Phylum Ctenophora (Comb Jellies, sea walnuts)
cnenophore = "to bear a comb"

~150 species
include **comb jellies** and **sea walnuts**
first described in late 1600's as a kind of jellyfish
only designated as a unique phylum of animals in 1800's
apparently an ancient group
515 M yr old fossils have been found in China
*Stromatoveris*
→ clearly related to Ediacaran creatures of 542 MY ago
new (2014) research has found that this group is the oldest animal group; even older than sponges
all are marine
most spherical and transparent; .5” – 2” diameter
not bell or polyp shaped as cnidaria
no polymorphism
are biradial
2 long tentacles in most
a few simple organs

**Body Wall**
similar to Cnidaria
outer **epidermis**, inner **gastrodermis**
gelatinous layer of **collenchyme** (similar but not identical to mesoglea of cnidaria)

**Support and Locomotion**
use vertical ciliated plates (=combs) for locomotion
in some the cilia are 200 x's the length of cilia in other animals
→ each comb beats in succession like a wave starting at aboral (upper) end
a few elongated forms crawl on bottom
comb jellies apparently have muscle layers derived from mesoderm
a trait not found in sponges or cnidaria but in higher organism like flatworms

Feeding
most are carnivores
they eat small crustaceans and other small zooplankton
no nematocysts
instead have 2 long **tentacles** with **colloblasts**
=adhesive cells and lasso cells
some tentacles are relatively long
eg. *Pleurobranchia* ~1/2 “ diameter has 6” tentacles
surface of body is sometimes covered with papilliae containing colloblasts and suckers
eg. *Leucothea*

colloblasts are stimulated by movement of prey
some pursue their prey
others cast out tentacles like fishing nets
as tentacles accumulate prey they are wiped across the mouth and food is extracted
a few are parasitic

a few are compressed and elongated ribbon shapes; some of these are up to 7’ long
some are pink, orange, olive
all are bioluminescent; resemble translucent glowing balloons in the surf
→ flashes at night or when prodded
most are planktonic
some species are common in coastal waters
many occur in very large "schools"
Texas species sometimes wash up onto beach in large numbers called "sea snot"
a few are pelagic, esp in deeper waters
some wormlike forms are benthic and creep along the sediment
like Cnidaria, at "tissue" level of complexity
no stinging cells; instead have adhesive cells (=**colloblasts**) for getting food
chief identifying feature is 8 rows of **comb plates** of cilia extend from **mouth** to **aboral** end
comb jellies have a complete digestive tract:
most have **pharynx** (throat) inside mouth
GVC branches throughout body into jelly layer
has tiny "anal canals" that expel undigested materials

**Excretion**

have specialized excretory cells (= **rosette cells**)
which line GVC
they extend cilia into mesoglea to collect wastes

**Nervous System**

unlike cnidarians’ nerve net, comb jellies have a more sophisticated nervous system with a rudimentary brain and synapses for cell to cell communication
primary sense organ is **statocyst** for balance

**Reproduction**

**asexual** reproduction
remarkable powers of regeneration
any half can regenerate

**Sexual reproduction**

all are **hermaphrodites**
in most sperm and egg discharge through mouth
external fertilization
unique larval form = **cydippid**
some northern species are able to reproduce while still larvae
perhaps due to predator pressure

**Ecology**

midlevel in food-chain
they eat plankton
in turn eaten by some jellyfish and sea turtles

**Classification**

- **Class: Nada**
  - no tentacles
  - eg. Beroe
- **Class: Tentacula**

**Phylogeny**

origin is obscure
probably arose from radially symmetrical planula-like ancestor
however, new (2013) genetic research indicates that they are the earliest animal group to evolve, even before the sponges
that would mean that comb jellies evolved nerves, muscles, and other complex features that were later lost in sponges and cnidaria
may be only surviving remnant of ancient ediacaran biota (635-542 MY ago)

**Human Impacts**

sometimes cause serious bioinvasions
eg. introduced by cargo ships from North America into the Black Sea
ate all zooplankton → fish starved
in 10 years caused complete collapse of fisheries