2nd largest phylum 50,000 – 110,000 described species

Classes:

Polyplacophora 800 spp

chitons, gumshoe chiton

Aplacophora 288 spp

worm-like without shells <5mm in length
200-3000 meters (some up to 7000 m) depths

Monoplacophora 19 spp

mantle tissue → 1 or more calcareous shells without spicules

Gastropoda 40,000-75,000 spp

snails, limpets, slugs, whelks, conchs, periwinkles, sea hares, sea butterflies

Bivalvia 7650 spp

clams, oysters, scallops & mussels

Scaphopoda 350 spp

tusk-shaped conical shells (15 cm long) shallow water to great depths

Cephalopoda 600 spp

nautilus, squid, cuttlefish & octopus

Class: Polyplacophora

(Greek many plate bearing)

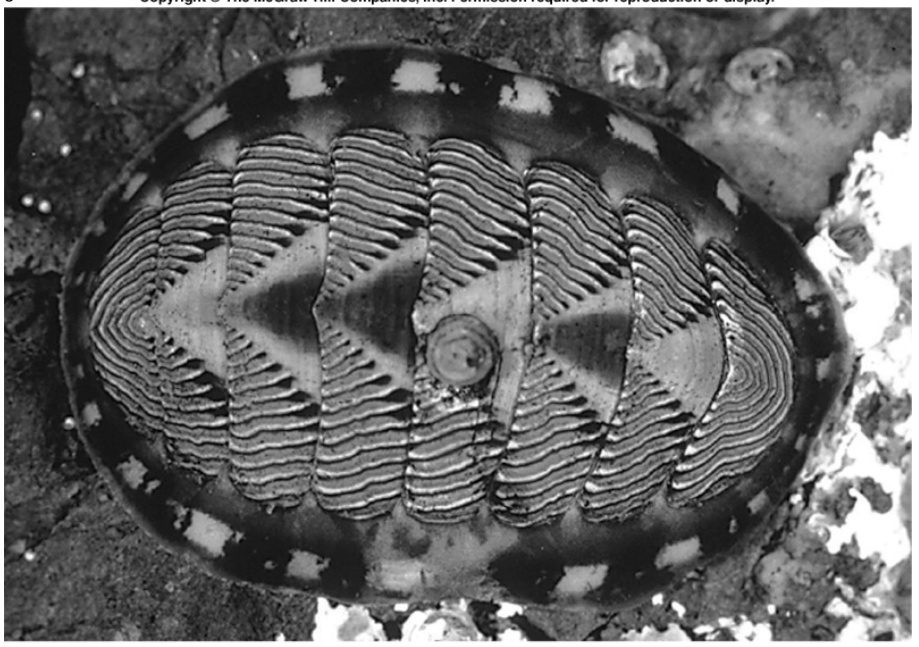
800 species

chitons

Characteristics

1) shell→ 7 to 8 overlapping/articulating plates
2) thickened mantle protrudes laterally with plates embedded → "**girdle**"
3) mantle cavity houses up to 80 bipectinate gills
4) water flow anterior to posterior
5) herbivores—scraping algal films from substrate with **radula/odontophore**
6) few carnivorous

