PHYLUM ECHINODERMATA (Ch. 25)

1. INTRODUCTION

‘spiny-skinned’ - 6k species, size cm to 2 m

• radial symmetry (also cnidarians)
  - pentamerous - structures in multiples of five

• endoskeleton - spines under skin

• water-vascular system

• deuterostome development

ecology - marine bottom, evolves from sessile

evolution - odd but successful
  - diverged early from chordates

2. WATER VASCULAR SYSTEM

many functions - feed, move, circ, resp

ring canal - circular inside central disk

stone canal - draws in seawater

madreporites - pores for stone canal

radial canals - extend into each arm
  - branch into tube feet & ampulla

ambulacral groove - runs along bottom of arm

tube feet - protrude thru groove
  - muscular suckers for attachment

ampulla - control pressure in tube feet

3. CLASSES

1. sea lilies - stalked or free-swimming
  - 5 pairs of flexible & branched arms
  - mouth & anus on top, filter-feeding

2. sea urchins (incl. sand dollars)
- no arms, fused endoskeleton, long spines
- mouth on bottom & anus on top, suspension feeders

3. sea stars - dominant predator, 5 thick arms (varies 6-24)
- mouth on bottom (vestigial anus on top)

4. brittle stars - 5 flexible arms, active predator
- small disk, mouth on bottom (no anus)

5. sea cucumbers - bilateral (mouth in front, anus at rear)
- suspension feeder (10-30 tentacles)

4. ENDOSKELETON

ossicles - calcium plates embedded in dermis
- fused into solid test in sea urchins

spines - calcium crystals attached to ossicles
- covered by epidermis, short or long
- fixed or muscle-controlled

5. LOCOMOTION

crawling - sluggish in most (extend tube feet)
- quick in brittle stars (groove closed)

swimming or sessile - sea lilies

6. NUTRITION

filter & suspension feeders
- arms or tentacles trap food in mucus

predators & herbivores
- ossicles form jaws (Aristotle’s lantern)
- eversible stomach in sea stars
- Cuvierian organ in sea cucumbers

7. REPRODUCTION

sexual - dioecious, external fertilization

asexual - regeneration (regrow arm)

metamorphosis - from bilateral larva
8. OTHER SYSTEMS

nervous - poorly developed (sessile)
- unspecialized senses, no ganglia

circulation - water-vascular system

respiration - diffuse thru tube feet & radial canals

excretion - diffuse out coelom