

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