Figure 16.01a



A

Figure 16.09a

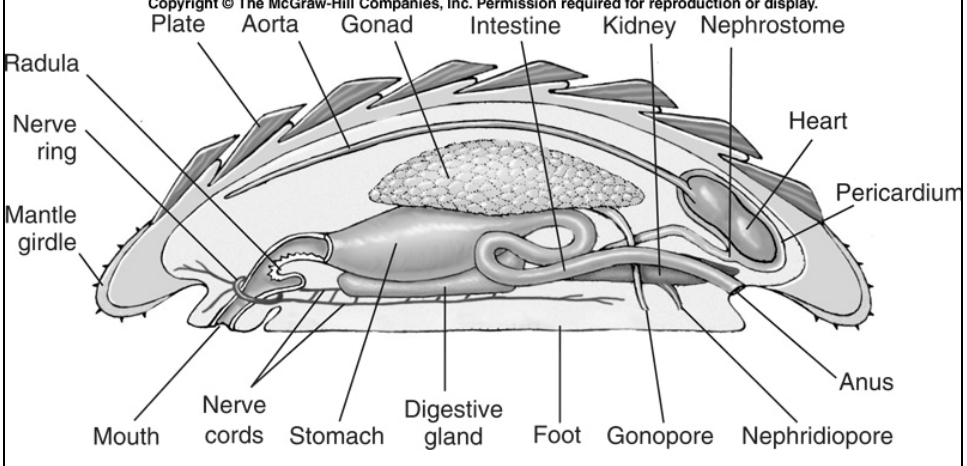


Figure 16.09b

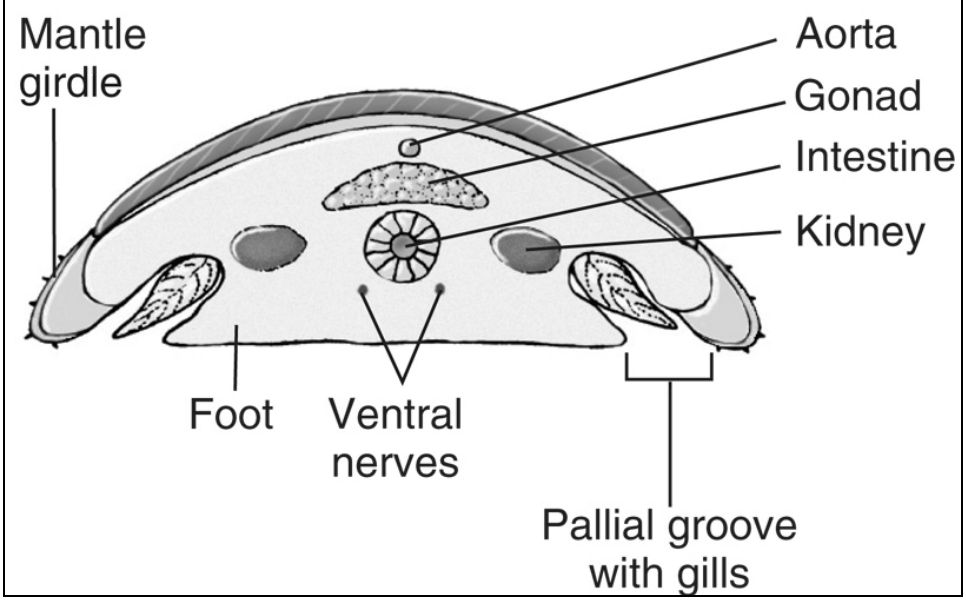


Figure 16.09c

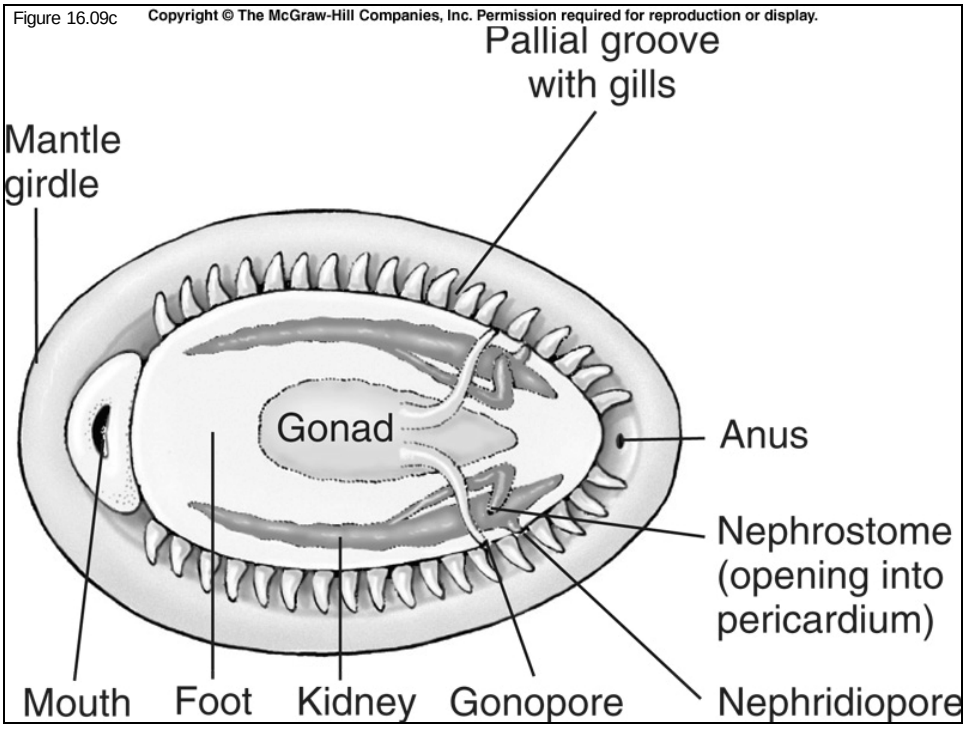
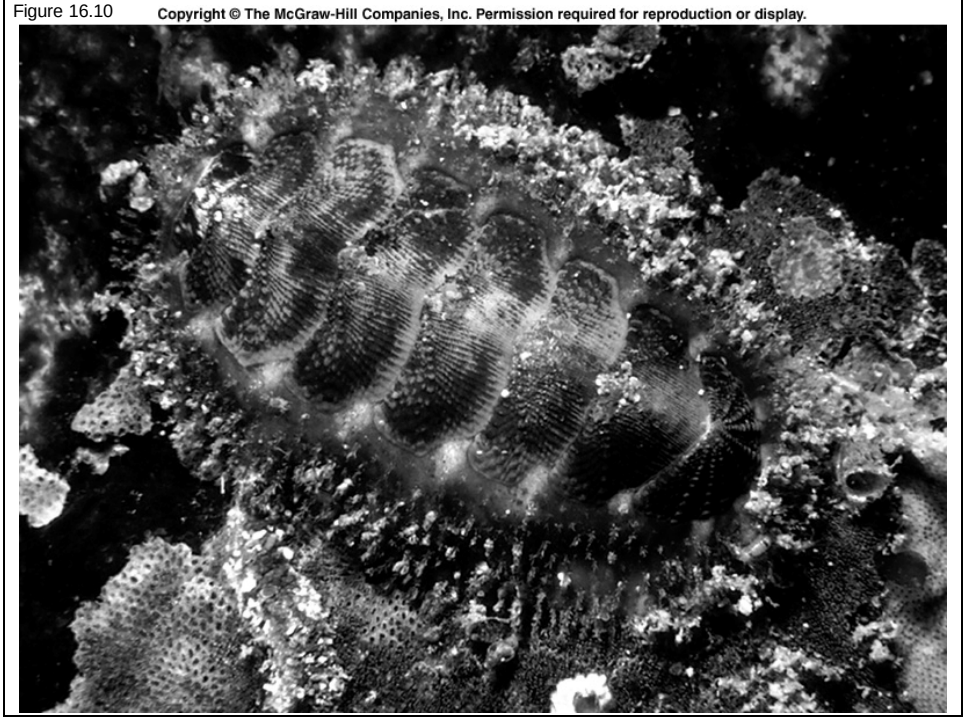


Figure 16.10



Class: Gastropoda

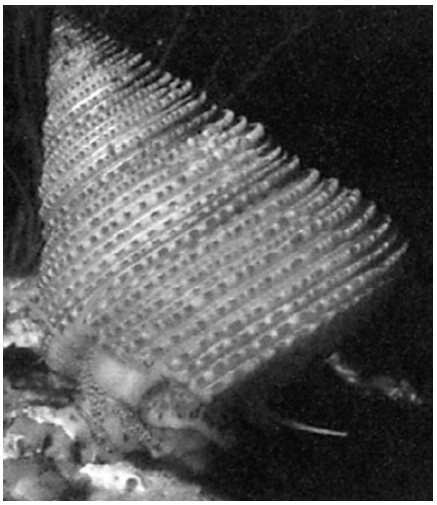
(Greek: stomach foot)

70,000 species/15,000 fossil

snails, slugs

Characteristics

1) shell→ continuous univalve/compact coiled/absence
2) torsion: 180º counterclockwise twist of the body occurring during veliger larval stage
3) reduction of mantle cavity
4) reduction of numbers of gills
5) restricted water flow
6) herbivores—scraping algal films from substrate with radula/odontophore
7) carnivorous



