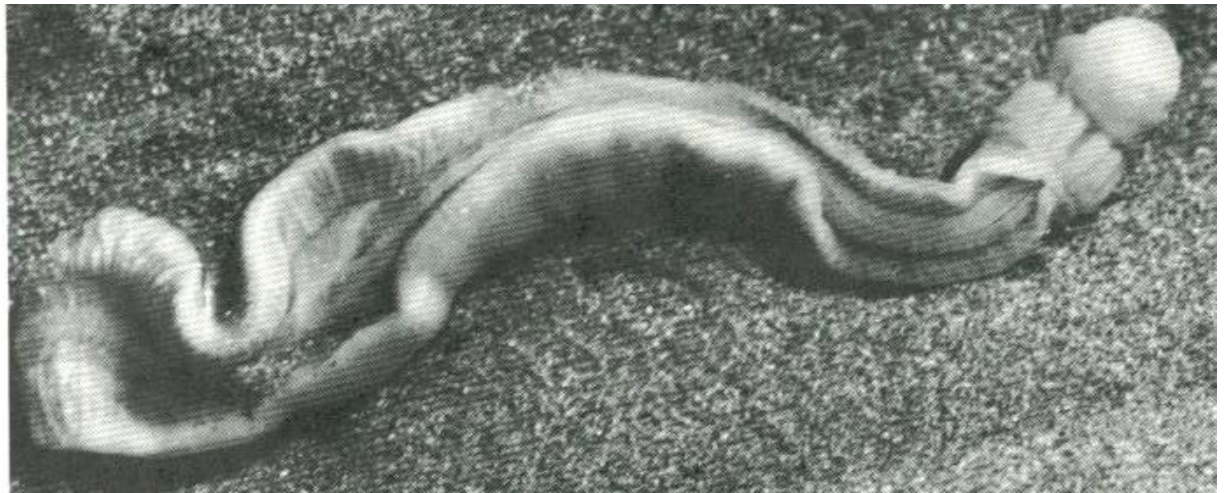
Body Structure



Habitats

زیستگاه

- این گروه با نقب زدن در شن های بستر زیست می کنند



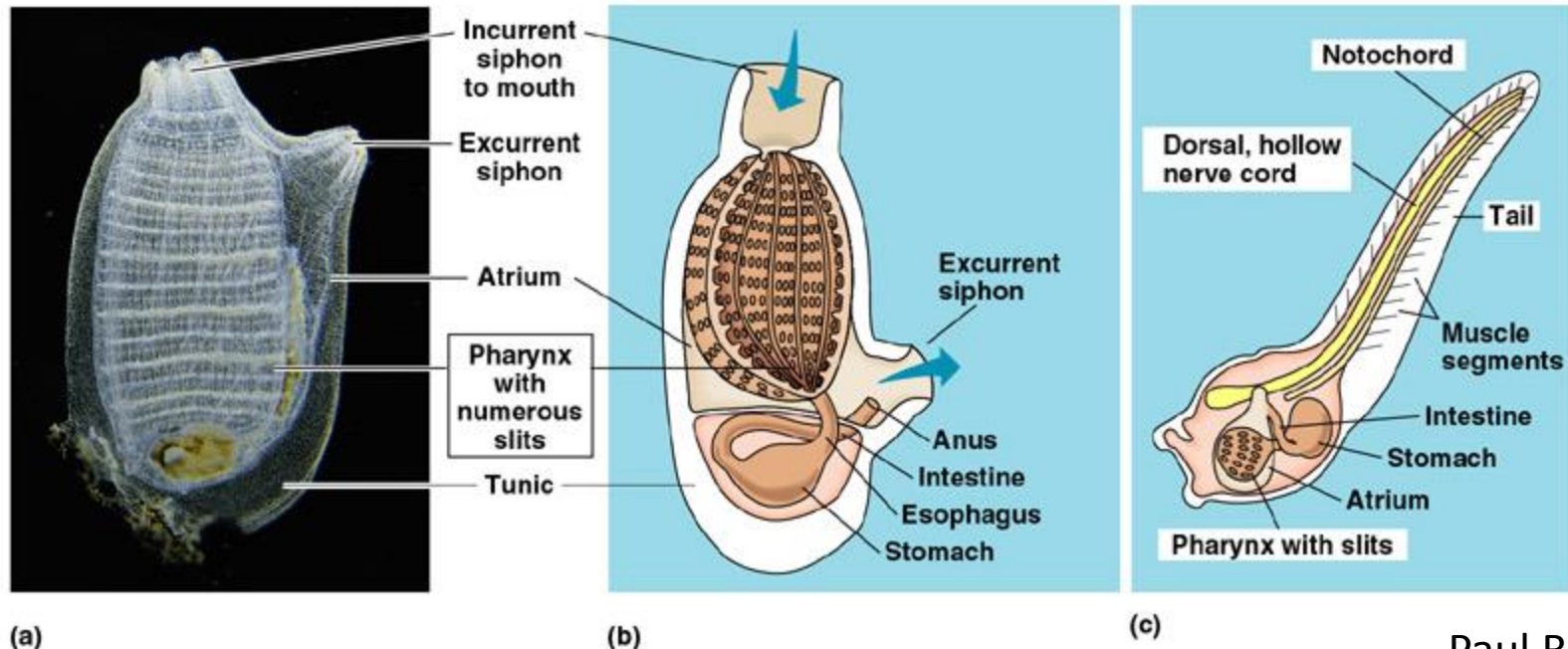
زیر شاخه تونیکاتا *Subphylum Tunicata*

غلاف داران

- در حدود 200 گونه از آنها شناخته شده است.
- نوتوکورد و نروکورد فقط در دوره لاروی مشاهده می شود
- اندازه بدن حدود چند سانتی متر است
- طناب پشتی در ناحیه دم دیده می شود به همین خاطر به یوروکورداتا هم معروفند.
- پوششی بنام تونی سین اطراف بدن آنها را می گیرد.
- هر مافرودیت هستند و لی نمی توانند خود را بارور کنند.

Urochordata

