

Review Fig. 16.1 in text

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Vertebrates

Living Gnathostomes (jawed fishes)

Cartilaginous fishes
(Class Chondrichthyes)

- About 1000 species
- Unchanged in last 200 MY
- Nearly all marine
- Shark populations threatened

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Vertebrates

Living Gnathostomes (jawed fishes)

Cartilaginous fishes
(Class Chondrichthyes)

- No bone (calcified cartilage)
- Heterocercal tail See Fig. 16.6 in text
- Paired pectoral and pelvic fins
- Pelvic claspers in males
- Placoid scales

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Vertebrates

Living Gnathostomes (jawed fishes)

Cartilaginous fishes
(Class Chondrichthyes)

- Exposed gill slits
- No swim bladder See Fig. 16.7 in text
- Retain high urea concentrations
- Well-developed senses

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Vertebrates

Feeding in Chondrichthyes

- Mostly carnivores
- Olfactory organs
- Mechanoreception with lateral line
- Good vision See Fig. 16.9 in text
- Attacks fine-tuned with electroreceptors

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Vertebrates

Reproduction in Chondrichthyes

- Internal fertilization
- Types of maternal investment:
1. Oviparity
 2. Ovoviviparity
 3. Viviparity
- Intrauterine cannibalism "oophagy"

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Skates and Rays

- Dorsoventrally flattened
- Large, fused pectoral fins
- Dorsal spiracles for water intake
- Pavement-like crushing teeth
- Skates lay eggs in leathery case "mermaid's purse"

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Vertebrates

Living Gnathostomes (jawed fishes)

Bony fishes (Osteichthyes)

- Skeleton of bone (endochondral)
- Presence of swim bladder or lungs See Fig. 16.12 in text
- Gill cover = operculum

Two classes:

1. Class Actinopterygii
2. Class Sarcopterygii

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Vertebrates

Ray-finned fishes (Actinopterygii)

Two major groups:

1. Chondrosteans
 - Sturgeons, paddlefishes, bichirs
 - Heterocercal tail, ganoid scales See Fig. 16.15 in text
2. Neopterygians
 - Bowfin and gars remain from early radiation
 - Second radiation led to teleosts "modern bony fishes"

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Vertebrates

Ray-finned fishes (Actinopterygii)

Teleost modifications:

- Cycloid or Ctenoid scales See Fig. 16.18 in text
- Homocercal tail See Figs. 16.13 and 16.14 in text
- Fin morphology
- Swim bladder
- Jaw design

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Vertebrates

Lobe-finned fishes (Sarcopterygii)

- Only 7 species; includes lungfish and coelacanth
- Diphyrcercal tail
- Muscular fins See Fig. 16.19 in text
- Lungs and gills present
- Lineage gave rise to tetrapods

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Vertebrates

Teleost Function

- Migration
 - Diadromous fishes (anadromous vs. catadromous) See Fig. 16.27 in text
 - Spawning migrations
 - Seasonal (temperature)
- Respiration
 - Gill filaments with plates containing blood vessels See Fig. 16.25 in text
 - Water flow opposite of blood flow
- Reproduction
 - External fertilization and oviparity in most
 - Large numbers of eggs See Figs. 16.29-31 in text
 - Larvae carry yolk sac

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