Chapter 15: Chordata

Subphyla

Urochordata

1400 spp

Cephalochordata →

29 spp

Vertebrata

48000 spp

Chordate Characteristics

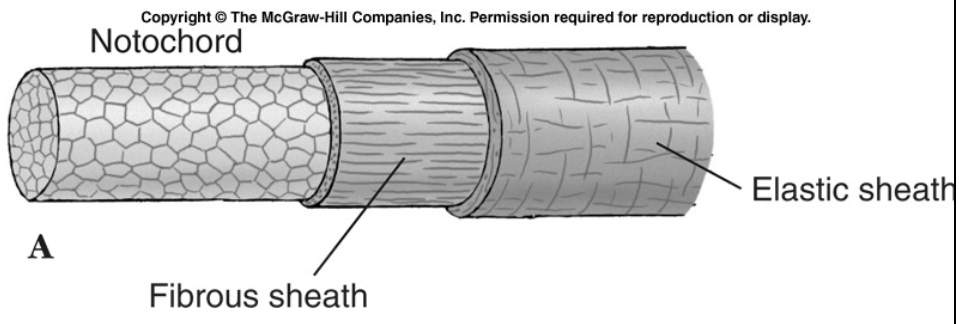
bilateral symmetrical
deuterostome

distinctive characteristics

- **notochord**
- **dorsal hollow nerve cord**
- **pharyngeal pouches or gill slits**
- **postanal tail**
- **endostyle**
  - **recently recognized**
  - **secretes mucus in invertebrate chordates/ lamprey larvae**
  - **becomes the thyroid glands in adult lamprey/remaining vertebrates**

Vertebrata → Craniata

Figure 23.01a



Subphylum: Urochordata **(Gr: tail string)**

Class: Ascidiacea	**1250 spp**
Class: Larvacea	**70 spp**
Class: Thaliacea	**70 spp**

Figure 23.06

Class: Ascidiacea (solitary tunicates)

