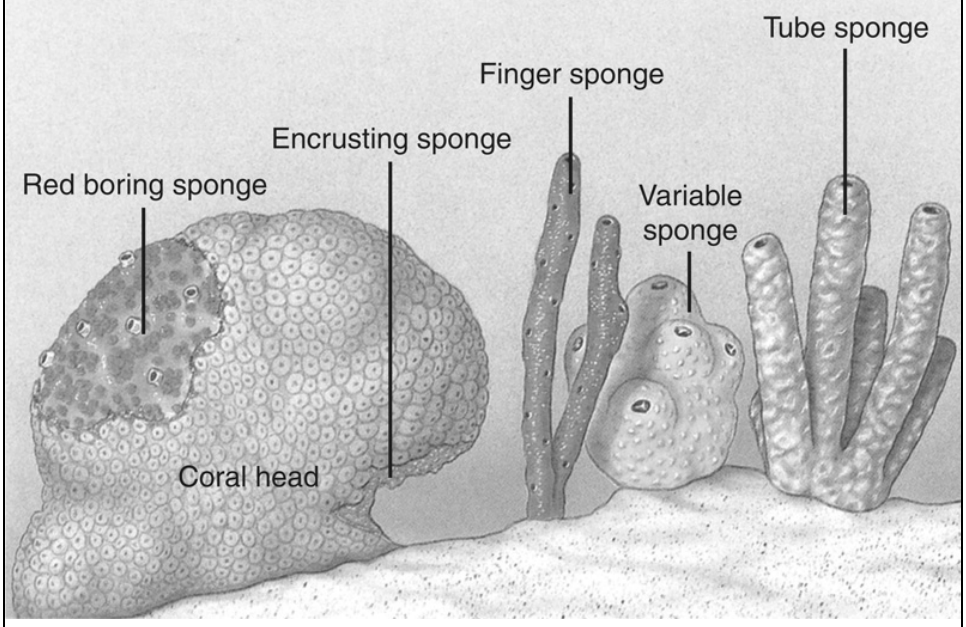
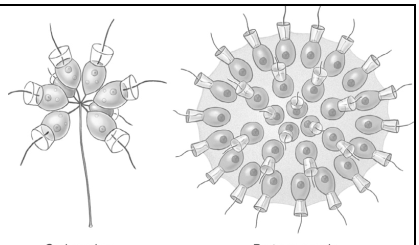
Chapter 6
Porifera



Unicellular Protists

choanoflagellates-colonial organization



Codonosiga *Proterospongia*

Theories of Unicellular Origin of Metazoans

1) 1874-Haeckel first proposed metazoans arose from a colonial flagellated form & cells gradually became specialized

2) as cells in a colony became more specialized, the colony became dependent on them

3) colonial ancestral form was at first radially symmetrical, & reminiscent of a blastula stage of development

4) this hypothetical ancestor was called a *blastea*

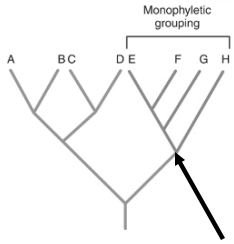
5) another hypothetical ancestral forms similar to a gastrula may have existed, & refer to them as *gastraea*

6) Bilateral symmetry evolved when the planula larvae adapted to crawling on the floor

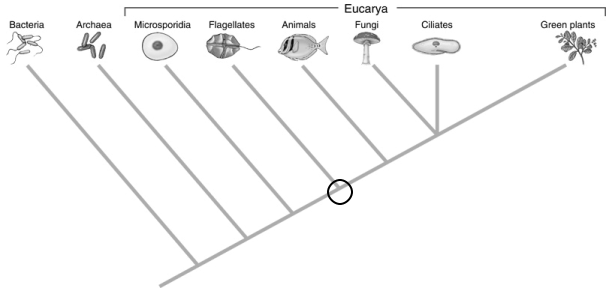
7) Molecular Evidence

a) small subunit rRNA & biochemical pathways support the *colonial flagellate hypothesis*

b) metazoans appear to be *monophyletic* & arising from *choanoflagellates*



Monophyletic group contains the most recent common ancestor of all members of the group & all of its descendants



Phylum: Porifera : "pore-bearing"; their sac-like bodies are perforated by many pores.

