

Objectives for Lecture 20 – Protista – Primitive Eukaryotes

- Not plants, animals, nor fungi. They're the weird things...
- Autotrophic Algae
- Heterotrophic slime mold

Primary Endosymbiosis	Secondary Endosymbiosis
<p>Green Algae (Chloro)</p> <p>One endosymbiotic event</p> <p>Unicellular</p> <p>Simple to complex</p> <p>Primary Endosymbiosis—</p> <p>Arundell & Keeling, 2001.</p>	<p>All other types of algae</p> <p>Eat one that gets eaten (3 things total)</p> <p>Uni to multi cellular</p> <p>4 layer membrane bound chloroplasts</p> <p>Simple</p> <p>Secondary Endosymbiosis—</p> <p>Arundell & Keeling, 2001.</p>

- Understand the differences between the three basic life cycle types – zygotic meiosis, gametic meiosis, and sporic meiosis or alternation of generations.

Zygotic	Gametic	Sporic (Alt of Gen)
<ul style="list-style-type: none"> • Occurs in zygote germination • Gametophyte and parents haploid • Fuse into diploid zygote • Zygote undergoes meiosis • RESTS then germinates into +'s and -'s • Angiosperms • Isogamy 	<ul style="list-style-type: none"> • Meiosis @ gamete formation • Humans and Diatoms • Oogamy 	<ul style="list-style-type: none"> • Zygote(1n) → sporophyte → spores(2n) • Independent sporophytes and gametophytes • Gametophytes in Gametangium • Spores in Sporangium • Angiosperms • Ulva • Iso and Oogamous

- Know the features that green algae share with land plants, the evidence that land plants evolved from green algae.

- ✓ Retained to be nurtured by mother
- ✓ Sporopollenin (no embryo!)
- ✓ Apical meristem
- ✓ Partial cuticle and stomata
- ✓ ABA present in algae

- Be able to name the five evolutionary trends within the green algae.
 - Egg not shed (protected)
 - Embryo attached to gametophyte

with independent sporophytes and gametophyte

Such as the human

- o Partial cuticle/stomates
 - o Embryophytes: sporophyte dominant
 - o Bryophytes: gametophytes dominant
 - o Colonized land ~450 mya
- Know the life cycle of the unicellular green alga Chlamydomonas
 - o Asexual: Absorbs flagellum, haploids divide, zoospores develop in parent cell, zoospores burst out of parent, zoospores grow
 - o Sexual: Low P and N in environment. Focus more on few progeny wil higher chance of survival. Haploids divide to make + and - gametes. Shed cell walls and fuse to be 2n zygote. Rest (zygospore). Emerge under good conditions.
- Gamete, a haploid reproductive cell; gametes fuse in pairs, forming diploid zygotes.**
- Understand the meaning of ...
 - ✓ Isogamy: same sized gametes. MANY gametes produced. Fewer resources given to each gamete
 - ✓ Oogamy: Large female, small male gamete. Can focus more nutrients on fewer progeny for a higher chance of survival
 - Know that Ulva has alternation of generations with independent gametophytes that form in the gametangium and Sporophytes that form in sporangium
 - Know the approximate date at which plants colonized the land was 450 mya

Objectives for Lecture 21 - Protista - Other algae

- Know what phytoplankton are and what the biological and ecological importance is.
 - o Phytoplankton: tiny aquatic photosynthetic microorganisms responsible for primary production of organic compounds from CO₂ in the WATER. Responsible for O₂ gas. Causes blooms.
- Know what rides tides are, what organisms cause them and what their environmental and health effects are.
 - ✓ Red Tide: masses of dinoflagellates that can release toxins. Poisons animals and waters. Occurs when phytoplankton populations are not contained.
- Be able to name the polysaccharides from red and brown algae that are economically important as emulsifying agents (colloidal stabilizers) and thickening agents.
 - ✓ Agar: capsules, cosmetics, culture medium, gel electr.
 - ✓ Carrageenan: paints, cosmetic, dairy ,beer clarifier
 - ✓ Nori: suhi

Euglenoid	Green Algae	Cryptomonads	Dinoflagellates	Diatoms	Brown	Red
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unicelled	Uni to multi	Unicelled (2°)	unicelled	unicelled	Multicelled	Multicelled
Particle uptake	Photosynthetic	Particle uptake	Photosynthetic and heterotrophs	photosynthetic	Photosynthetic	Photosynthetic
Chl a/b, carot	Chl a,b, carotenoids	Chl a/c, phycobi	Chl a/c, carotenoids	Chl a/c, carot	Chl a/c, carot	Chl a and phycobilins
No cell wall	Cellulose (Closest to land plants)	No cell wall Nucleomorph (2° endo)	Cellulose plates	Silica. 2 portions	Cellulose and alginic acid	Cellulose, agar, carrageenan, CaCO ₃
Flagella	Yes or no	2 flagella	2 flagella	heterokonts	heterokonts	No flagella
Marine or fresh	Fresh	Marine or Fresh Phytoplankton	Marine Phytoplankton	Marine	Marine	Marine and fresh water
Asexual	Both (Zygo mei)	Asexual	Both (sexual rare)	Both	Both (aog)	Both (aog)

- Know what zooxanthellae are.
 - Endosymbiotes that lost their cell walls and provide carbs to the host. Corals require for photosynthesis. (Little rounded tips of anemones!)
 - Make photosynthesis more effective.
- Know what the term heterokont refers to and which algae are heterokonts.
 - Heterokont: 2 differently shaped flagella
 - Diatoms and Brown Algae
- For the brown algae know the basic body plan is a blade, stipe and holdfast, and understand why some brown algae have to have sieve tubes
 - ✓ Sieve tubes used for the large fan structures to receive nutrients.

Objectives for Lecture 22 -Bryophytes

- Be able to name the three major groups of bryophytes
 - Mosses, Hornworts, Liverworts
- adaptations to dry land found in bryophytes.
 - Gametes produced in Antheridia and Archegonia with retention by the mother with a protective cell layer. EGG NOT SHED. Sperm has to work for it's prize.
 - Zygotic meiosis
 - Gametophyte dominant
 - Unbranched Diploid sporophyte contains many spores, allows more in number.
 - Sporopollenin: resistant to decay and drying out
 - AMS
 - Partial Cuticle/Stomates
 - ABA
- Shortcomings of the Bryophyte
 - Wet locations
 - Water needed for sexual reproduction
 - Rhizoids anchor, not true roots
- Know the meaning of the
 - ✓ Embryophyte: retention of sporophyte in archegonium . Bryophytes and vascular plants. Sporophyte dominant and branched

Holdfast