larval stage

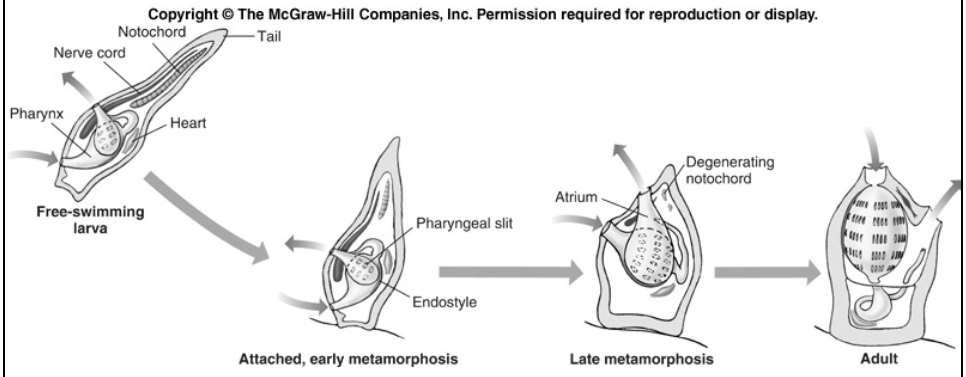


Figure 23.04

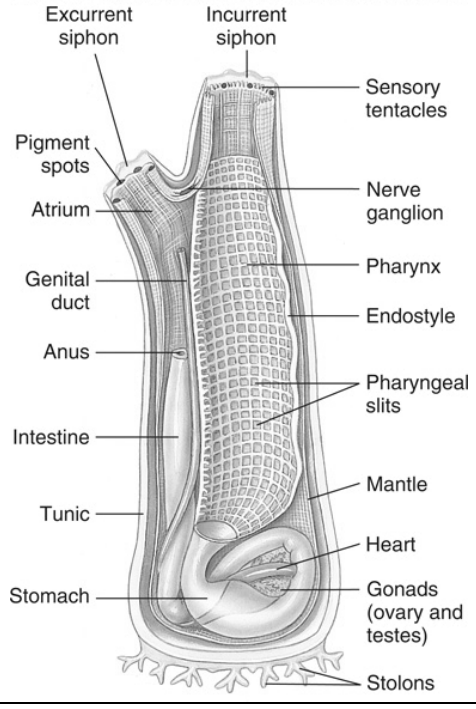
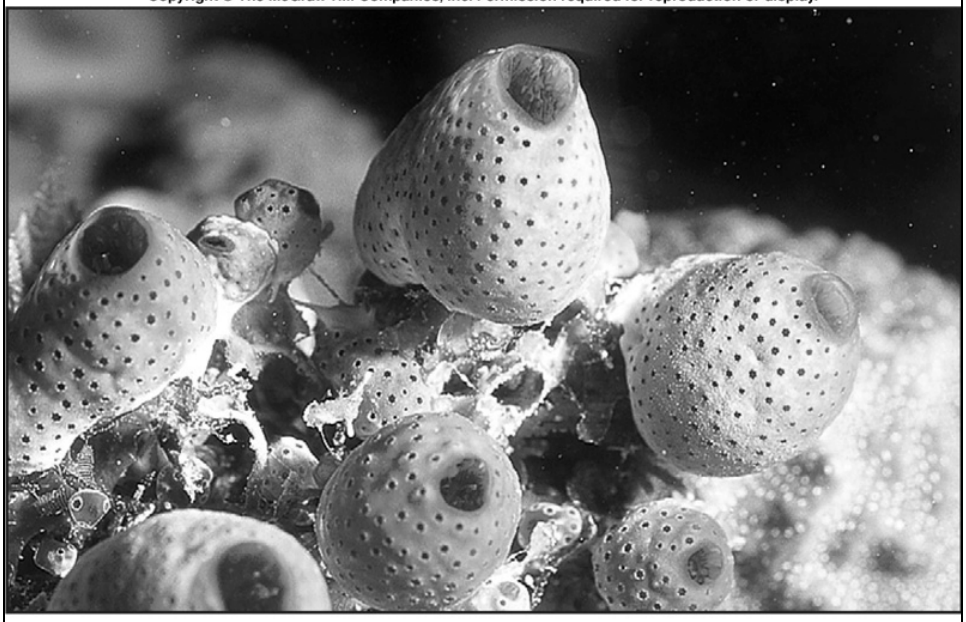
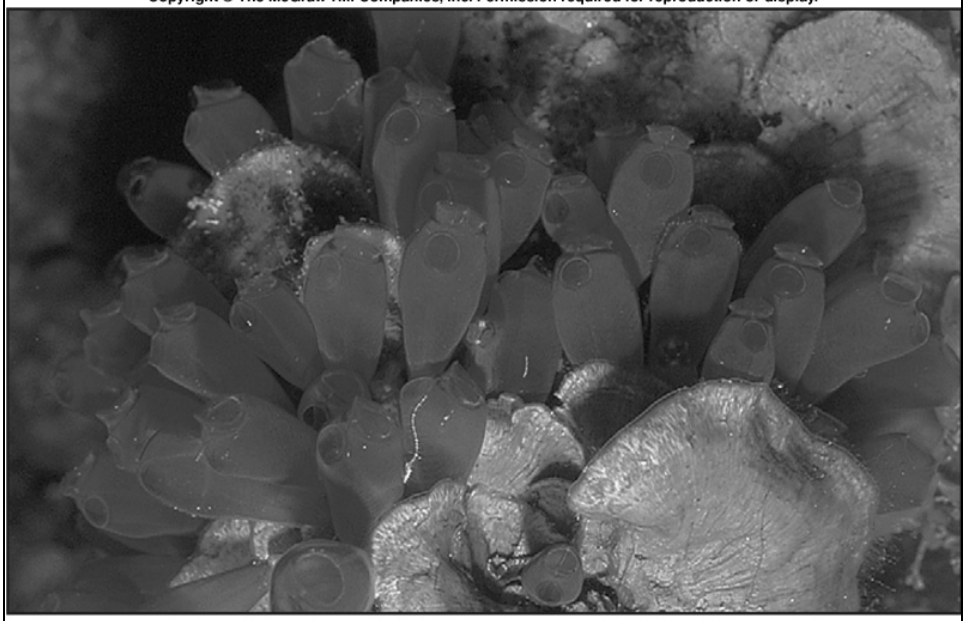