5000 species

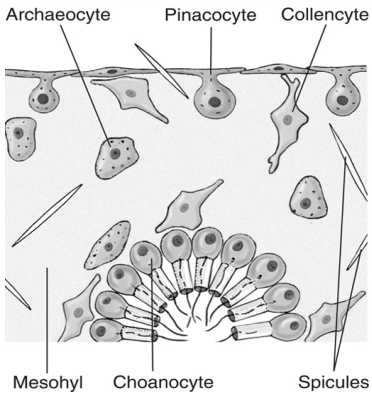
mostly marine: found in all seas and at all depths; they vary greatly in size
few brackish
some 150 live in fresh water

General Features

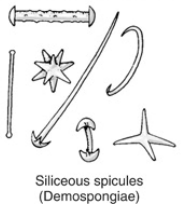
1) some sponges appear *radially symmetrical*, but many are irregular
2) some stand erect, some branched, & some encrusting
3) embryos free-swimming, adult sponges always attached
4) *sessile*: efficient aquatic filter
5) flagellated "collar cells", or *choanocytes*, move water (with food) through pores
6) brightly colored → pigments in their dermal cells
7) growth patterns often depend on characteristics of the environment
8) many other animals live as commensals or parasites in or on sponges
9) sponges also grow on a variety of other living organisms
10) few animals prey on sponges
11) sponges may have elaborate skeletal structure & often have a noxious odor

12) skeletal structure of a sponge can be fibrous and/or rigid

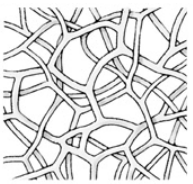
a. rigid skeleton: calcareous or siliceous *spicules*
b. fibrous portion→collagen fibrils in intercellular matrix
c. one form of collagen, *spongin*, comes in several types
d. composition along with their shape of spicules→ basis of sponge classification




Siliceous spicules
(Hexactinellida)


Siliceous spicules
(Demospongiae)