Calliostoma annulata

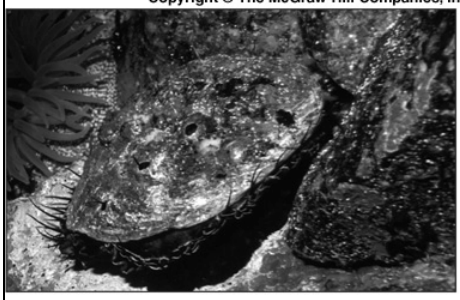
Nucella

nudibranch egg ribbons

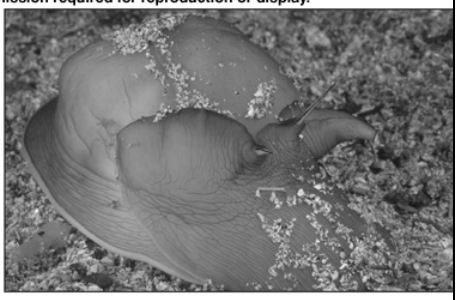
Cyphoma gibbosum – flamingo tongues

Caribbean corals

Figure 16.15



A abalone



B moon snail

Conus
1) extends proboscis attract fish
2) stings & injects venom
3) engulfs fish with distensible stomach

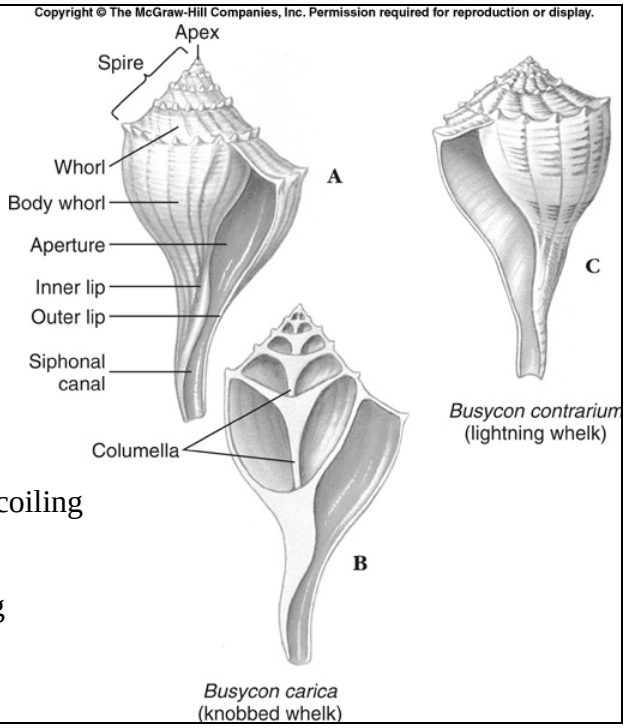
regurgitates scales & bones several hrs later

B

0063.jpg

Figure 16.12

Coiling → Shell



left: counterclockwise coiling
sinistral

right: clockwise coiling

dextral

Figure 16.13

Torsion 180° counterclockwise twist of the visceral mass

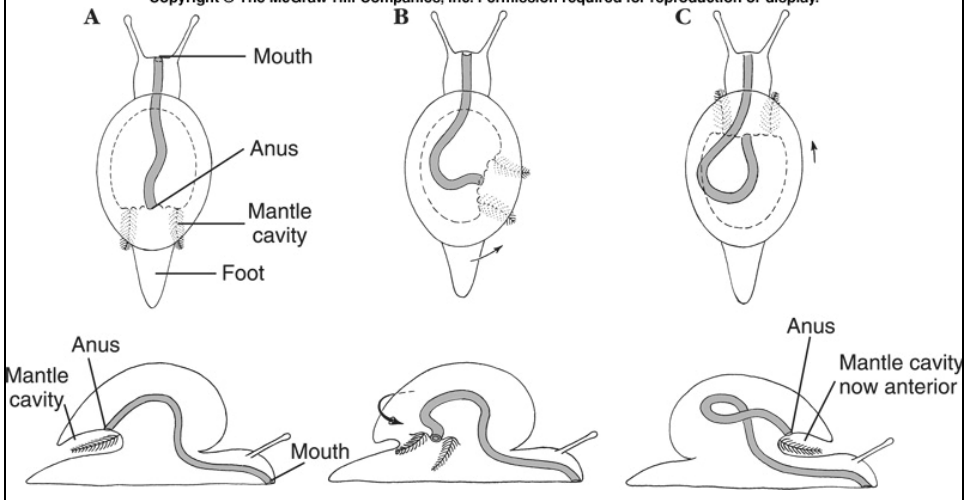
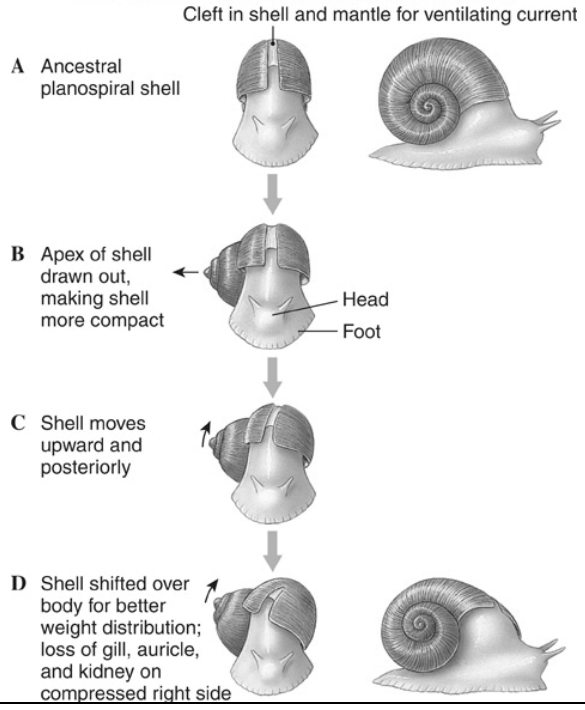
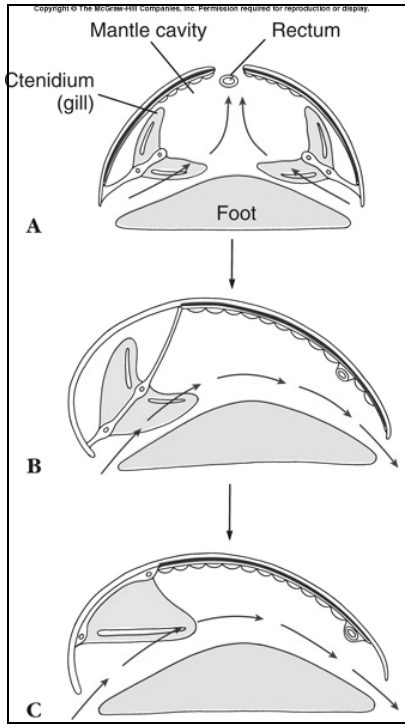


