Fungi

I. Deuteromycetes or Fungi imperfecti

*Penicillium notatum*

Widely distributed in nature, and is often found living on foods as a contaminant, and in indoor environments.

Has been renamed as *Penicillium chrysogenum*.

Reproduces by forming dry chains of spores.

Brush-shaped conidiophores.

Conidia are blue to blue-green, and the mold sometimes exudes a yellow pigment.

It is the source of several β-lactam antibiotics.

**Common Names:**

**Class:**

**Genus & Species:**

**Diagnostic Characteristics:**

**Clinical Significance:**

**Stages of Development:**

**Any other important Facts:**
**Aspergillus niger**

Is a filamentous fungi that is found in mesophilic environments. It is not only a xerophilic fungi, but is also a thermotolerant organism, that produces colonies composed of white or yellow felt that is covered by dark asexually produced fungal spores. Mycelial hyphae are divided by a septum and are transparent. It produces citric acid as well as industrial enzymes, such as amylases, proteases, and lipases.

**Common Names:**

**Class:**

**Genus & Species:**

**Diagnostic Characteristics:**

**Clinical Significance:**

**Stages of Development:**

**Any other important Facts:**
II. Zygomycetes

*Rhizopus stolonifer*

Has a cosmopolitan distribution and is found on bread and soft fruits such as bananas and grapes. Asexual spores are formed within sporangia. Germination of the spores forms the haploid hyphae of a new mycelium. Successful mating results in the formation of durable zygospores at the point of contact. The zygospore germinates and forms a sporangiophore whose sporangium contains both + and – haploid spores. Rhizoids are used for attachment. Pathogen, opportunistic infections of humans (zygomycosis).

**Common Names:**

**Class:**

**Genus & Species:**

**Diagnostic Characteristics:**

**Clinical Significance:**

**Stages of Development:**

**Any other important Facts:**
III. Yeast

*Candida* spp.

*Candida* colonies and *Candida* pseudohyphae

Is commensal, and is among the gut flora. Pathogen, overgrowth causes candidiasis (thrush), and is often observed in immunocompromised individuals, such as HIV-positive patients. Candidiasis can also occur in the blood and in the genital tract. This fungus has a dimorphic life cycle with yeast and hyphal stages. The yeast produces hyphae (strands) and pseudohyphae. The pseudohyphae can give rise to yeast cells by apical or lateral budding.

**Common Names:**
**Class:**
**Genus & Species:**
**Diagnostic Characteristics:**
**Clinical Significance:**
**Stages of Development:**

**Any other important Facts:**
**Saccharomyces cerevisiae**

Yeast colonies

Budding yeasts stained

Useful yeast, called Brewer’s yeast, Baker’s yeast, Ale yeast
It is the microorganism behind the most common type of fermentation.
It is also the main source of nutritional yeast and yeast extract.
Utilizes ammonia and urea as the sole nitrogen source
*S. cerevisiae* reproduces by budding.

**Common Names:**
**Class:**
**Genus & Species:**
**Diagnostic Characteristics:**
**Clinical Significance:**
**Stages of Development:**

**Any other important Facts:**
Entamoeba histolytica (trophozoite)

Motility- pseudopods
Nucleus
Peripheral chromatin-usually evenly distributed and uniform in size
Karyosome-chromatin (a mass of chromatin often found in the interphase cell nucleus representing a more condensed zone of chromatin filaments) small, discrete; usually centrally located
Cytoplasm-finely granular
Inclusions-RBCs occasionally
Pathogenic- Invasive-causes Amoebic dysentery

Entamoeba histolytica (cyst)

Shape-usually spherical, round to oval, with a thick cell wall
Nucleus 4 in mature cyst, peripheral chromatin present
Karyosome-small, discrete, usually centrally located
Cytoplasm- chromatoid bodies-present; elongated bars with bluntly rounded ends cigar-shaped

Common Names: 
Class: 
Genus & Species: 
Diagnostic Characteristics: 
Clinical Significance: 
Stages of Development: 
Any other important Facts:

Sarcodina

Entamoeba coli (trophozoite)

Motility: nonprogressive, sluggish
Nucleus
- Peripheral chromatin-irregular in size and distribution
  - Karyosome-chromatin is large, discrete, usually eccentrically located
Cytoplasm: coarse; often vacuolated, inclusions may include bacteria, yeasts
Non-pathogenic

![Entamoeba coli (trophozoite)](image1)

Entamoeba coli (cyst)