- Tunicates: at young age have dorsal nerve cord
 - As larvae, they swim, looking for a place to settle
 - Once they find a place to anchor, they undergo metamorphosis, losing many chordata characteristics (nervous system, muscles, etc.)

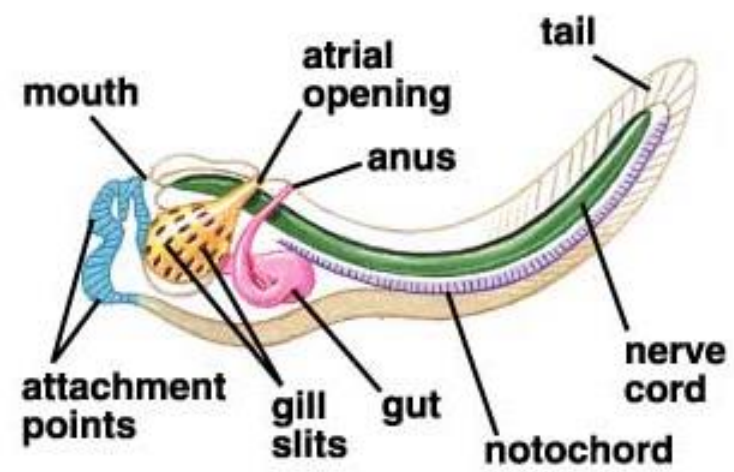


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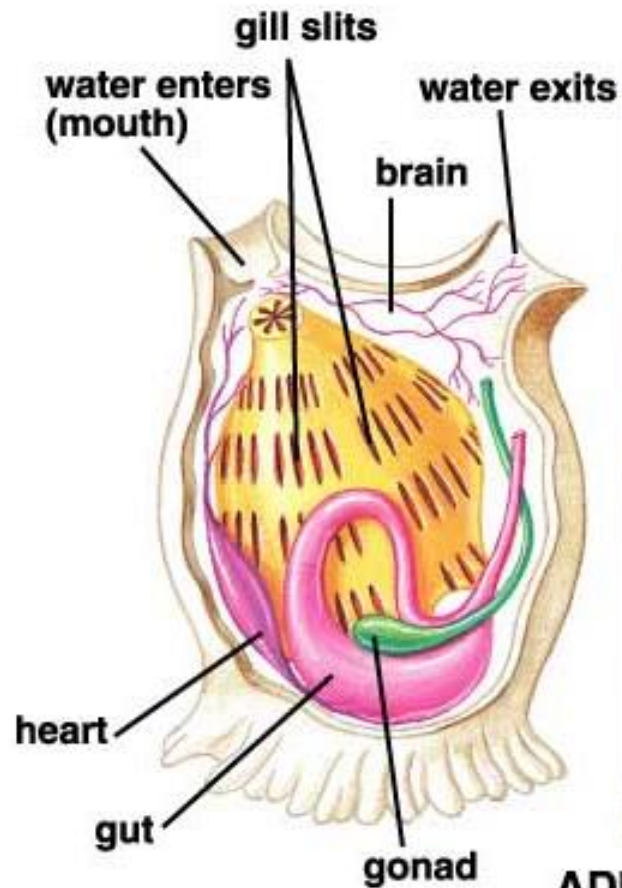
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Tunicate Diagram. Digital image. <http://kentsimmons.uwinnipeg.ca/16cm05/1116/34-03-Tunicate-L.jpg>. Pearson Education Inc. Web. 13 Mar. 10.