Figure 16.14



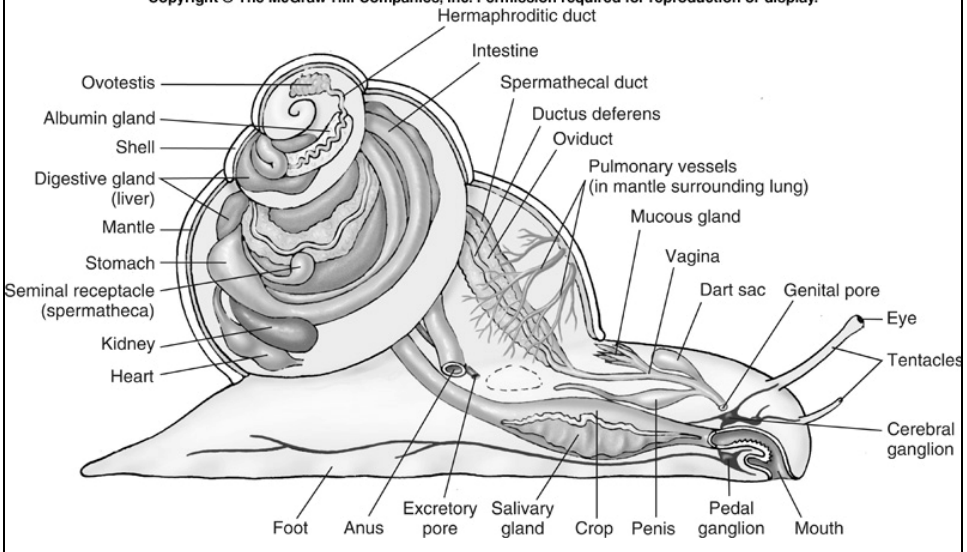


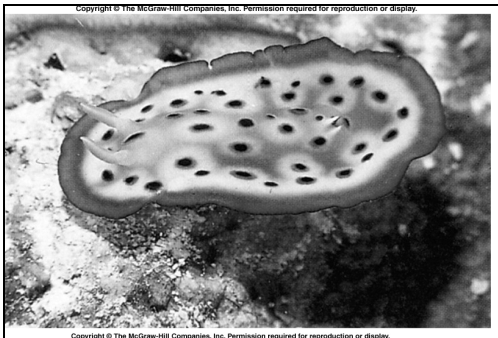
Diadora aspera — keyhole limpet

lost of one ctenidium

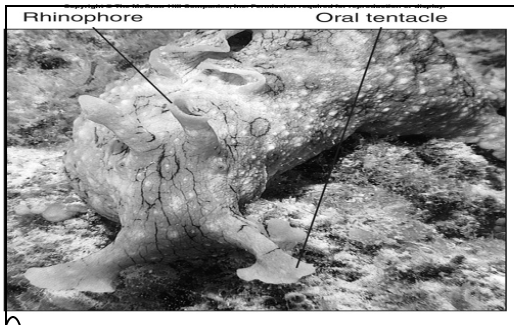
derived condition lost of filaments→ most marine gastropods

Figure 16.18

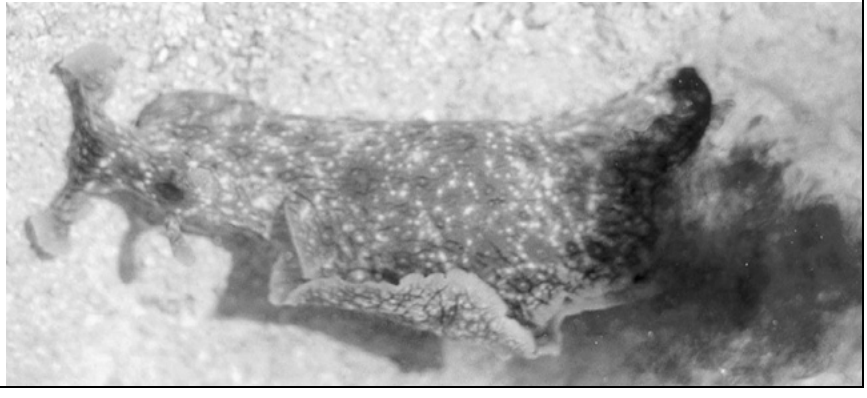




B



Aplysia sea hare



Class: Bivalvia

(Latin: two valved)

7000 species

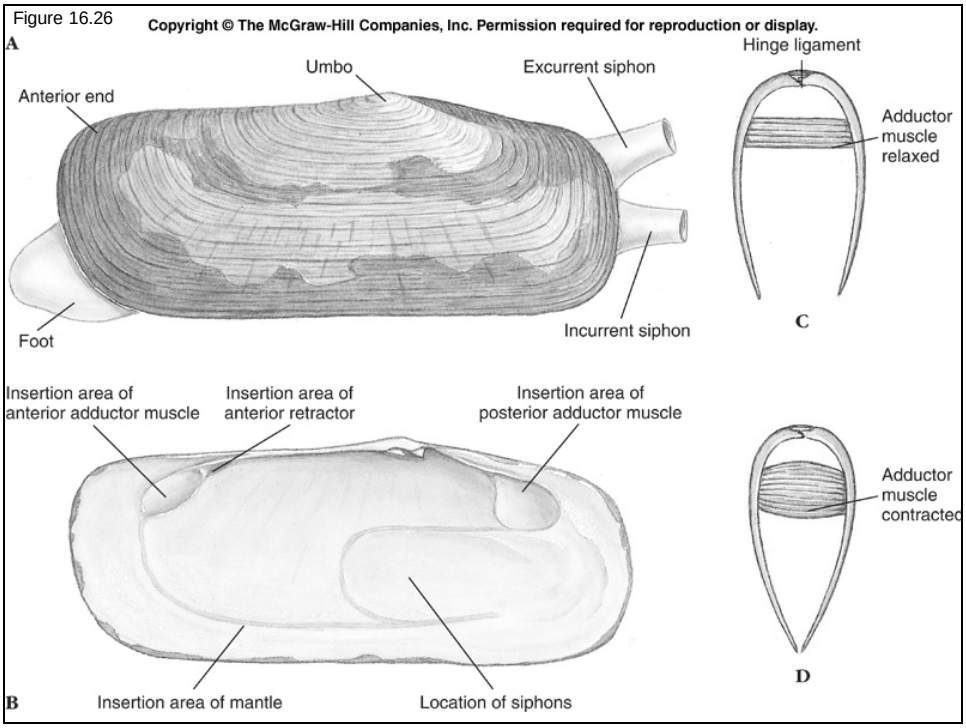
Characteristics

1) shell→ two valves
2) laterally compressed
3) enlarged of mantle cavity
4) large gills
5) filter feeders
6) spade-like foot
7) no radula