Calcareous


Spongin

Class

Calcarea small calcareous sponges

spicules

composed of $CaCO_3$

monaxons or 3 or 4 rays

Hexactinellida glass sponges

spicules

composed of silica

6 rayed

Demospongiae

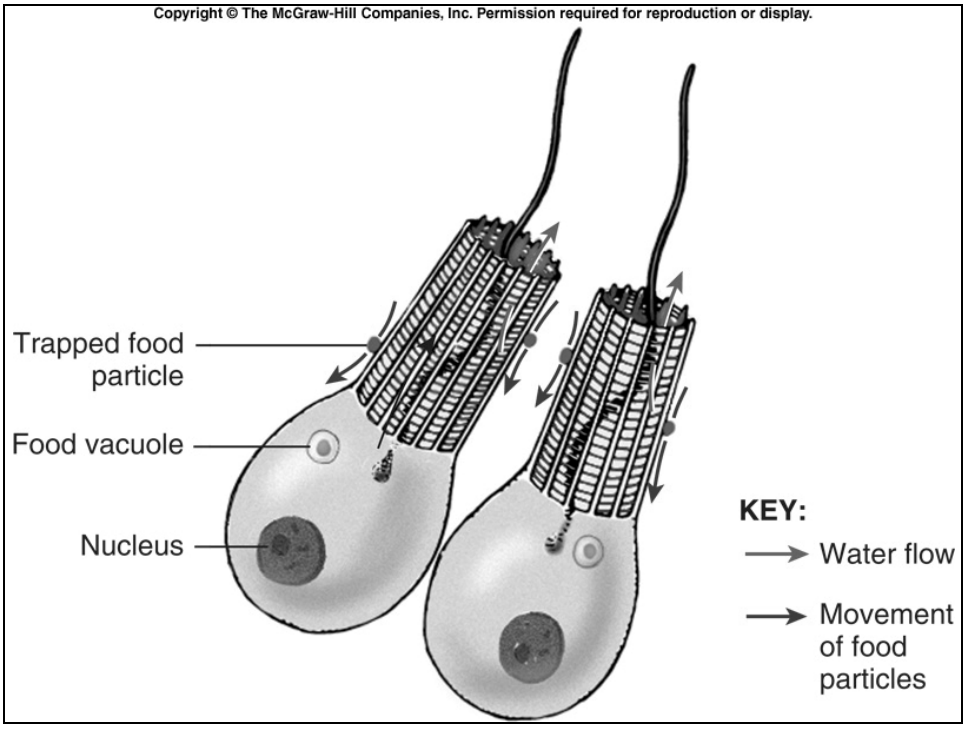
95% of living sponges

spicules

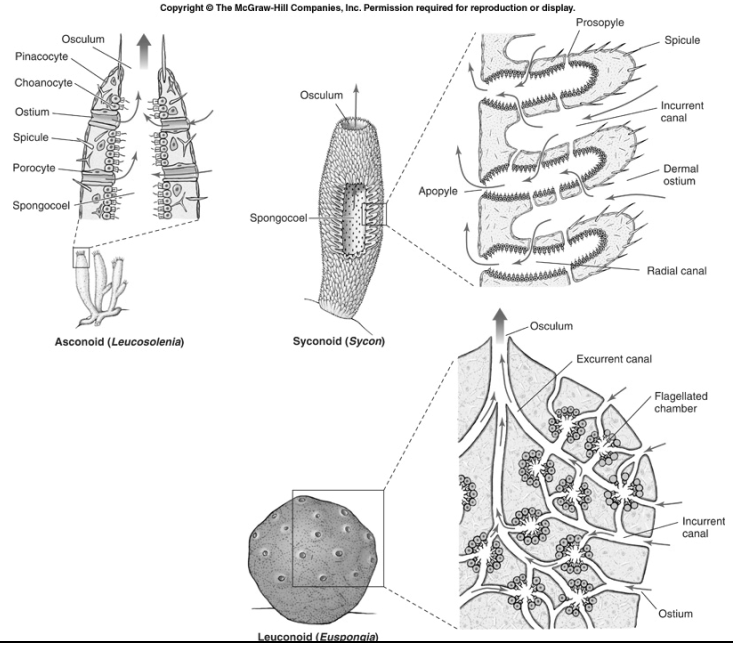
composed of silica

not 6 rayed

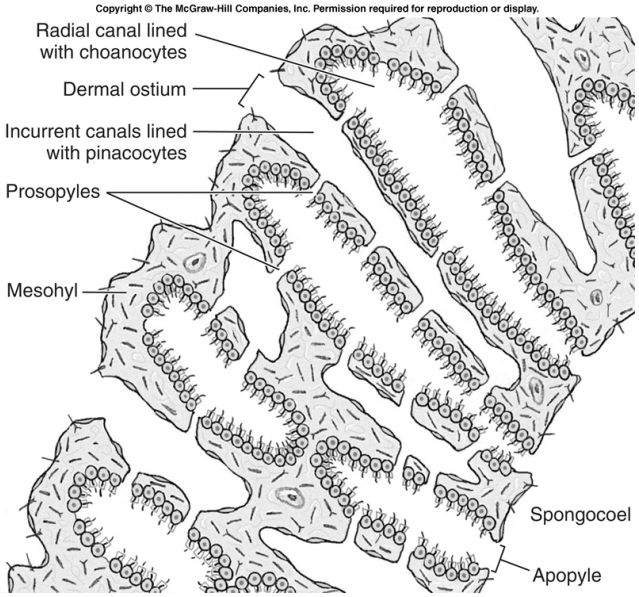
bound together by spongin or may be absent

