Turtles

Chapter 12
Turtles

- Two major groups
  - Cryptodires
    - 10 families
  - Pleurodires
    - 3 families
**Figure 1-4** Phylogenetic relationships of extant vertebrates. This diagram shows the probable relationships among the major groups of extant vertebrates. Note that the cladistic groupings are nested progressively; that is, all placental mammals are therians, all therians are synapsids, all synapsids are amniotes, all amniotes are tetrapods, and so on.
Turtle respiration

• Breathing – can’t breathe with muscles in between ribs
  – They have muscles that are attached to the viscera that force it upward and then also muscles that increase the size of the visceral cavity that allows the viscera to settle back down
  – Transverse abdominus and pectoralis muscles forces viscera upward
  – Abdominal oblique and Serratus muscles are inspiratory muscles
Turtle respiration

• Many aquatic turtles are able to get oxygen from water
  – Pharynx and cloaca are major sites for aquatic gas exchange
    • Soft-shelled turtles (pharynx)
    • *Rheodytes leukops* (cloaca)
Turtle shell and skeleton

- Shell is made up of dermal bone, the neural series as well as the ribs are fused to the dermal bone.
- Ribs are unique in being external to the pelvic and pectoral girdle
- The Scutes which originated from the epidermis which do not coincide with the underlying bone.
Shell

- Many turtles have hinges in their shells
  - *Terrapene* and *Cuora* (american and asian box turtles) have one hinge on the plastron
  - *Kinosternon* have two hinges on the plastron
  - *Testudo* have one hinge on the plastron but at the location of the second hinge in *Kinosternon*
  - *Kinixys* have a hinge at the back part of the carapace
Thermoregulation

• Many turtles especially pond turtles control their body temperature by basking.

• Large turtles have thermal inertia (their body mass is so large that it takes a considerable amount of time to equilibrate with the environment)

• Some marine turtles achieve a considerable degree of endothermy
  – Maintain body temperatures much higher than the water
  – Leatherbacks forage in cold oceans and maintain temps up to 18 degrees warmer than the water
  – Countercurrent arrangement of blood vessels is thought to contribute to retaining heat
Temperature dependent sex determination (TSD)

• Changes of 3 to 4 degrees C result in different sexes, with higher incubation temperatures producing the larger sex
• Check out fig. 12-10
• In turtles the larger sex is usually females but in Crocodilians it is males
Turtle migrations

- Marine turtles migrate back to the beach that they were born. Sometimes over great distances (up to 2000 miles)
- Some species (Kemps and Olive Ridley) nest in large numbers known as arribadas
Turtle conservation

• Turtles used for:
  – Food (eggs, meat)
  – Pets
  – Decoration (tortoise shell glasses, etc.)

• Ban on collection of many turtle species in Texas last year

• [http://www.youtube.com/watch?v=NNHwVJM7Y](http://www.youtube.com/watch?v=NNHwVJM7Y)
Turtle diversity

• Pleurodира
  – Chelidae 52 species mainly in Aus and S America
  – Pelomedusidae 19 species
    Common pond terrapins of Africa
  – Podocnemidae 8 species S America and Madagascar

• Gondwanan distribution
Turtle diversity

- Cryptodira
  - Testudinidae 51 species (tortoises)
  - Bataguridae 69 species (mostly asian)
Diversity

• Emydidae 41 species (mostly N America)

• Trionychidae 30 species (N America, Africa, Asia)

400 lb softshell from vietnam
Diversity

- Carettochelydiae 1 species from New Guinea and N Australia

- Dermatemydidae 1 species from Mexico and Central America
diversity

• Kinosternidae 22 species from N and S American

• Cheloniidae 6 species worldwide tropical oceans
diversity

- Dermochelydae 1 species worldwide marine

- Chelydridae 3 species, 2 in N America and 1 in SE Asia