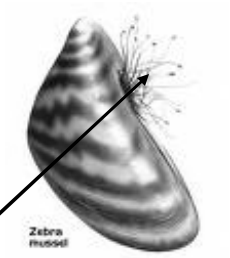
Figure 16.co

Figure 16.32

Figure 16.26



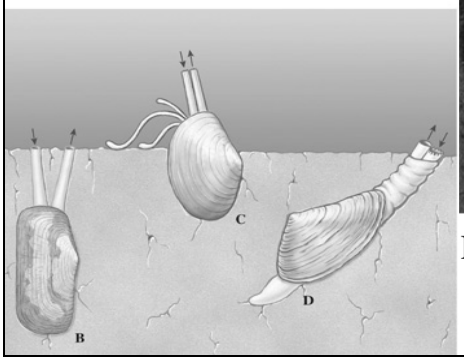
mussel bed community of rocky intertidal
Mytilus californianus



zebra mussel ***Dreisenna***
introduced species from Baltic

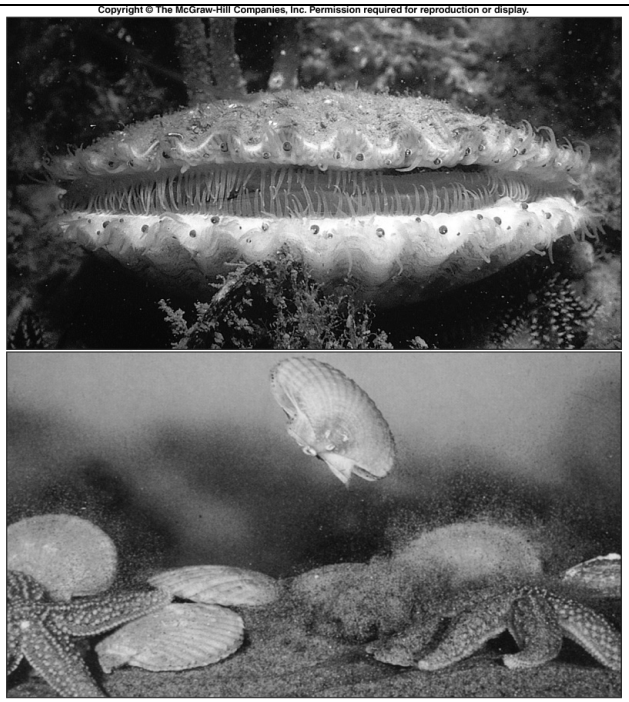
byssal threads

larvae released from ship ballast waters



D

Figure 16.24b



B

Figure 16.29

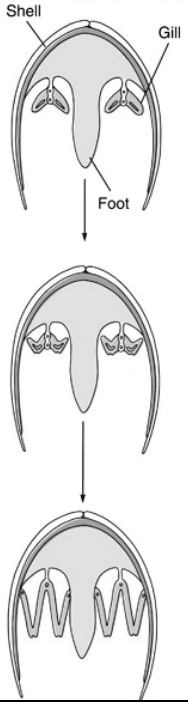


Figure 16.30

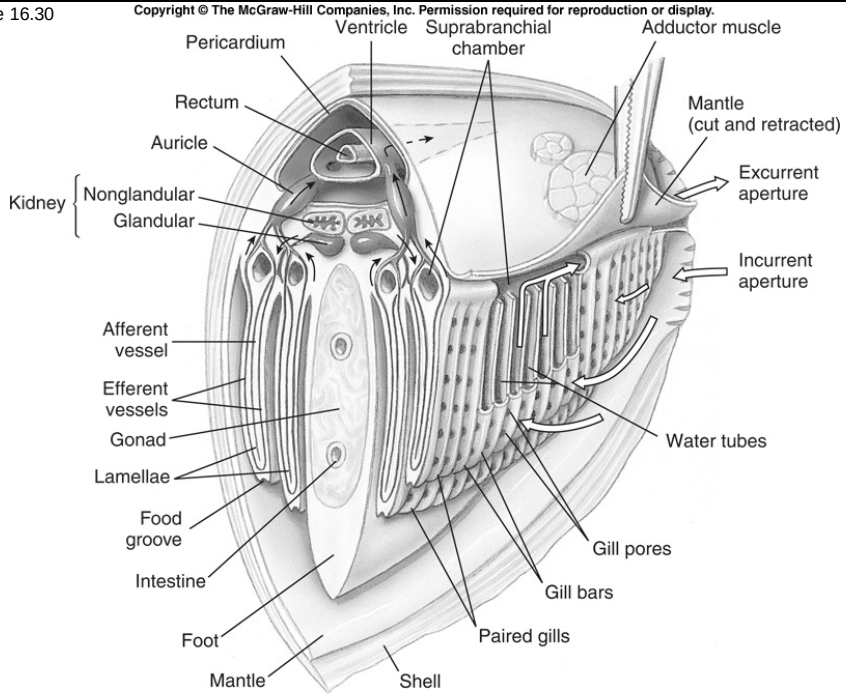


Figure 16.31

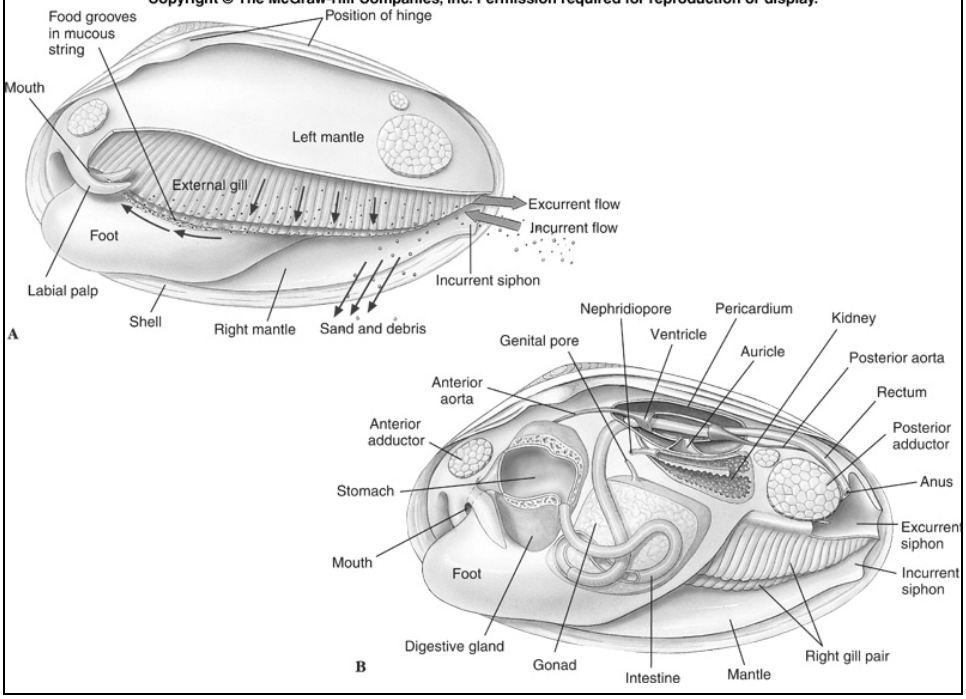


Figure 16.33

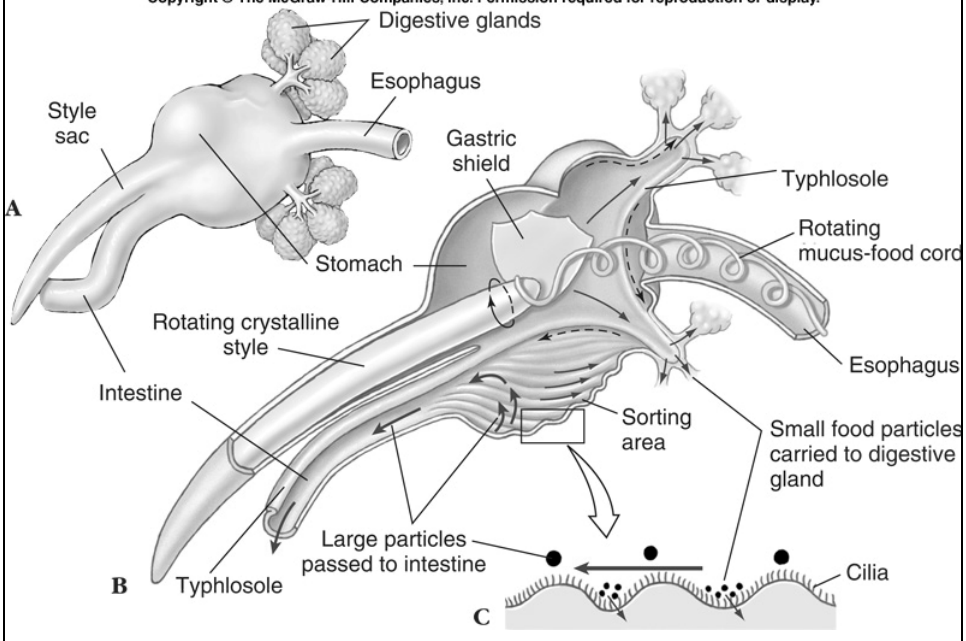


Figure 16.33c

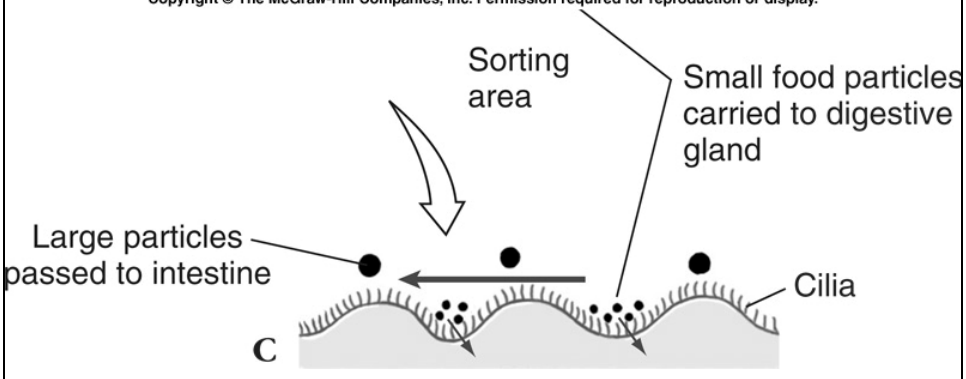


Figure 16.34

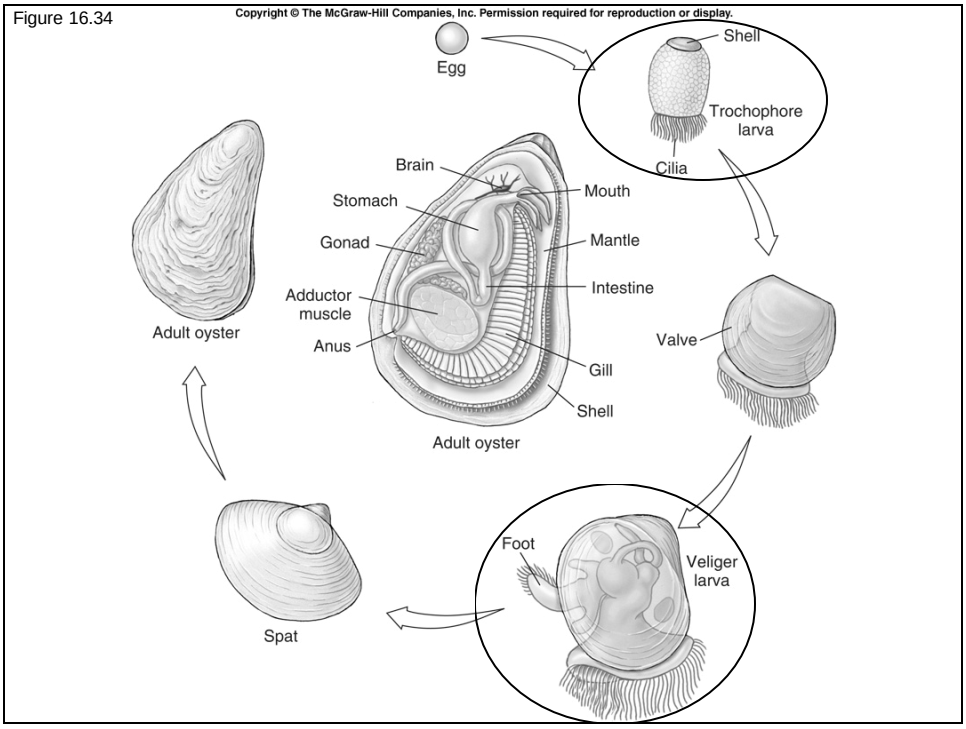


