(80)

NAME _____

EID # _____

EXAM 3
April 26, 2005
BIO 329

Directions: All explanations, definitions, and descriptions should be presented in good English. This means complete sentences should be used except when lists or fill-in-the-blanks are required. Spelling of mycological terms should be accurate. Slight misspellings may be overlooked, but major misspellings will result in wrong answers.

1. Multiple choice (30 points @ 2 points each); circle the number of the correct choice.

   a. Enteroarthric conidiogenesis is usually only associated with the agent of:

      1. cryptococcosis
      2. histoplasmosis
      3. blastomycosis
      4. coccidioidomycosis
      5. aspergillosis

   b. Most agents of aspergillosis are Fungi Imperfecti, as far as we know, but all are thought to be anamorphs of fungi that would be included in the ordinal (order) taxon:

      1. Onygenales
      2. Eurotiales
      3. Ustilaginales
      4. Tremellales
      5. none of the above choices

   c. The inhalation of conidia is not associated with:

      1. cryptococcosis
      2. histoplasmosis
      3. blastomycosis
      4. coccidioidomycosis
      5. aspergillosis

   d. The endemic region for coccidioidomycosis is ecologically identified as:

      1. the Lower Sonoran Life Zone
      2. Southern California
      3. the Ohio and Mississippi River basins
      4. areas heavily forested with eucalyptus
      5. none of the above choices

NAME _____

e. The latex particle of agglutination test for fungal antigen(s) is probably most associated with the detection of:

1. aspergillosis
2. cryptococcosis
3. blastomycosis
4. histoplasmosis
5. coccidioidomycosis

f. The most reliable method (100% correct) for the diagnosis of active coccidioidomycosis is:

1. obtaining a positive skin test with coccidioidin
2. documenting travel by a patient to the southwestern area of the U.S.
3. finding spherules in body fluids or tissue samples
4. documenting X-ray profiles in patients consistent with coccidioidomycosis
5. observing in patients red bumps on areas on the skin

g. The immunodiffusion test that may result in one or two bands known as H and M bands is associated with the serodiagnosis of:

1. histoplasmosis
2. blastomycosis
3. cryptococcosis
4. coccidioidomycosis
5. aspergillosis

h. A yeast morphology in biopsy specimens is not associated with patients having:

1. cryptococcosis
2. histoplasmosis
3. blastomycosis
4. coccidioidomycosis
5. aspergillosis

i. Opportunistic disease resulting from neutropenia is generally most associated with:

1. cryptococcosis
2. histoplasmosis
3. blastomycosis
4. aspergillosis
5. any of these choices

NAME _____

j. African varieties of agents of histoplasmosis are known as:

1. var. *capsulatus*
2. var. *duboisii*
3. var. *grubii*
4. var. *farciminosum*
5. none of the above choices

Following are five selected clinical situations that were presented to a medical mycologist. Name the probable disease agent responsible for each situation.

k. Specimen: Deep sputum and lung tissue

Symptoms: Pulmonary disease, which is acute with fever and weight loss

Microscopic examination: Oval cells and buds with narrow attachment. Most fungal cells seen in macrophages, and other lymphocytes.

Culture: Yeastlike at 37°C on blood agar. Cells uninucleate with buds at one end. At 25°C hyphal colony white to gray-brown. Microconidia produced laterally at tips of narrow conidiophores. Macroconidia are generally spherical, 8-14 μm in diameter and covered with bulbous appendages.

Probable agent

1. *Coccidioides immitis/posadasii*
2. *Ajellomyces (Blastomyces) dermatitidis*
3. *Aspergillus fumigatus*
4. *Ajellomyces (Histoplasma) capsulatus*
5. *Filobasidiella (Cryptococcus) neoformans*

l. Specimen: Lung lavag fluid and lung tissue

Microscopic examination of lavag: conidia and conidiophores; of tissue: large diameter hyphae form Ys when they branch.

Culture: At room temperature and at 45°C a hyaline (nonpigmented) mold with dusty gray/green conidia produced by uniseriate phialids.

Probable agent

1. *Histoplasma capsulatum*
2. *Coccidioides immitis/posadasii*
3. *Filobasidiella (Cryptococcus) neoformans*
4. *Aspergillus fumigatus*
5. *Ajellomyces (Blastomyces) dermatitidis*

NAME _____

m. Specimen: Spinal Fluid

Symptoms: Headaches varying from mild to intense, possibly accompanied by fever.

Microscopic examination: Only a few organisms even in spun specimens. Organisms generally round with single or multiple buds.