Figure 23.05b



B

Figure 23.05a



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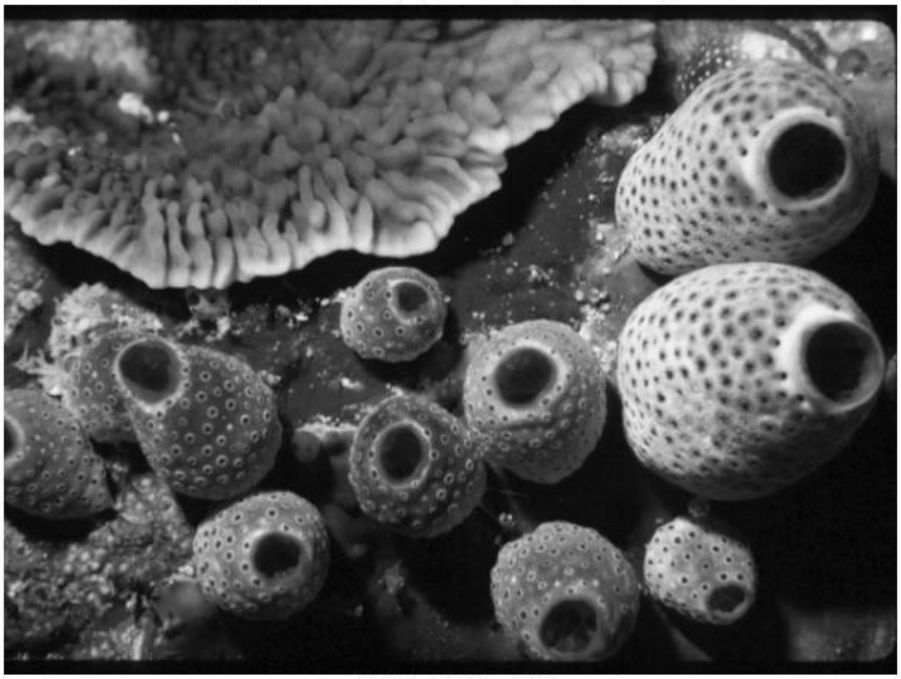