Shape: usually spherical
Nucleus
- 8 nuclei in mature cyst
  - Karyosome-large, discrete, usually eccentrically located
Cytoplasm: chromatoid bodies less frequently present; usually splinter-like pointed ends

![Entamoeba coli (cyst)](image2)

Common Names:

Class:
Genus & Species:
Diagnostic Characteristics:
Clinical Significance:
Stages of Development:
Any other important Facts:

Sarcodina
*Amoeba proteus*

Shape - starfish like

![Amoeba proteus (trophozoite)](image1)

![Amoeba proteus (cyst)](image2)

Common Names:
Class:
Genus & Species:
Diagnostic Characteristics:
Clinical Significance:
Stages of Development:
    Cyst   Trophozoite
Any other important Facts:

Flagellates

**Giardia lamblia (trophozoite)**

- Shape- pear-shaped
- Motility-“falling leaf”
- Nucleus- 2 nuclei
- Axostyle-structure down middle
- Flagella-4 lateral; 2 ventral; 2 caudal
- Sucking disk occupy ½ - ¾ of ventral surface
- Pathogenic

**Giardia lamblia (cyst)**

- Shape- oval or ellipsoid
- Nuclei- usually 4; usually located at one end
- Fibrils and flagella- oriented longitudinally in cyst
- Pathogenic

Common Names:
Flagellates

**Protozoa**

*Trichomonas vaginalis (trophozoite)*

- Shape: pear-shaped
- Motility: rapid, jerking
- Nuclei: 1
- Flagella: 3-5 anterior; 1 posterior
- Undulating membrane extends ½ length of the body; seen in vaginal smears and urethral discharges
- Pathogenic
Trypanosoma cruzi

Common Names:
Class:
Genus & Species: Trypanosoma cruzi
Diagnostic Characteristics:
Clinical Significance:
Stages of Development:

Trypanosoma cruzi (trophozoite)
Flagellates

Trypanosoma gambiense

Common Names:

Class:

Genus & Species:

Diagnostic Characteristics:

Clinical Significance:

Stages of Development:

Any other important Facts:
Flagellates

Euglena spp.

Common Names:
Class:
Genus & Species:
Diagnostic Characteristics:
Clinical Significance:
Stages of Development:

Any other important Facts:
Ciliates

**Balantidium coli (trophozoite)**

- Shape: ovoid with tapered anterior end
- Motility: ciliated, undulating
- Nuclei: 1 large, kidney shaped macronucleus
- Body surfaces covered by spiral, longitudinal rows of cilia
- Monkey or primate parasite
- Pathogenic

**Balantidium coli (cyst)**

- Shape: spherical or oval
- Nucleus: 1 large macronucleus visible

**Common Names:**

**Class:**

**Genus & Species:**

**Diagnostic Characteristics:**

**Clinical Significance:**

**Stages of Development:**
Paramecium caudatum

Paramecium caudatum (trophozoite)

**Common Names:**

**Class:**

**Genus & Species:**

**Diagnostic Characteristics:**

**Clinical Significance:**

**Stages of Development:**

Any other important Facts:
**Cryptosporidium parvum**

- Parasite will not take up iodine
- Size - very small
- Immunocompromised - will cause diarrhea, dehydration, death
- Uses a truant stain - red to hot pink
- Mostly found in daycares with small children
- Pathogenic
Cryptosporidium parvum (cyst)

**Common Names:**

**Class:**

**Genus & Species:**

**Diagnostic Characteristics:**

**Clinical Significance:**

**Stages of Development:**

**Any other important Facts:**

Apicomplexa (Sporozoan)

**PROTOZA**

*Plasmodium falciparum*

RBCs remain normal size
Gametocyte- crescent shape or sausage-shaped; about 1 ½ times diameter of RBC
Pathogenic

*Plasmodium falciparum (ring stage)*

RBCs infected with parasite
Usually just see rings, a small ring that is 1/5 diameter of RBC with small thread-like cytoplasm circle and one or two small chromatin dots.
Common Names:
Class: Apicomplexa (Sporozoan)
Genus & Species: Toxoplasma gondii
Diagnostic Characteristics:
Clinical Significance:
Stages of Development:
Any other important Facts:

PROTOZOA

Plasmodium falciparum (ring stage)

Toxoplasma gondii
Toxoplasma gondii

Common Names:
Class:
Genus & Species:
Diagnostic Characteristics:
Clinical Significance:
Stages of Development:
Any other important Facts: