BSC 201L (15e)
Lab #10 - The Fishes

Use the text and figures in Exercise 18 (The Fishes) to aid your study of the preserved specimens and slides; examine the additional specimens as indicated.

Things to know for Fishes:
- Presence/absence of jaws
- Male or female?
- Structures and their functions

**Phylum Chordata** – cont’d
- **notochord**; skeletal rod for muscle attachment
- **dorsal, tubular nerve cord**; anterior enlarged to form brain
- **pharyngeal pouches**; in aquatic spp., develop into **gill slits**
  - (1° for particle feeding; 2° modified to true gills for respiration)
- **post-anal tail**; 1° for locomotion in water
- **endostyle**; secretes mucus and traps small food particles **OR**
  - **thyroid gland**; the vertebrate derivative of the endostyle

**Subphylum Vertebrata / Craniata**
- **Class Myxini**, hagfishes
  - jawless; “teeth” on tongue are not true teeth
  - no paired fins; no dorsal fin
  - slime glands
  - can tie body in a knot to gain leverage while feeding
  - *Myxine glutinosa*, Atlantic hagfish
  1. Preserved adult
     - **LABELS**: 4 tentacles (barbels) surrounding the mouth

- **Class Petromyzontida**, lampreys
  - jawless; “teeth” in **buccal funnel** and on tongue are not true vertebrate teeth
  - 1-2 dorsal fins
  - *Petromyzon marinus* – text pp. 277-282
  2. Preserved **ammocoete larva** – Figs. 18-2, 18-3
     - **LABELS**: oral hood with oral papillae, gill slits

DO NOT confuse the ammocoete larva with *Branchiostoma* (amphioxus / lancelet)!!!

**Ammocoete larva**
- **Branchiostoma**
  - oral hood with papillae
  - 7 pairs of gill slits
  - has eyes
  - dorsal and caudal fins distinct

  - **Branchiostoma**
  - oral hood with tentacles
  - numerous pharyngeal perforations
  - lacks eyes
  - lacks true fins
3. Preserved adult – Fig. 18-1
   – nostril is the hole on top of the head
   – photo-sensitive pineal organ is light colored area behind the nostril
   – **LABELS**: buccal funnel, gill slits, eyes, nostrils, first dorsal fin, second dorsal fin, caudal fin

**Class Chondrichthyes**, sharks, rays, skates, chimaeras
   – cartilaginous skeleton, no true ossification
   – jaws modified from pharyngeal arches; teeth are modified scales
   – **spiracles**: modified first gill slits (accessory openings for water intake)
   – be able to distinguish male from female (males have claspers on pelvic fins)

Shark – text pp. 282-287
   – gill slits lateral (rays have gill slits on ventral side)

4. Preserved adult – Figs. 18-4, 18-6
   – **LABELS**:
     - External: eye, nostril, spiracle, gill slits, lateral line canal, dorsal fins, pectoral fins, pelvic fins, caudal fin
     - Internal: intestine with spiral valve; liver

5. Juvenile sharks (need only draw pelvic fins) – Fig. 18-7
   – distinguish male from female
   – **LABEL**: claspers (occur only on the male!)

6. Shark jaws
   – teeth are modified **placoid scales**
   – rows of teeth constantly replace lost ones

*Dasyatis americanus*, American sting ray
   – pectoral fins modified to form “wings”
   – ventral gill slits

7. Preserved adult

**Chimaera (= rat fish)**
   – jaws w/ bony plates; upper jaw fused to cranium
   – males of this species have a clasper on the head as well as on the pelvic fins

8. Preserved adult

9. Skate egg case (= “mermaid’s purse”)

Class Actinopterygii, bony ray-finned fishes
- **endochondral bone** (replaces cartilage during development)
- jaws; paired and median fins; operculum

*Perca flavescens*, yellow perch – text – 288-293
10. Preserved adult – Figs. 18-9, 18-11, 18-12
- **LABELS:**
  - **External:** eyes, gills, first dorsal fin, second dorsal fin, pectoral fins, pelvic fins, anal fins, caudal fin
  - **Internal:** swim bladder

*Congrina flava*, yellow conger eel
- compare mouth and fins with lamprey and hagfish
11. Preserved adult
DO NOT confuse the “conger eel” (a fish) with the “Congo eel” (a type of salamander)!!!

**Fish scale types** (scales reduce drag for more efficient swimming):
12. **placoid** scales – Fig. 18-5
   - shark scales are dermal denticles (= “epidermal teeth”) with pulp, dentine, enamel

13. **ganoid** scales
   - primitive bony scales, found in bichirs, paddlefishes, sturgeons, gars
   - diamond-shaped; enamel on upper surface, bone on lower

14. **cycloid** scales
   - smooth margins, with no teeth or projections
   - found in fish with soft-rayed fins (*i.e.*, minnows, goldfish); slower swimmers

15. **ctenoid** scales (most common scale type)
   - comb-like projections reduce drag, increase swimming efficiency
   - found in fish with spiny-rayed fins (*i.e.*, yellow perch); faster swimmers

**Observation:** examine fish diversity (no drawings needed)

**Observations:** Examine the Lamprey, Dogfish (= shark), and Perch Biosmounts.
[ Not necessary to draw, but helpful with dissections, etc. ]

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FOR NEXT LAB MEETING:
- download **handout for Lab #11**; these lab activities are NOT in the lab manual
- write out each taxonomic summary in your Laboratory Specimen Notebook BEFORE lab.