Tunicate



LARVA



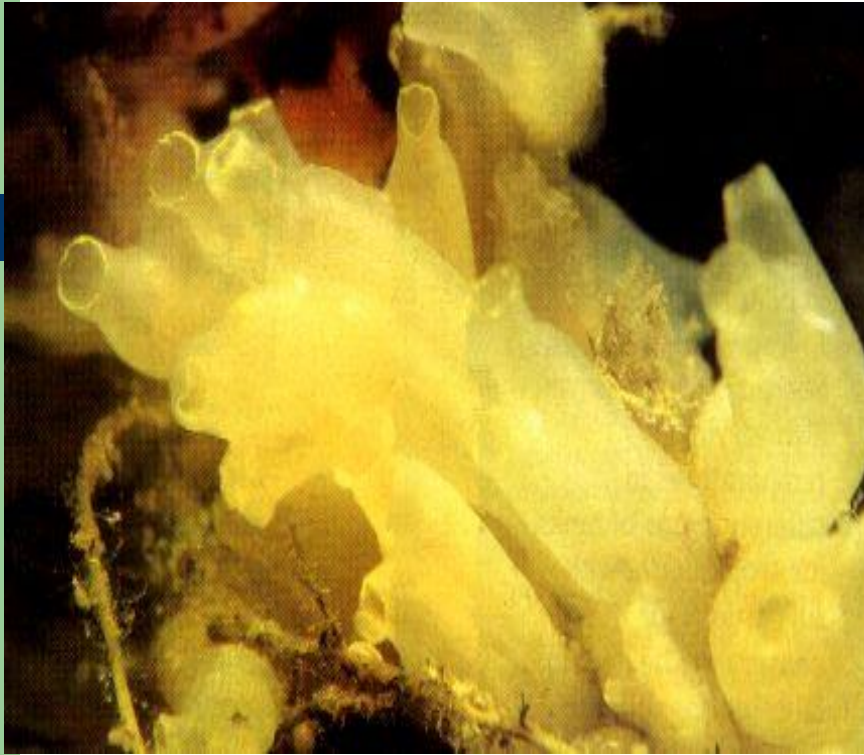
ADULT



Endostyle

اندو استیل

ساختماني از چند ردیف سلول مترشحه و مژکدار است که پروتئین خاصی را ترشح می کند. نقش این اندام به دام انداختن، جذب و هضم ماده غذایی همراه با لایه پروتئینی است. جنس ترکیب پروتئینی از یدو تیروزین است



