

Phylum Ctenophora (Comb Jellies, sea walnuts)

ctenophore = "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

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

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 papillae containing colloblasts and suckers

eg. *Leucotheca*

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

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

Animals: Phylum Ctenophora; Ziser Lecture Notes, 2015.9

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some benthic forms reproduce by fragmentation

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

Animals: Phylum Ctenophora; Ziser Lecture Notes, 2015.9

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tentacles

diverse forms

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

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