CHAPTERS 16 & 17: PROKARYOTES, FUNGI, AND PLANTS

Honors Biology 2012

1

PROKARYOTES

- Lived alone on Earth for over 1 billion years
- Most numerous and widespread organisms (total biomass of prokaryotes is ten times that of eukaryotes)
- Live in cold, hot, salty, acidic, and alkaline habitats
- Some are pathogenic (most are benign or beneficial)
- Two domains: Bacteria and Archaea
  - Archaea and Eukarya evolved from a common ancestor

2

PROKARYOTES

- Cell walls maintain shape, provide protection, and prevent lysis in a hypotonic environment
- Cell wall differences can be distinguished by gram stain
  - Gram-positive have simple walls with a thick layer of peptidoglycan
  - Gram-negative have complex cell walls with less peptidoglycan and an outer membrane of lipids bonded to carbohydrates

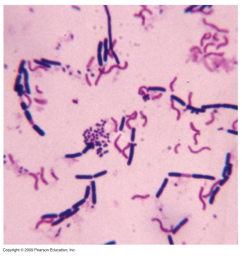
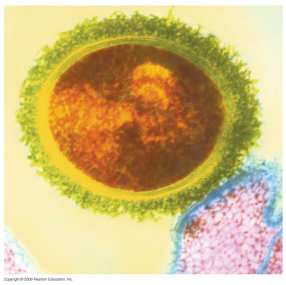


Fig. 16.4



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PROKARYOTES

- Use pili to stick to substrate
- Flagella allow movement response to chemical and physical signals
- Endospores - thick protective coat that can dehydrate and is tolerant of extreme heat and cold
- Endotoxins vs. exotoxins
- Bioremediation

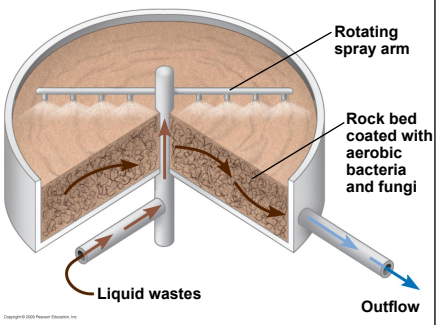


Fig. 16.10

4

PROTISTS

- Obtain nutrition in a variety of ways (autotrophs, heterotrophs, and absorption)
- Symbiosis - close association between organisms of two or more species

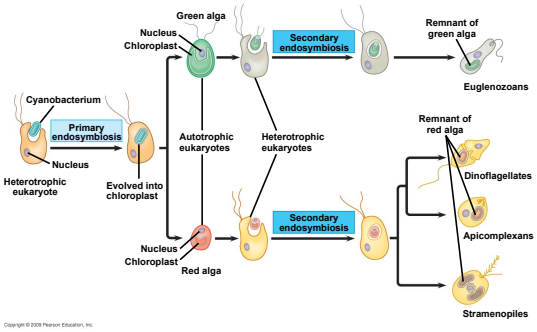


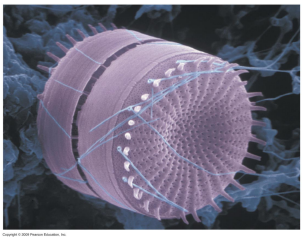
Fig. 16.12

5

PROTISTS

- Euglenozoans - have a crystalline rod of unknown function inside flagella (include heterotrophs, autotrophs, and pathogenic parasites)
- Dinoflagellates - marine and freshwater phytoplankton
- Ciliates - use cilia to move and feed
- Stramenopiles - named for "hairy" flagellum (usually paired with a "smooth" flagellum (ex. water molds, diatoms, and brown algae)

Fig, 16.15



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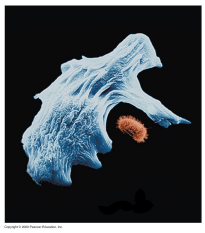
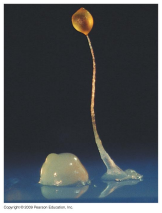
PROTISTS