Sea Squirts are fouling
organisms on wharves and
piers
Ciona intestinalis



Lightbulb Sea Squirt, *Clavelina
lepadiformis*

زیرشاخه سفالو کورداتا *subphylum Cephalochordata*

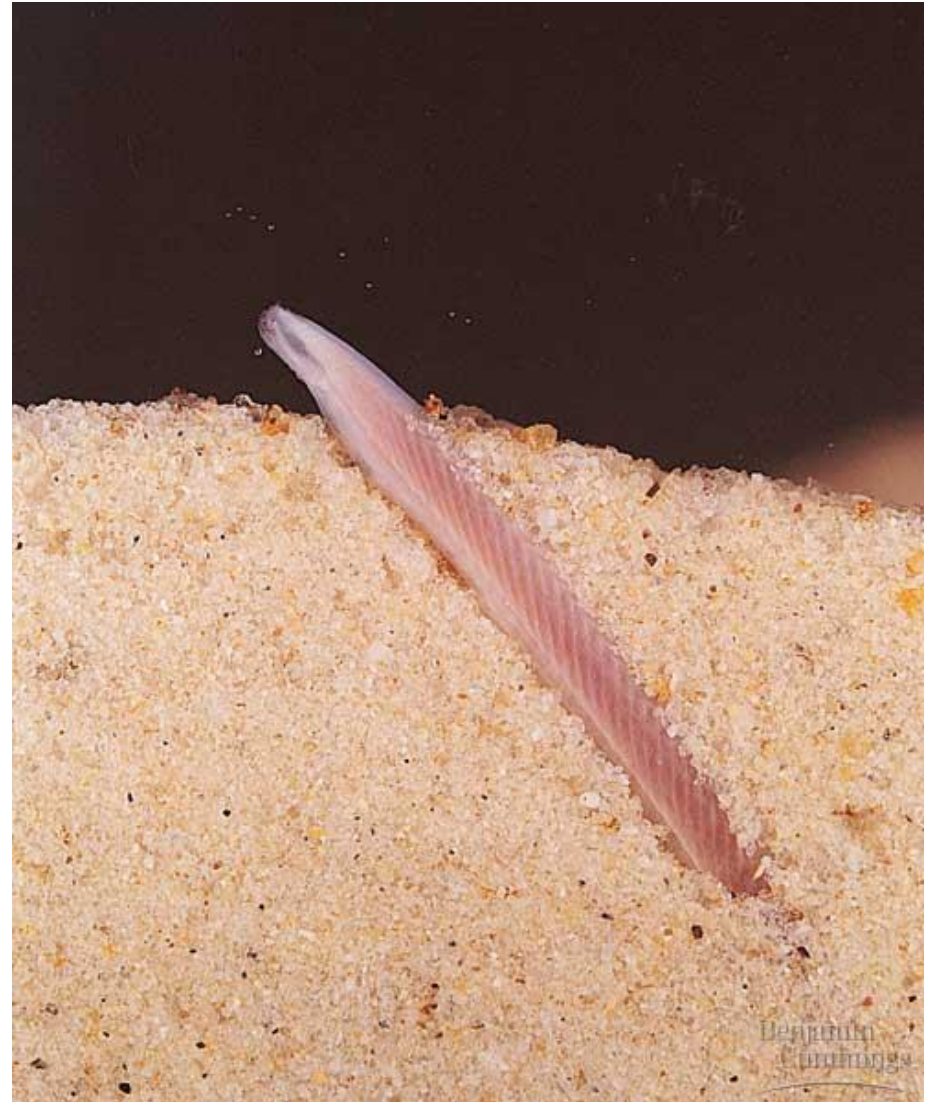
- نمونه شاهد آن آمفیوکسوس (لانسلت) است.
- شبیه ماهی می باشد اما برخلاف آن اندام حرکتی مانند باله های زوج را ندارد تنها یک باله فرد دمی دارد.
- فاقد قلب است.
- طناب پشتی و شکاف آبششی دائمی است.
- ساختمان میوتوم را می توان دید. <<<<<
- جنس ها جدا هستند.
- خون بی رنگ است.



يك سفالو كوردات تيپيك بنام آمفيوكسوس

Cephalochordata

- Lancelets: Get their names from their bladelike shape
- As larvae alternate between swimming upwards and passively sinking to eat plankton
- After metamorphosis into adults, they burrow into the sand and leave their head exposed to filter in food



Sample Animals

Urochordata
Sea squirt

Adult Tunicate



Tunicate. Digital image. Web. 13 Mar. 2010.
<<http://dbtgr.hgc.jp/cintestinalis1.png>>.