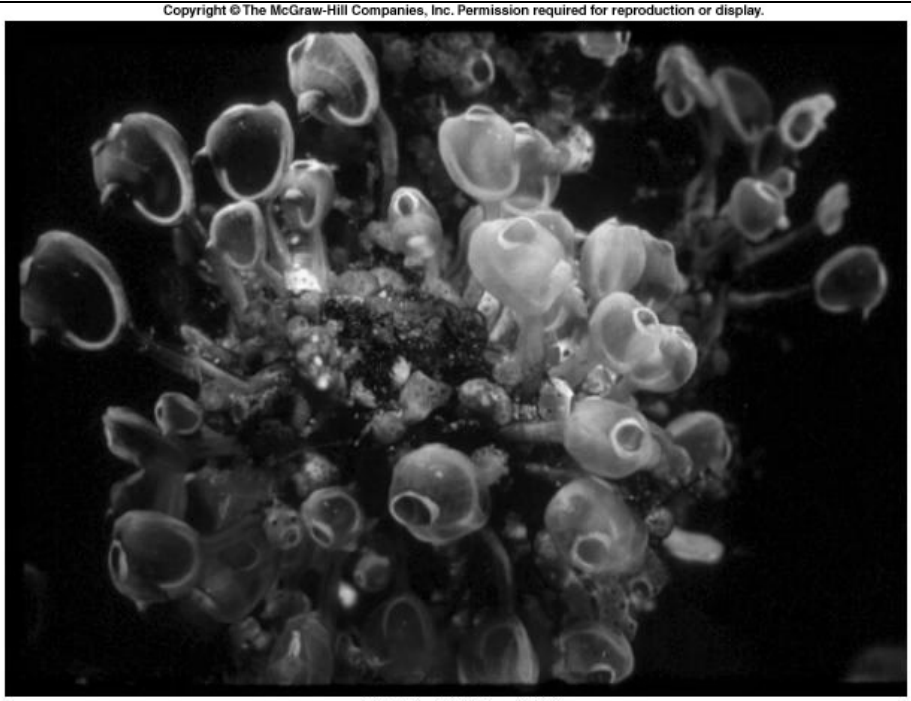
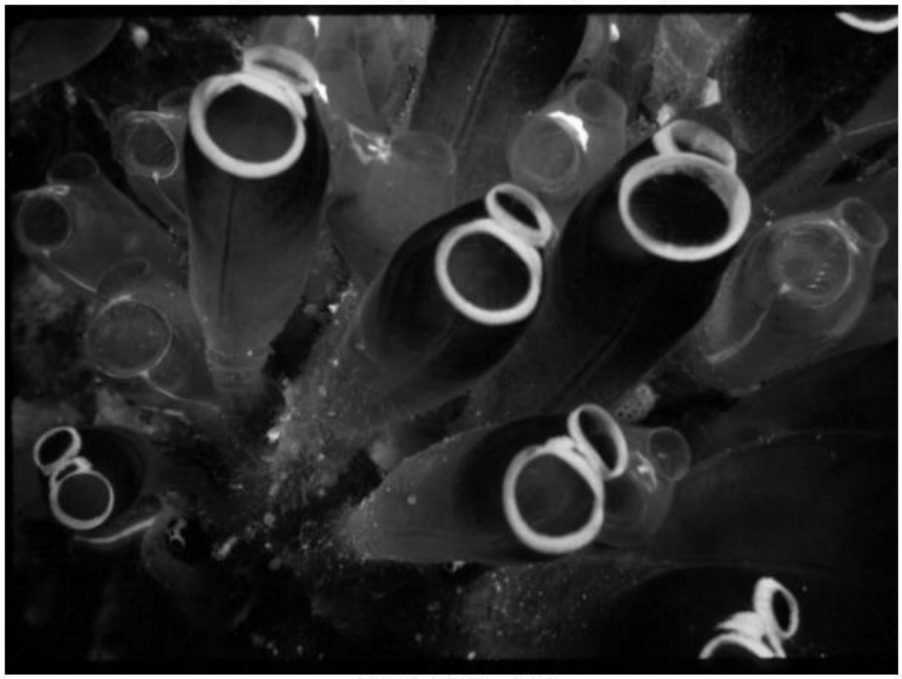
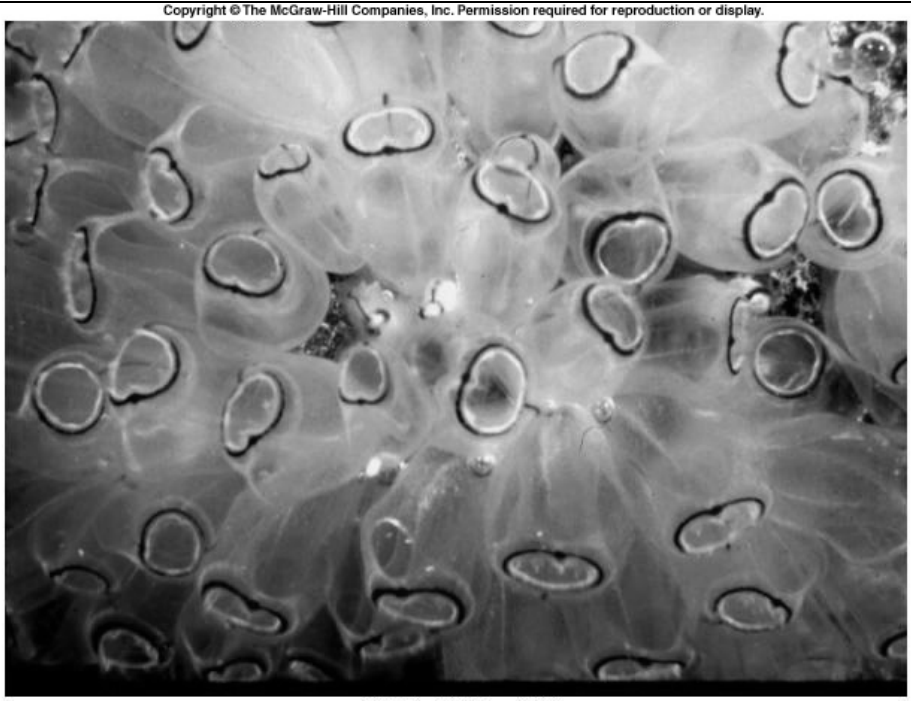