Figure 16.27a

A

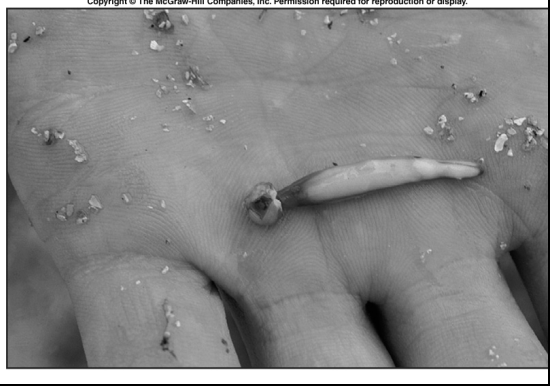
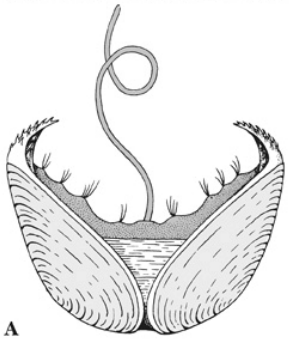


Figure 16.35

freshwater clam larva

Glochidium



A

Lampsillis ovata

pocketbook mussel

B

Class: Cephalopoda

(Greek: head foot) 600 species

Characteristics

1) external shell→ divided by septa (partitions)
2) chambered shell connected by siphuncle (vascularized strand of tissue contained within a tube of $CaCO_3$
3) internal shell reduced or absence
4) foot modified as tentacles, arms, and siphon
5) large mantle cavity
6) jet propulsion movement
7) stealth carnivore
8) speed, chromatophores (camouflage), chemical defense
9) ganglia fused→large brain encased cartilaginous cranium
10) eye

