Protists ("Protozoa")

A. Introduction

1. Complete organism in a plasma membrane

a. Unicellular of Acellular?

1. Unclear

2. Systematics complex

a. Lots of groups - some included in plants

B. Form and Function

1. Nucleus and Cytoplasm

a. Nucleoli - in some organisms contain genes for ribosomal RNA

b. Macronuclei and micronuclei

1. Macronucleus controls cell function except reproduction

2. Micronucleus controls reproduction

2. Locomotion

a. Cilia and Flagellae

1. Identical structures

a. Different in number

2. 9+2 microtubules

a. Sliding microtubule hypothesis

1. Cross bonds between microtubules release and catch

2. Requires ATP

b. Pseudopodia

1. In amoeboid forms - amoeboid motion

a. Also in cells of mammalian immune system

2. Extensions of cytoplasm

3. Different versions of pseudopodia

3. Excretion and Osmoregulation

a. Contractile vacuoles

1. Vacuoles in cytoplasm

a. Remove excess water

b. Remember freshwater fish? - protozoan in freshwater has same problem

4. Nutrition

a. Autotrophes and heterotrophes

b. Different approaches

1. Phagocytosis - amoebas engulf prey

2. Cytostome - "mouth"

a. Didinium

c. Food Vacuole

1. Vacuole that contains food to be digested

2. Enzymes dumped in to vacuole to break up chemicals

5. Reproduction

a. Fission - simple cell division

a. Sometimes multiple - produce spores - important in protozoan pathogens

b. Sexual Processes

a. A few protozoans are exclusively asexual

b. Gametes

c. Conjugation

1. In ciliates - exchange of micronuclei

C. Systematics - won't go over all groups in book. - read them anyway

a. Phylum Euglenozoa - flagellated

1. Flagellum at one end - extends from flask- shaped reservoir

2. Eyespot - stigma - functions to orient organism to light

3. Some species have chloroplasts - some don't

4. Subphylum Kinetoplasta

a. Bad guys - parasites in humans and other vertebrates

b. Sleeping sickness and Chagas disease

b. Transmitted by insect bites

c. Specialized morphology - Trypanosoma - flagellum extends down the side of the organism in a fold of the cytoplasm

b. Phylum Apicomplexa - Previously known as Sporozoa

1. Class Coccidea

a. All endoparasites

b. Life cycle includes asexual and sexual reproduction

1. Infective spores

c. Really important one is Genus *Plasmodium*

1. Carried by mosquito - injected with saliva of mosquito

2. Stages

a. Sporozoites migrate to liver

b. Enter liver and hatch - reproduce asexually - produce merozoites

c. Merozoites - got to red blood cells - feed on hemoglobin

a. Reproduce in red blood cells

b. Break out of red blood cells every 48 or 72 hours

1. Depends on species

c. Cause chills and fevers - overcoats in Madagascar

d. Mosquito bites a person with malaria and picks up the parasite

a. Parasite reproduces sexually in mosquito to start cycle all over again

c. Phylum Ciliophora - ciliates

1. Many are covered with Cilia - some have cilia only around mouth

2. Macro and micronuclei

3. Pellicle - covers ciliate. - maybe armored - maybe just plasma membrane

. a. Trichocysts - shoot out a dart when touched

1. Used against *Didinium* , a ciliated predator

4. Cytostome - "mouth"

1. Gullet

2. Cytoproct - discharge fecal material

5. Reproduction -

1.Binary fission

2. Conjugation

a. Macronucleus disintegrates

b. Micronucleus undergoes meiosis

c. Two haploid pronucleii fuse

d. Binary fission

e. Remember my remarks in lab about importance of meiosis

3. Autogamy - self fertilization - just do meiosis and fuse your own gametes

d. Amoebas - used to be phylum Rhizophora

1. Problems with taxonomy - amoeboid forms are polyphyletic

2. *Amoeba proteus* is representative

3. Foraminifera - Amoebas with calcium carbonate shells

1. Really important in ocean

2. Shells are major ocean bottom deposit - Foraminiferan ooze

a. Shallow depths to 4600 m

3. Fossils very important indicators for geologists

a. Help find oil

4. Actinopodans - also known as radiolarians - silica shells

1. Also important in sea

2. Shells build up - radiolarians ooze - 4600 m to bottom

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