Culture: At room temperature, on SDA or malt extract agar, colonies mucoid, cells globose to spheroidal, 2.5 to 8 µm in diameter. At 37°C, growth yeastlike on both SDA or blood agar. No evidence of true hyphae or pseudohyphae.

Probable agent

1. *Coccidioides immitis/posadasii*
2. *Ajellomyces (Blastomyces) dermatitidis*
3. *Ajellomyces (Histoplasma) capsulatus*
4. *Filobasidiella (Cryptococcus) neoformans*
5. *Aspergillus fumigatus*

n. Specimen: Pus from cutaneous lesion

Symptoms: Cutaneous lesion

Microscopic examination: Large multinucleate yeasts 8-15 µm in size, buds with wide attachment to parent.

Culture: Yeast at 37°C on blood agar. At room temperature usually a white mold. Conidia are paddle-shaped in optical section, vary from 2-10 µm in diameter and are borne singly or in chains of two or three on slender lateral conidiophores.

Probable agent

1. *Ajellomyces (Histoplasma) capsulatus*
2. *Coccidioides immitis/posadasii*
3. *Ajellomyces (Blastomyces) dermatitidis*
4. *Aspergillus fumigatus*
5. *Filobasidiella (Cryptococcus) neoformans*

NAME _____

o. Specimen: Sputum

Symptoms: Pulmonary disease

Microscopic examination: Large "sporangia-like" structures (30-60 μm) in sputum in KOH mounts.

Culture: At room temperature, rapid growth, usually as a gray floccose colony, which later darkens to brown and maybe even black. Spores appear to arise directly from vegetative hyphal cells that are separated by empty cells.

Probable agent

1. *Filobasidiella (cryptococcus) neoformans*
2. *Coccidioides immitis/posadasii*
3. *Ajellomyces (Blastomyces) dermatitidis*
4. *Ajellomyces (Histoplasma) capsulatus*
5. *Aspergillus fumigatus*

2. Fill in the blanks (30 pts at 2 pts each; you can abbreviate genus/form-genus names here.):

a. *Cryptococcus neoformans* monokaryons sometimes produce clamp-like structures, basidia and basidiospores. This unusual process is known as _____.

b. Genes of fungi that control mating and are located at the mating type loci of sexually compatible fungal strains of the same species are often called _____ because they do not represent alleles, but instead are distinct genes that encode distinct proteins.

c. Most cases of coccidioidomycosis in Texas and South America are said to be caused by the form-species _____.

d. Conidia of the agents of histoplasmosis and blastomycosis are produced _____.

e. Erythema nodosum and erythema multiformi are allergic responses sometimes manifested by individuals having the mycosis _____.

f. Protective immunity is most associated with the clearance of benign forms of the mycoses _____ and _____.

g. Calcified residual healed lesions are often found in the tissues of individuals who years ago had acute forms of the mycosis _____.

h. Yeast cells of the endemic fungal pulmonary pathogen _____ often have more than one nucleus.

NAME _____

i. Among the endemic fungal pulmonary mycoses, chronicity and dissemination to the body sites, such as skin and bones, is probably most associated with _____.

j. The capsule of *Cryptococcus neoformans* is chemically described as a _____ _____. (Please spell out.)

k. When observed in tissue, most cells of the fungus _____ are located in macrophage.

l. The polymerization of melanin by a polyphenoloxidase is most characteristic of the fungal pathogen _____.

m. The hyphae of aspergillus when observed in human tissue are branched in a _____ (use mycological term here) fashion.

n. A very common name for an acute form of histoplasmosis that is frequently associated with exploring caves is _____.

3. Short answers/definitions (20 points @ 4 points each).

a. Enteroarthric conidia _____

_____

_____

_____

_____

_____

_____

_____.

b. Varieties of *Cryptococcus neoformans* and of *Filobasidiella neoformans* (a list will do) _____

_____

_____

_____

_____

_____

_____

_____

_____.

NAME _____

c. Eurotiales _____

d. Clinical syndromes of aspergillosis (A list will do.) _____

e. Pigeon breeder's disease and farmer's lung: what do they have in common? _____

NAME _____

4. Essays: Below please find one exam topic for you to respond to in essay fashion. (See comments on page one about sentences and spelling.) Please provide your essay on the attached lined sheets.

   During the third portion of BIO 329 the coverage was focused on five systemic invasive mycoses, which are largely of pulmonary origin. Please compare and contrast those that are said to be largely primary (endemic) mycoses with those that are said to be mostly opportunistic. Your essay should **NOT** include discussion of the agents involved: it will be taken for granted that these are known to you. Your answer should include, but not necessarily be restricted to, comments about the influence of host immune states, host tissue responses, and treatment requirements, if required. (No need to mention of specific drugs).