- Amoebas - move and feed by pseudopodia
- Slime molds
  - Plasmodium - amoebozoan that forms a plasmodium (multinucleate mass of cytoplasm)
  - Cellular - when food is scarce form a slug-like aggregate





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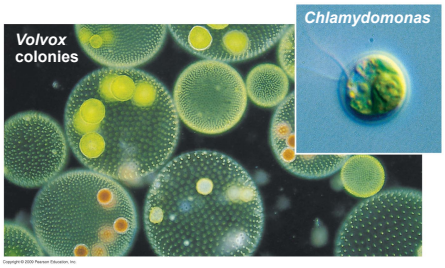
PROTISTS

- Red algae - soft-bodied
- Green algae - include both chlorophytes and charophytes (closest living relatives of land plants)



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ALGAE LIFE CYCLES

- Alteration of generations (hapliod gametophyte and diploid sporophyte)

9

MULTICELLULARITY

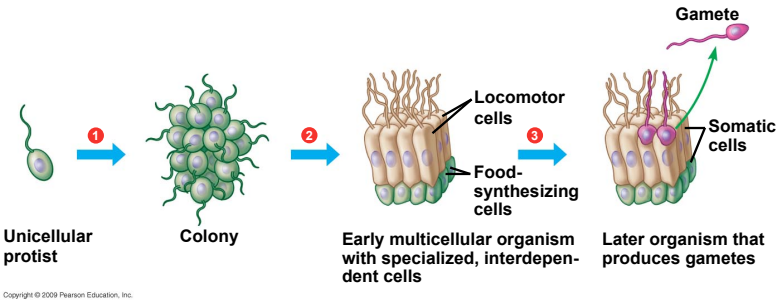

Fig. 16.21

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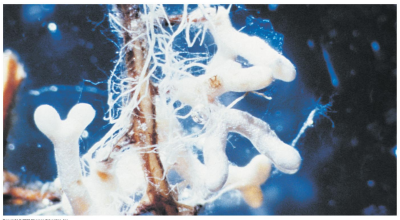
PLANTS AND FUNGI

- Mycorrhizae - mutually beneficial associations of plant roots and fungi hyphae
  - Fungi enabled plants to colonize land by helping them absorb water and other minerals and plants provided sugars to the fungi



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TERRESTRIAL PLANTS

- Defined by:
  - Alteration of haploid and diploid generations
  - Walled spores produced in sporangia
  - Male and female gametangia
  - Multicellular, dependent sporophyte embryos
- Challenges:
  - Maintaining moisture within cells
  - Obtaining resources from soil and air
  - Supporting body in air
  - Reproducing and dispersing without water

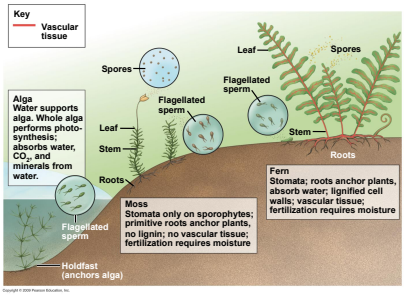


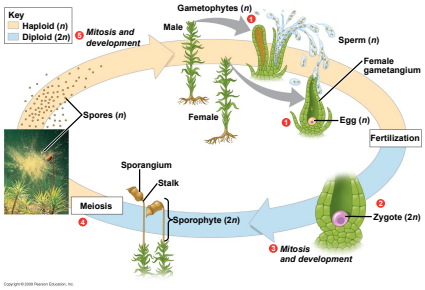
Fig. 17.1

12

MOSSES

- Nonvascular plant
- Dominant gametophyte
  - Produces eggs and sperm in gametangia
  - Zygote develops within the gametangium into a mature sporophyte which remains attached to the gametophyte
  - Meiosis occurs within the sporangia and haploid spores are released to develop into sporophytes

