

EXAM I (INTRO TO CHLORARACHNIOPHYTES) Terms to know (define/explain):

| | | | |
|----------------------------|---------------------|------------------------------|-------------------------|
| Acrokont | Epizoid | Meristem | Polyphosphate |
| Acronematic | Eukaryote | Metacentric spindle | Polarity |
| Agar | Exhaustive search | Microtubular roots | 1ary Endosymbiosis |
| Akinete | Exospores | Metaboly | Prochloron |
| Alga | Eyespot | Systematics | Prokaryote |
| Alginates | Faint Young Sun | Monophyletic | Protothecosis |
| Allophycocyanin | Female-gamete | Nomenclature | Pseudobranching |
| Androgonidia | Fertilization | Non-monophyletic | Pseudoparenchyma |
| Anisogamy | Filament | Monadoid | Pyrenoid |
| Antheridia | Fragmentation | Monoecious | Radial |
| Antherozoid | Furrowing | Monophyletic | Red tide |
| Apical cap | Gametic-meiosis | Multinucleate | Reticulated |
| Aplanospore | Gametogenesis | Multiseriate | Rhizoid |
| Autocolony | Gametophyte | Myzocytosis | Saccoderm-desmid |
| Autospore | Gas vesicles | Mycobiont | Scalariform-conjugation |
| Auxotrophy | Geminate | Nannandrous | 2ary Endosymbiosis |
| Axile-plastid | Genomics | Necridium | Semicell |
| Basal bodies | Gene loss | Neurotoxin | Sheath |
| Beta-granules | Gene substitution | Nitrogenase | Siphonaceous |
| Bilenticular | Gene transfer | Node | Siphonoxanthine |
| Biomagnification | Glaucophytes | Nucleomorph | Snow Ball Earth |
| BMMA | Globule | Nucule | Sperm-packet |
| Biological species concept | Glycogen | Oogamy | Sporic-meiosis |
| Carboxisomes | Gonidia | Oogonium | Sporogenesis |
| Carotenes | Grana | Open-mitosis | Sporophyte |
| Carotenoids | Gyragonite | Organelle | Starch |
| Carrageenan | HAB | Oscillation | Stephanokont |
| CCW | Haploid | Oxygenic-photosynthesis | Stichonematic |
| Cellulose | Holotype | Phylogenetic species concept | Stigma |
| Centroplasm | Hemicellulose | Phylogeny | Stolons |
| Chlorophyll | Hepatotoxins | Palmelloid | Stromatolites |
| Chromatic adaptation | Heterocysts | Parallel-basal body | Subaerial |
| Chromatoplasm | Heterogamy | Paraflagellar rod | Taxonomy |
| Classification | Heteromorphic | Paramylon | Topotype |
| Closed mitosis | Heteroplastids | Parenchyma | Tetrapyrrol |
| Coccoid | Heterothallic | Periplastidial compartment | 3ary Endosymbiosis |
| Codiolum-stage | Heterotrichous | Parietal | Thallophyte |
| Coenobium | Histones | Parthenogenesis | Thallus |
| Coenocytic | Homothallic | Pectin | Thermophilic |
| Colony | Hormogonium | Pellicle | Thylakoid |
| Conjugation | Hydrophobic | Peptidoglycan | Trabeculae |
| Cosmopolitan | Hydrophyllic | Phialopore | Transduction |
| Crown-cells | Hypnozygote | Phototaxis | Transformation |
| Cryptoendolithic | Internode | Phragmoplast | Trichome |
| CW | Inversion | Phycobilin | True branching |
| Cyanophage | Isogamy | Phycobilisome | Tubular-cells |
| Cyanophycin | Isokont | Phycobiont | Ubiquitous |
| Cyanotoxin | Isomorphic | Phycocolloid | Unicellular |
| Cysts | Isthmus | Phycocyanin | Uninucleate |
| Cytokinesis | Karyokinesis | Phycoerythrin | Uniseriate |
| Dioecious | Lectotype | Phycology | Volutin |
| Diploid | Lorica | Phycoma | Xanthophyll |
| DO | Identification | Phycoplast | Zonate |
| Dwarf-male | Lateral-conjugation | Phykos | Zoospore |
| Egg | Lichen | Phytol | Zygote |
| Endospores | Macrandrous | Phytoplankton | Zygotic-meiosis |
| Endosymbiosis | Male gamete | Placcoderm-desmid | |
| Epilithic | Mars analogues | Plesiomorphic | |
| Epiphytic | Meiosis | Pleuronematic | |

Discussions to practice:

1. Define the term alga and discuss why algae are so diverse and at the same time sharing many common features
2. Why and how people in Guam are having an increase in neurodegenerative disease (brain destruction)?
3. Describe the differences (2) as well as the similarities (at least 4) between blue-green algae and bacteria
4. What is the main algal photosynthetic pigment, and what are the accessory pigments?
5. Describe the process of energy transfer in the phycobilisome
6. What is chromatic adaptation? Explain how green and red lights affect cyanobacteria, and what is the advantage of this change of coloration?
7. Explain how the light and dark phases affect the buoyancy in cyanobacteria (gas vesicles)?
8. What is the function of the heterocyst, why are they thick-walled and colorless? Is the heterocyst a necessary structure for N₂ fixation?
9. Why Cyanobacteria are considered responsible for major (a) ecological, (b) biochemical, and (c) evolutionary changes in our planet?
10. How the CO₂, O₂, photosynthetic prokaryotes (cyanobacteria), snow-ball earth, and a faint young sun interacted to develop an explosion of eukaryotic life forms in our planet?
11. Fill up the grid:

| | Cyanobacteria | Chlorophyta | Euglenoids | Chlorarachniophyta |
|---------------------|---------------|-------------|------------|--------------------|
| Pigments | | | | |
| Storage products | | | | |
| Cell wall | | | | |
| Flagella | | | | |
| # Plastid membranes | | | | |

12. What the Endosymbiosis theory explains? What evidence can you show to support this theory? What are the main lineages of PRIMARY plastids? How secondary plastids originated in both lineages? Are there examples of plastids with a tertiary origin?
13. What are the differences between a phycoplast and a phragmoplast? Give examples of algae with a phycoplast and with a phragmoplast.
14. Why hypnozygotes are common in freshwater algae and almost nonexistent in marine algae?
15. Describe the evolution of the Chlorophyta, their main classes and how the following characters have evolved in the green algae: habitat, flagella, mitosis, cytokinesis, and life cycle.
16. Make sure you know (and be prepared to label) the life cycle of *Chlamydomonas*, *Volvox*, *Ulva*, *Codium*, *Derbesia*, *Oedogonium*, *Spirogyra*, and *Chara*
17. What are the pros and cons of the biological, morphological, and phylogenetic concepts of species in algae?
18. Make schemes of a typical cell labeling its parts of a) *Nostoc*, b) *Chlamydomonas*, c) *Euglena*

This guide has the only purpose to help you during your study session. It serves as example of the questions to be expected during the exam. It is not a substitute for your handouts, class notes, papers, or textbook.