Class: Larvacea — larvalike pelagic, walnut size

1869 tunicate tadpole larva → descendant of an ancient free-swimming chordate ancestor

Paedomorphosis (Gr: child + form)

Walter Garstang 1928

sexually mature animals retaining larval characteristics

1) neoteny-slow growth rate of body form→ adult form never attained at maturity

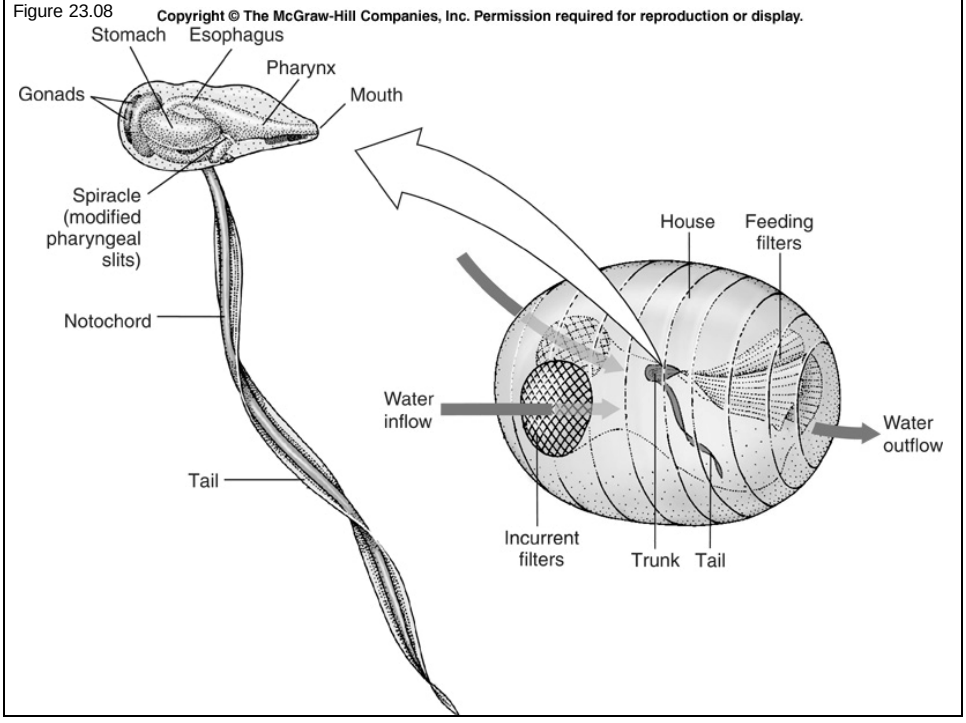
2) progenesis-precocious maturation of gonads in larval form; body stops growing→ never attains adult form

3) postdisplacement: onset of a developmental process delayed relative to reproductive maturation→ adult form is not attained

build gelatinous houses every 4 hrs

food source for fish in pelagic open oceans

Figure 23.08



Class: Thaliacea

free-living, planktonic

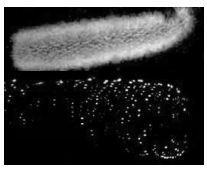
achieve mobility through modification of adult rather than larval form

- **buccal & atrial siphons at opposite ends**
- **highly developed bands of circular muscles**

nearly transparent

- **avoid detection by predators**
- **avoid detection by prey**

100-1000 of individuals/m^3



pyrosomes

ciliary activity

- **drives food through large pharnygeal basket**
- **provides locomotion**

salps

pharnygeal basket reduced to bar

cilia compact mucus net & food string

muscular contraction-feeding/locomotion

doliolids

pharnygeal cilia→ feeding currents

close buccal aperture
contract circular muscles → **5 mm individual travel 25 cm/sec**

Figure 23.07

Cephalochordata

small <10 cm length

laterally flattened

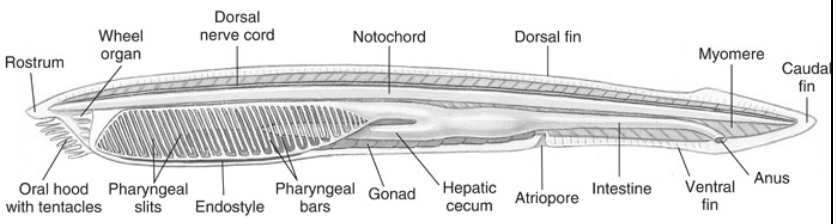
notochord extends beyond the nerve cord to anterior end

notochord contractile→ V-shaped muscles called myomeres

Figure 23.09

Amphioxus (Gr: both ends sharp)
***Branchiostoma* (Gr: gill mouth)**

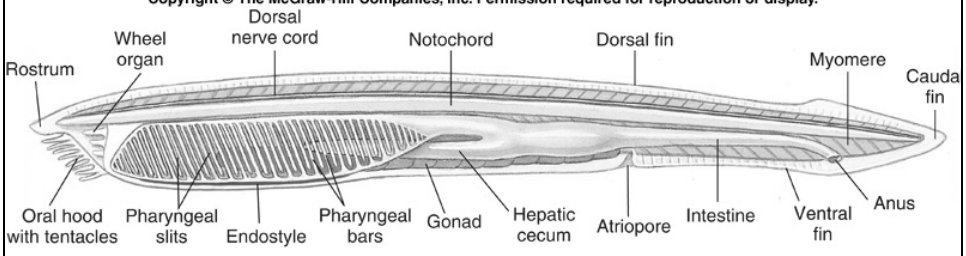
A



B

Figure 23.co

Figure 23.09b



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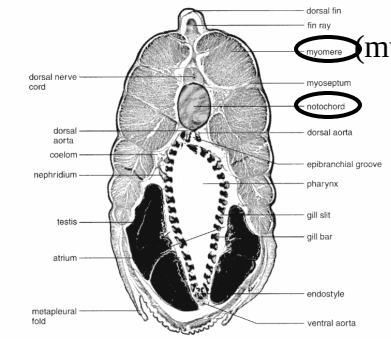


(muscles)

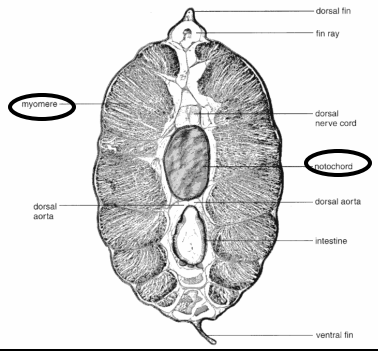


Figure 23.10

Pikaia an early chordate (cephalochordate) from Burgess Shale

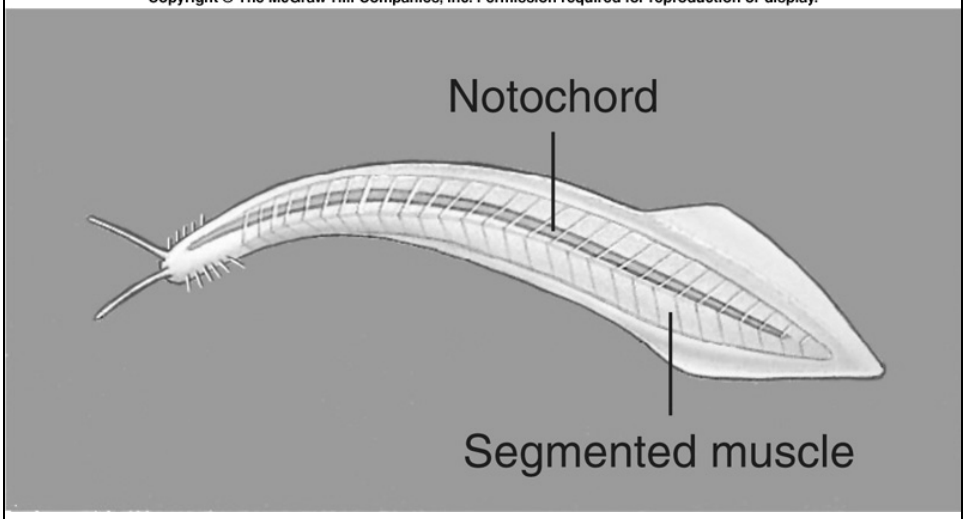
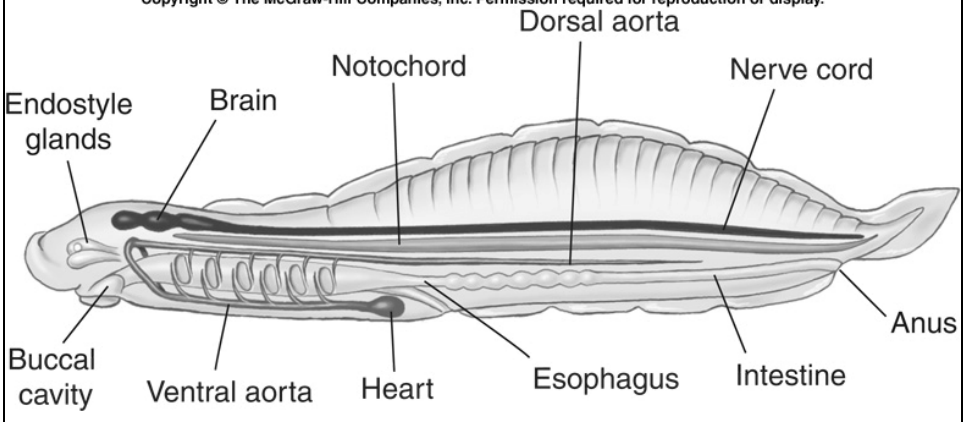