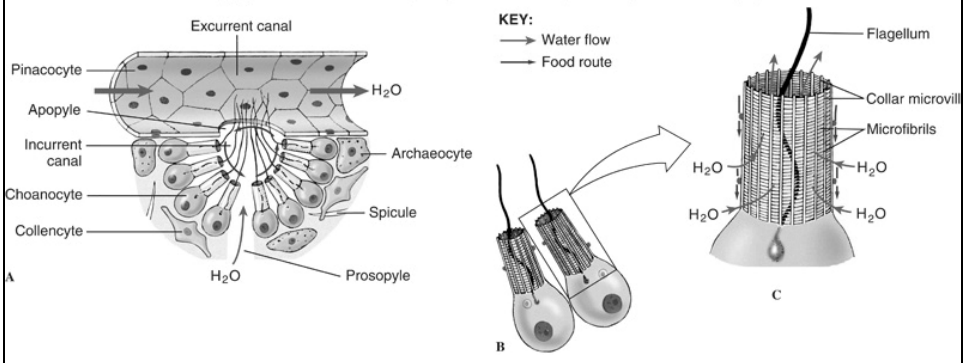


Three Body Forms

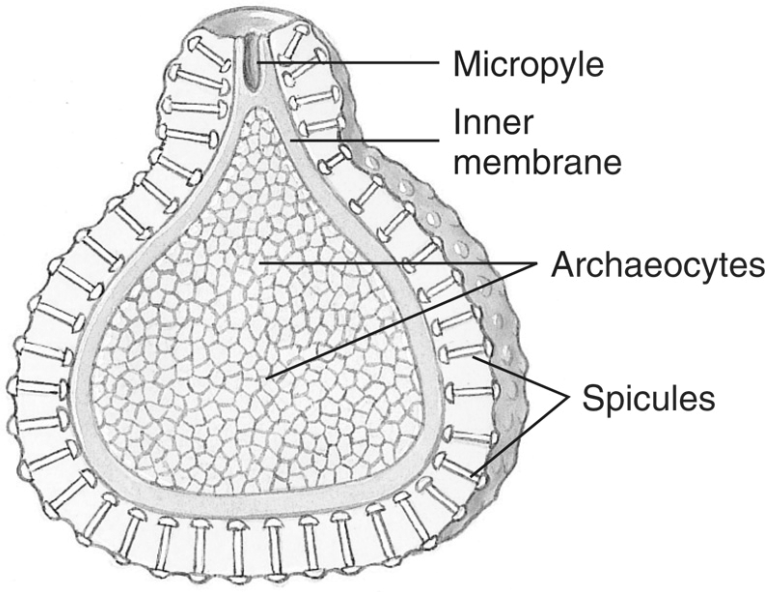


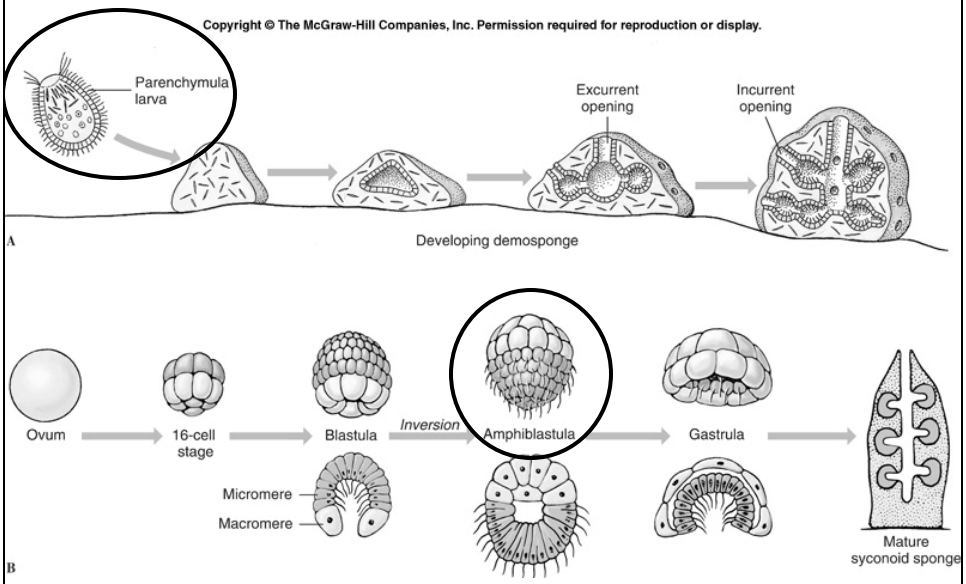
Sycon

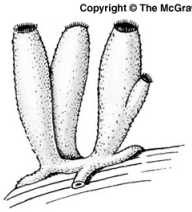




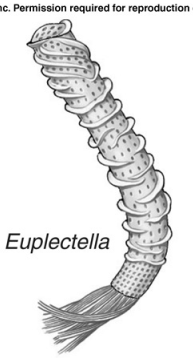
Gemmule: reproductive packet filled with archaeocytes