Figure 16.36

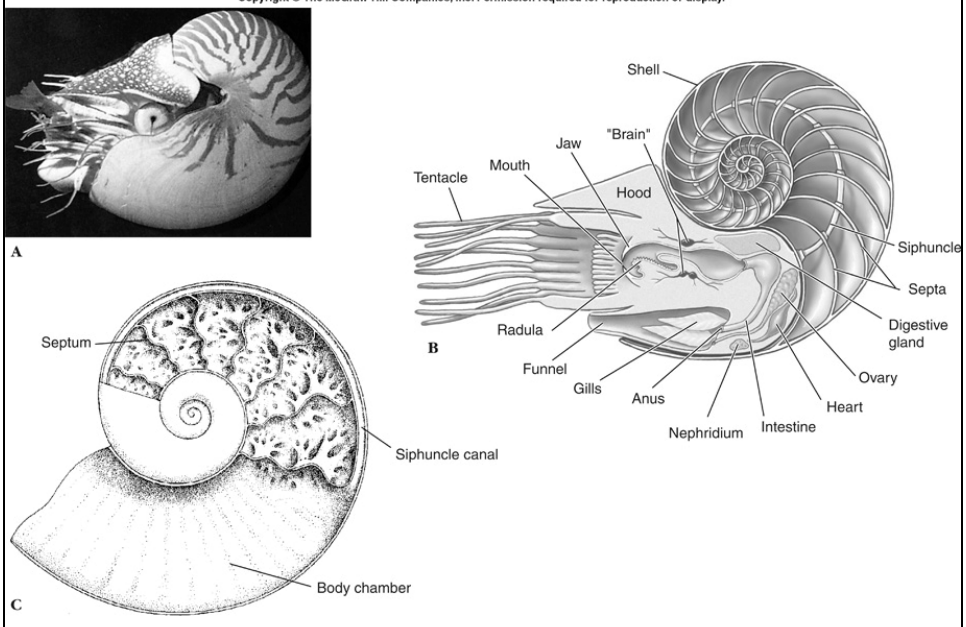


Figure 16.38b

Figure 16.38a

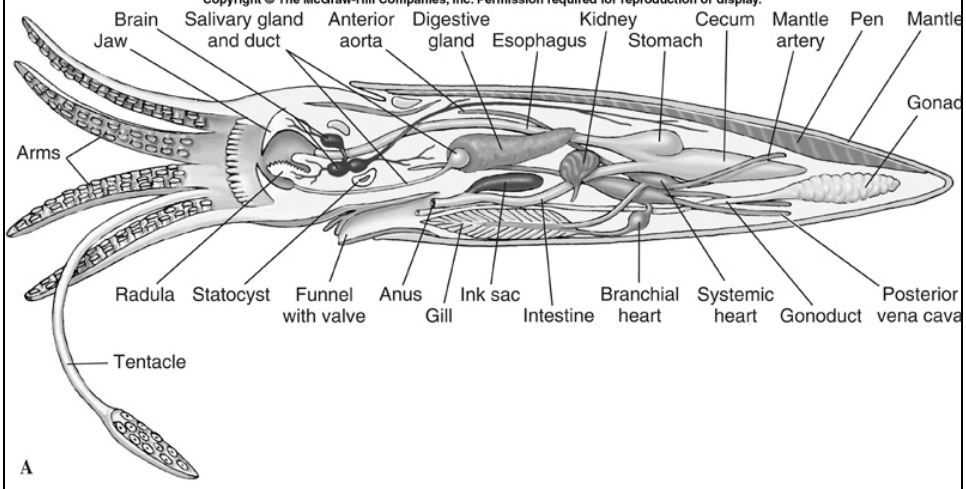


Figure 16.37

Figure 16.39

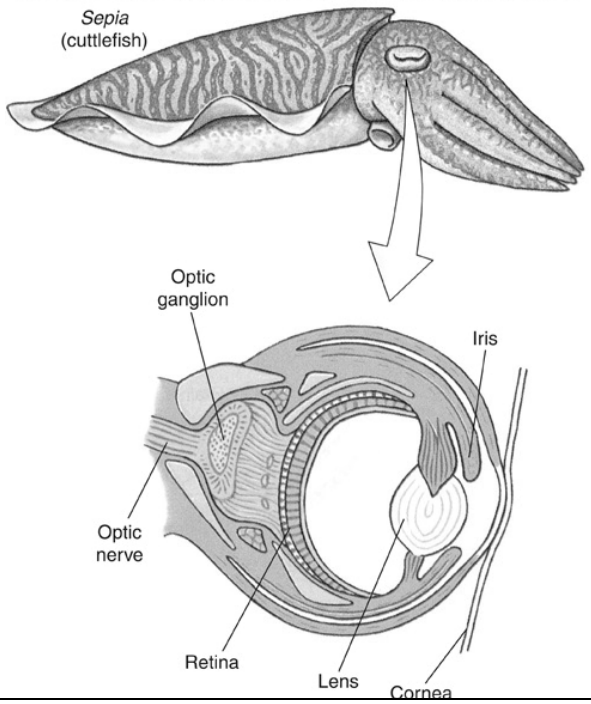


Figure 16.01e

E

Figure 16.40

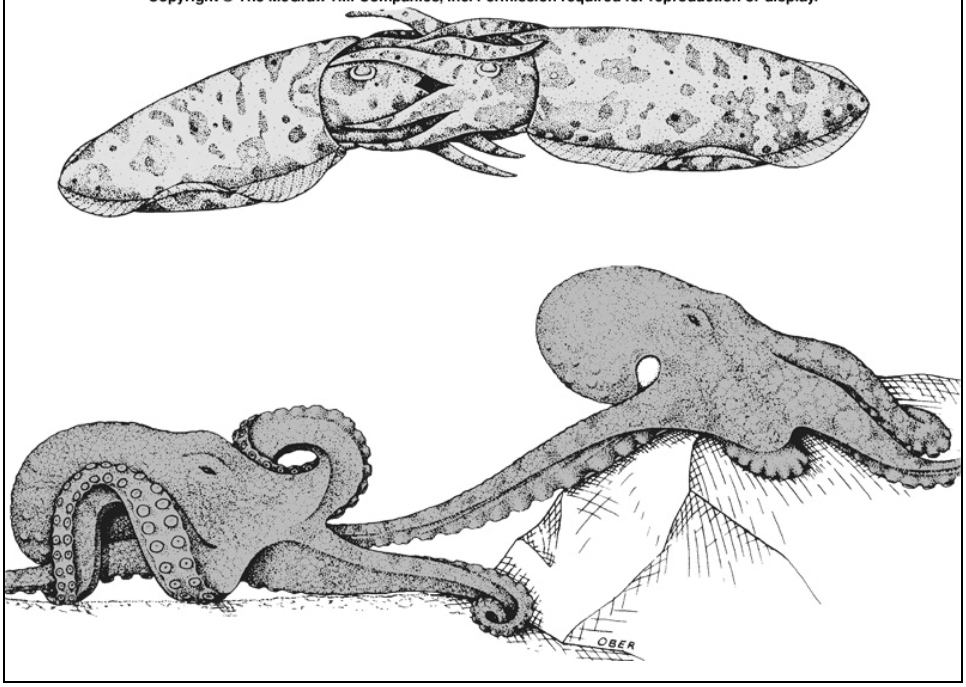


Figure 16.41

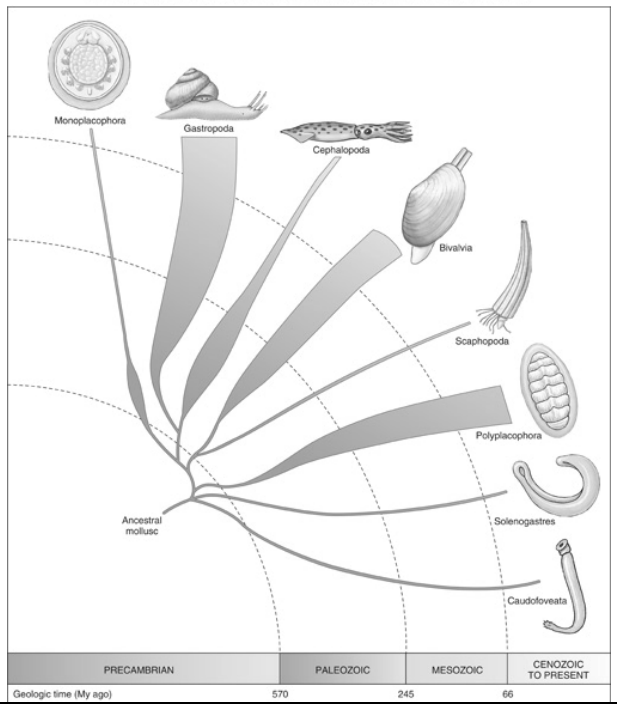
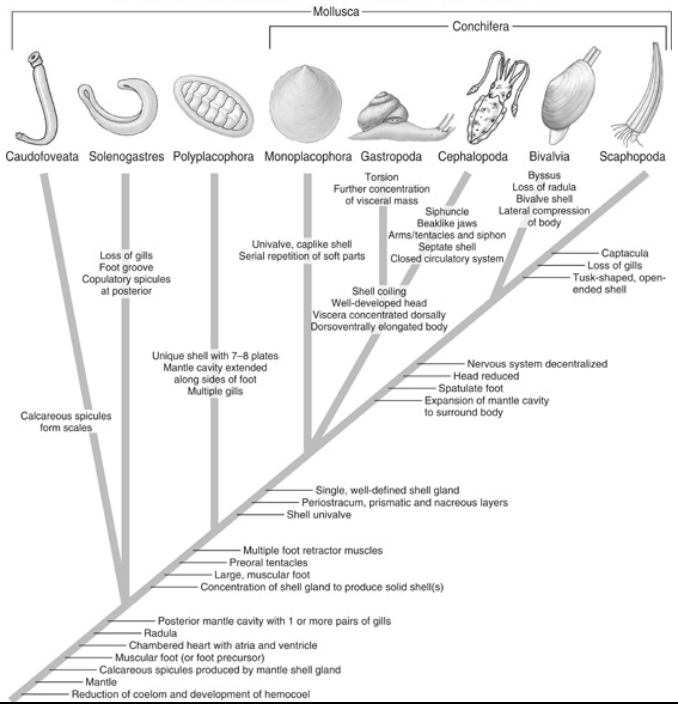


Figure 16.42



Evolution

1. fossil evidence: molluscs evolved in the sea; most remained marine
2. some bivalves & gastropods moved to brackish & fresh water
3. only gastropods successfully invaded land; limited to moist/sheltered habitats with calcium in soil
4. cephalopods evolved to become relatively intelligent
5. coelom limited to a chamber around the heart; ? molluscs arose separately from annelids & their coeloms not homologous