Figure 23.11

Haikouella, a chordate from early Cambrian shales of Haikou, China



Chordate Larval Stage

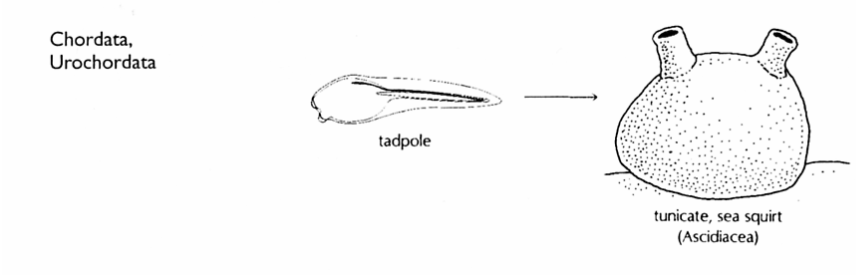


Figure 23.12

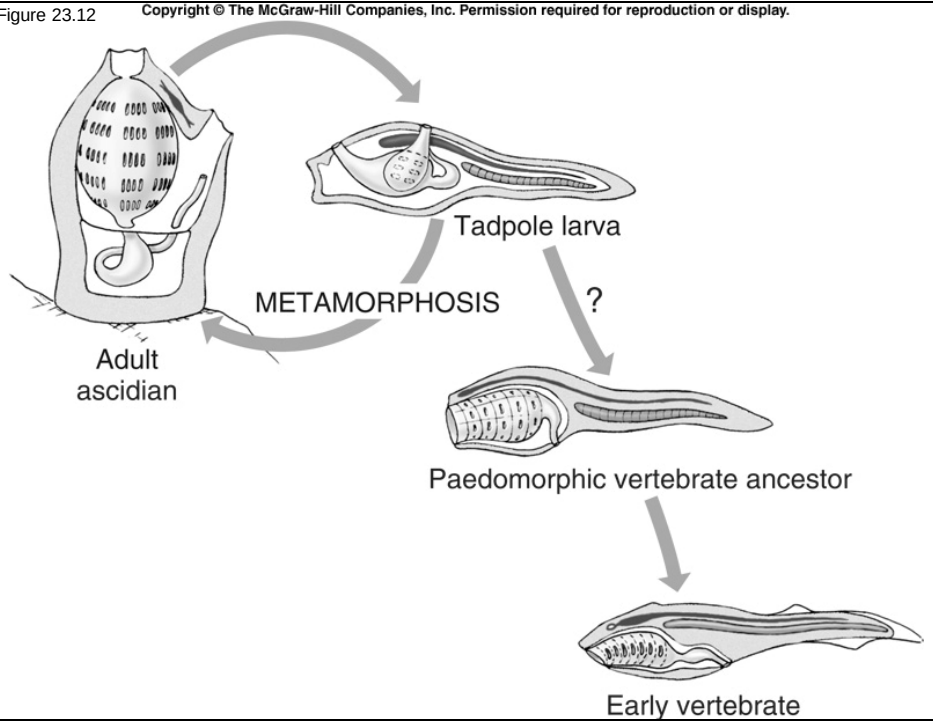


Figure 23.13

larval stage of lamprey

resemble amphioxus except

well-developed brain