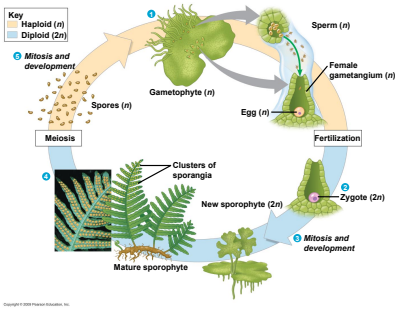
Fig. 17.2 & 17.4



13

FERNS

- Seedless vascular plants
- Like most plants have a dominant sporophyte and a small, inconspicuous gametophyte
- Sporangia develop on the underside of leaves of the sporophyte
- Formed most of the coal that exists today



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CONIFEROUS TREES

- Pine cone holds all of the tree's reproductive stages: spores, eggs, sperm, zygotes, and embryos
  - Male gametophyte is the pollen grain
  - Female gametophyte carry ovules in the scales of the cone

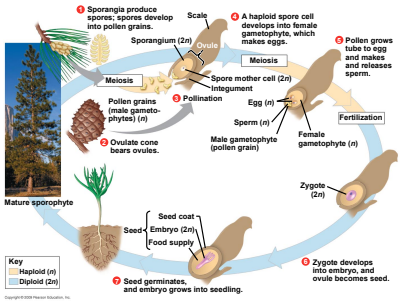

Fig. 17.7

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ANGIOSPERMS

- Flowers contain male and female gametophytes
  - Stamen - include the anther where pollen is released
  - Carpel - female reproductive structure that includes the ovary
    - Ovules develop into seeds and the ovary matures into fruit

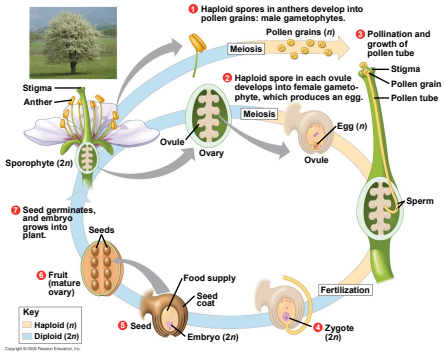

Fig. 17.9

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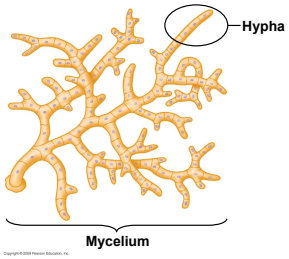
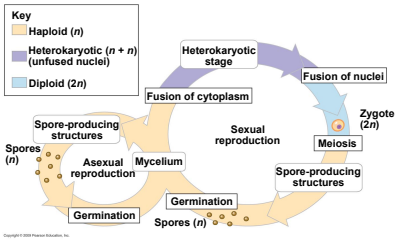
FUNGI

- Absorptive heterotrophic eukaryotes
- Most contain a mass of threadlike hyphae that make up a mycelium
- Have cell walls made of chitin
- Cause most plant diseases



Figs. 17.14 & 17.15



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FUNGI

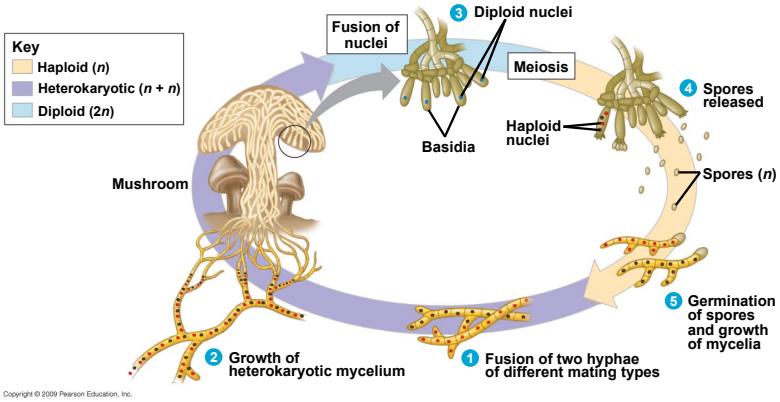

Fig. 17.17

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