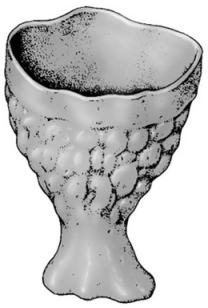




class: Calcarea *Leucosolenia*



Euplectella **class: Hexatinellida**

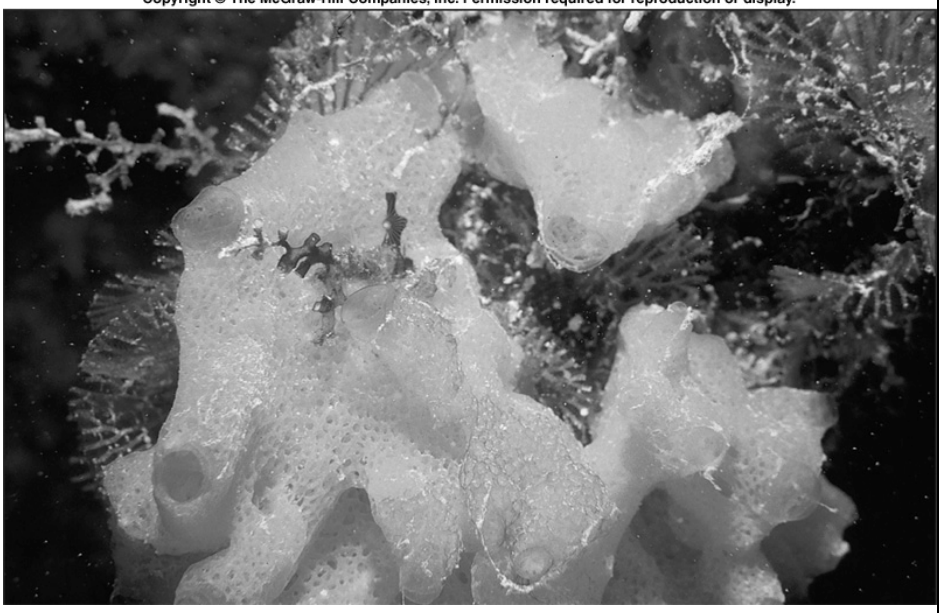


class: Demospongiae *Poterion*

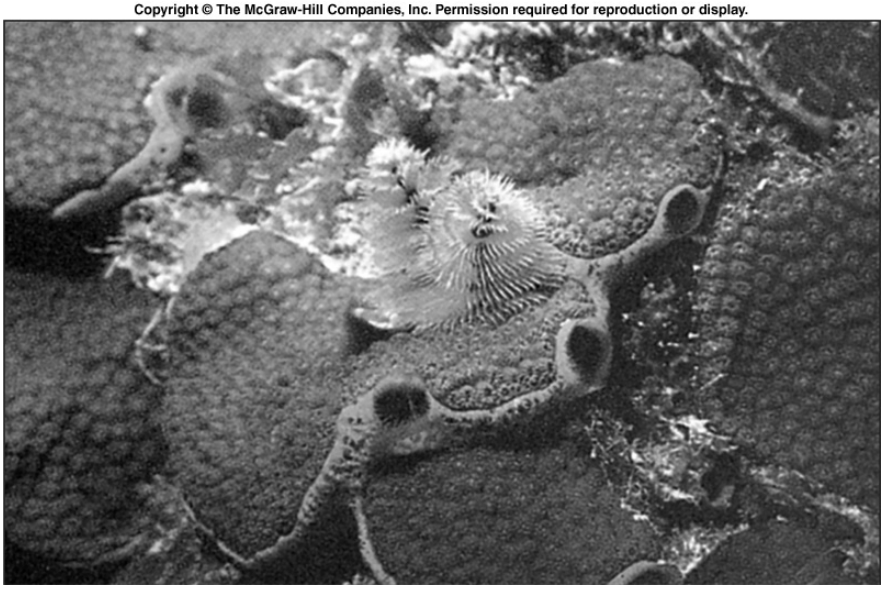
class: Demospongiae *Callyspongia*

class: Demospongiae

Class: Calcarea



Class: Demospongiae



Marine Demospongiae on Caribbean coral reefs

A B C