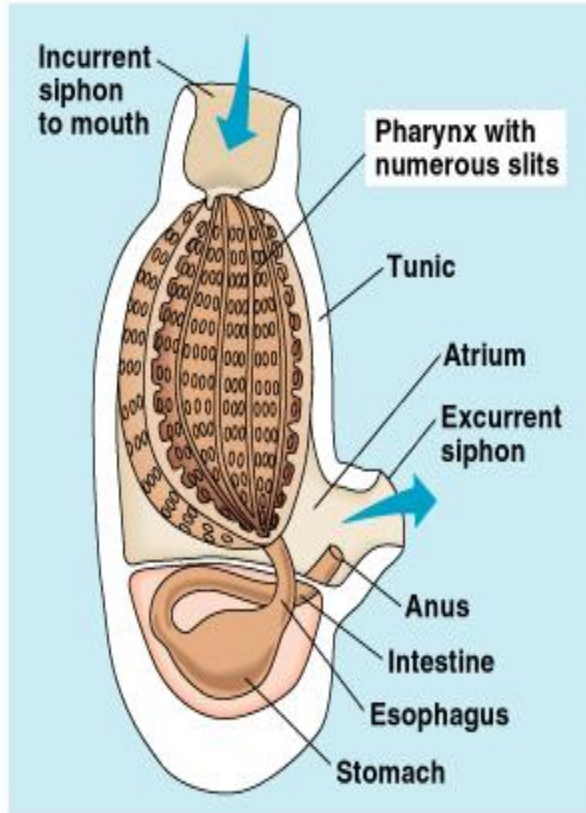
Cephalochordata

Lancelet



Digital image. *Echinoderms and Nonvertebrate Chordates*. Wikipedia. Web. 13 Mar. 2010. <<http://authors.ck12.org/wiki/images/8/88/BiolI-3002-15.png>>.

Body cavity



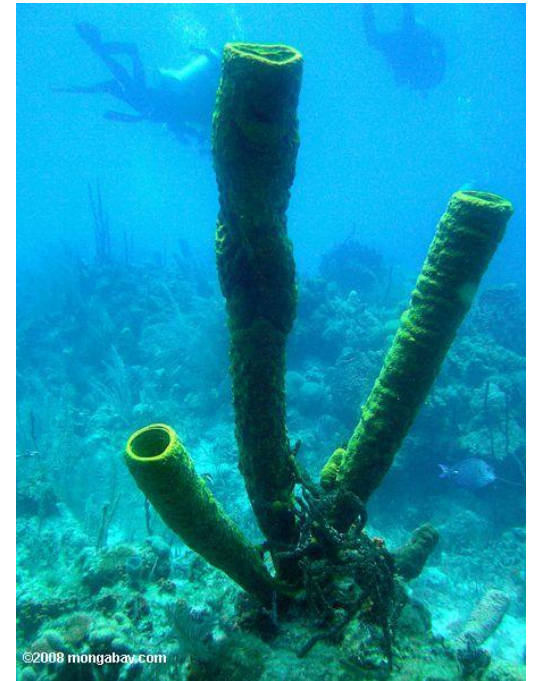
(b)

© 1999 Addison Wesley Longman, Inc.

- Tunicates: water is filtered into the atrium from the incurrent siphon and exits through the excurrent siphon.
 - Mucus net captures food particles and delivers it to digestive system
- Lancelets are similar except smaller atrium and they have a mouth

Nervous system

- Have a hollow, dorsal nerve (Urochordata only as larvae)
- Lancelets have a swollen tip of the dorsal nerve, which is not a true brain



Digital image. *AllPosters*. Web. 13 Mar. 2010.
<<http://img.allposters.com/6/LRG/29/2910/QDSPD00Z.jpg>>.

Giant Sea Sponge. Digital image. *Mongabay*. Web. 13 Mar. 2010.
<http://travel.mongabay.com/belize/600/belize_uw0087.JPG>.

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Circulatory system

- Tunicates have a heart and large blood vessels
 - Periodically changes the direction of flow of blood
- Lancelets have colorless blood which moves through a ventral vessel and back through a dorsal vessel



Lancelet (Branchiostoma lanceolatum)).
Digital image. Web. 13 Mar. 2010.
<<http://www.daviddarling.info/images/lancelet.jpg>>.

Digestive system

- Urochordata are filter feeders: they pump water and eat food particles that they filter into their stomachs.
- Cephalochordata feed on plankton as larvae, as adults they bury their bodies in the sand and filter water for food.



Digital image. Web. 13 Mar. 2010.
<<http://interactive.usc.edu/members/rosenblj/archives/plankton.jpg>>.