paired eyes

pronephric kidney

heart

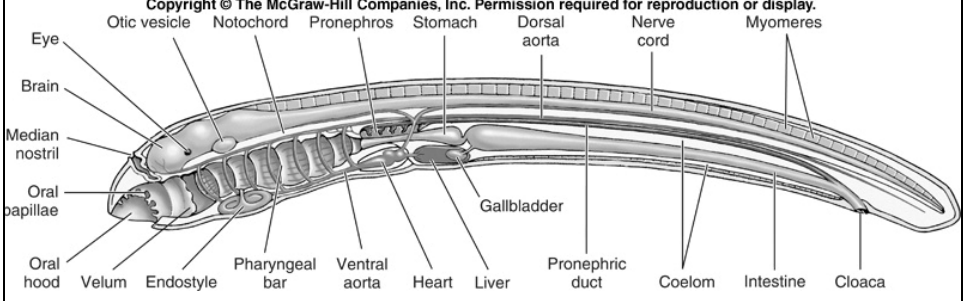


Figure 23.15

Conodont vertebrate ancestor
Paleozoic fossils similar to amphioxus

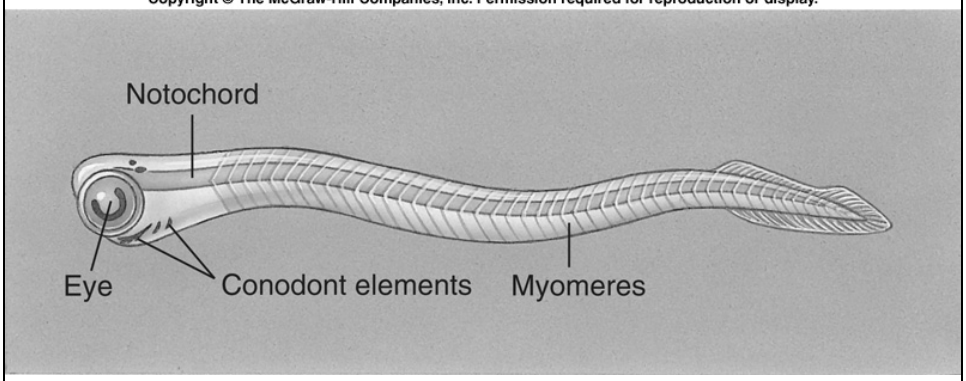


Figure 23.01b

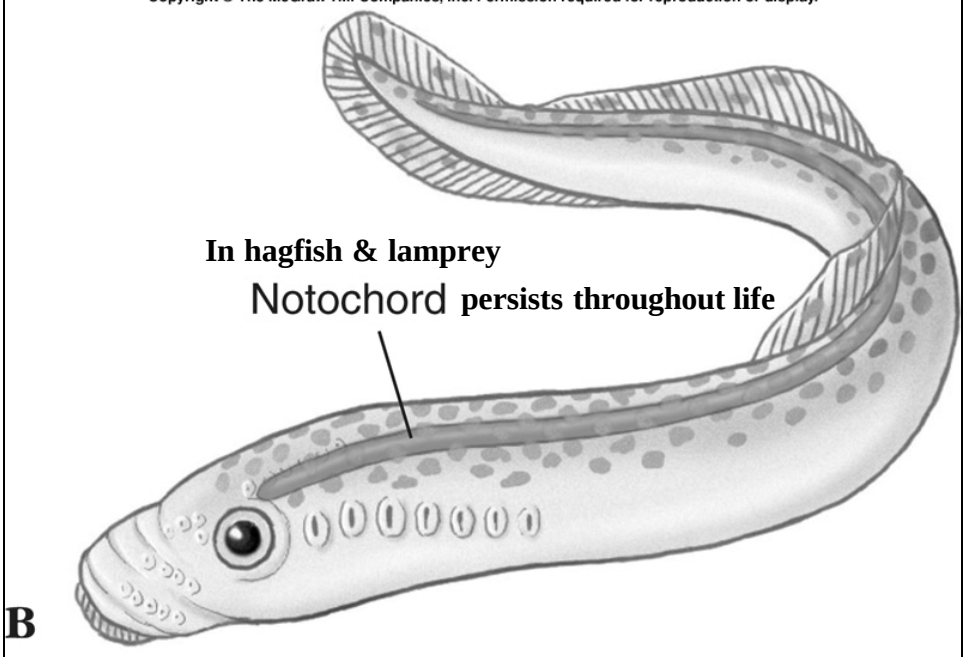


Figure 23.02