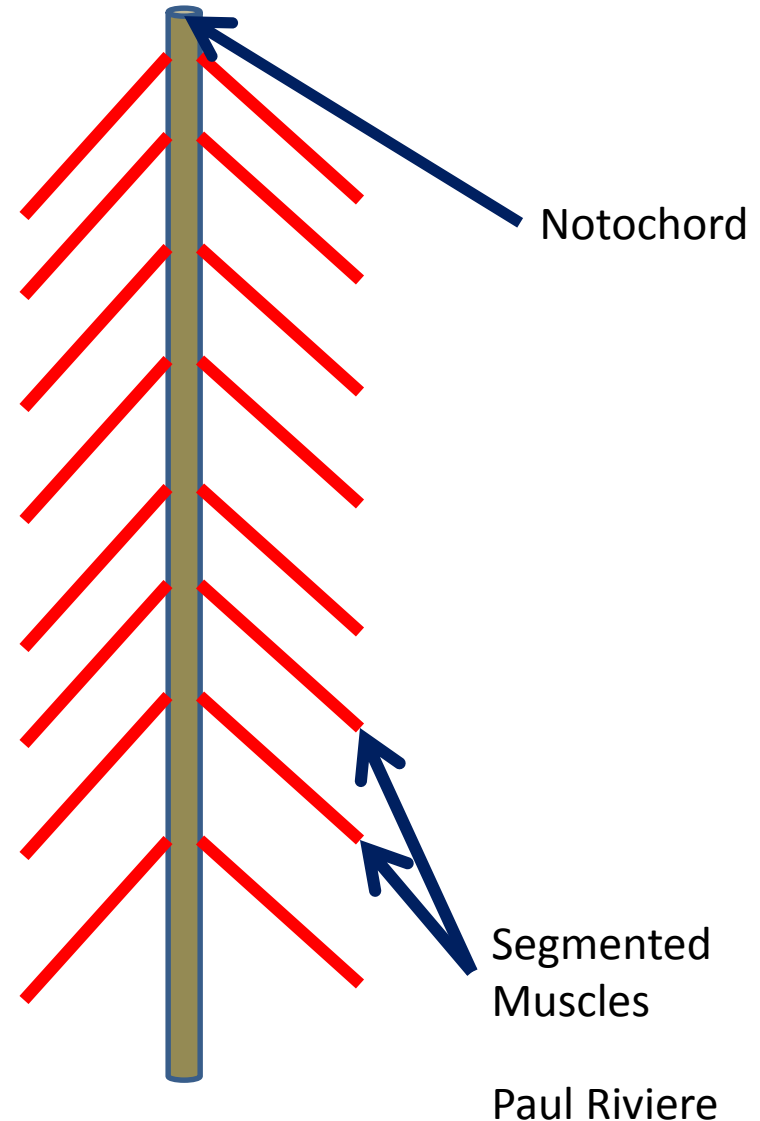
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Excretory system

- Lancelets pump water out through the atriopore, separately from waste
- Urochordata pump out water and waste with an excurrent siphon
 - Both have a separate mouth and anus

Locomotion/musculature

- Both have muscles that allow them to swim, though urochordata only as larvae
- Lancelets have segmented muscles that allow them to undulate



Skeletal type

- Notochord is a defining trait of these two phyla
 - It is a soft, flexible rod that is located between the digestive and nervous systems.
 - Allows these animals to swim

Primitive skeletal system, and notochord forms in almost all more advanced species at some point in development.

Sensory structure/features

- As larvae, Urochordata have light and gravity sensitive cells
- Cephalochordata use their tentacles as sensors



BlueBell Tunicate. Digital image. Web. 13 Mar. 2010. <<http://www.aboututila.com/PhotoGallery/DeepBlue/Photos/Bluebell-Tunicate-01.jpg>>.

Reproduction

- Urochordata
 - Both male and female (Hermaphroditic)
 - Can reproduce sexually or asexually (budding)
- Cephalochordata
 - Either male or female
 - Reproduces sexually

Gas exchange

- In Lancelets and Tunicates, gas exchange takes place across the body surface, as well as through pharyngeal slits



Other

- Tunicates can make cellulose
- Slits that allow water that enters mouth to leave body without entering digestive track.
 - Later evolve into gills for some vertebrates.
 - For tetrapods, become parts of ears, neck, and head: pharyngeal clefts

QUIZ

- 1. Cephalochordata use what as sensory features?
 - a) Tentacles
 - b) Tail
 - c) Mouth
 - d) Pharyngeal slits