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NAME _____

EID # _____

EXAM 1
February 22, 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. Among the following species and after about 100 years, sequencing has confirmed that one non-culturable organism long thought to be a fungus is not a fungus. That species is:
 1. *Rhinosporidium seeberi*
 2. *Pneumocystis jirovecii*
 3. *Lacazia loboi*
 4. *Malassezia furfur*
 5. None of the above choices
 - b. The structure of the multihyphal aggregates (ascoma/ascocarps) produced by different Ascomycota has been used traditionally to classify Euascomycotina at the level (rank) of:
 1. subphylum
 2. subkingdom
 3. class
 4. family
 5. none of the above choices
 - c. The kingdom Fungi today includes only one phylum of species that produce undulopodia. These species produce zoospores having
 1. a single anterior undulopodium of the tinsel type.
 2. two undulopodia, one of the tinsel type and one of the whip-lash type.
 3. a single posterior whip-lash type undulopodium.
 4. two whip-lash undulopodia.
 5. none of the above choices.

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- d. Recent gene sequencing data suggest that two of the traditional Ascomycota classes are each themselves made up of organisms that are members of two or three classes. These traditional classes are those that
1. do not produce ascoma and those that produce cleistothecia
 2. produce cleistothecia and perithecia
 3. produce loculoascostroma and perithecia
 4. do not produce ascoma and those that produce loculoascostroma
 5. none of the above choices
- e. The main fungal pathogen of humans included among the so-called "Basal Ascomycota" (Archiascomycotina/Taphrinomycotina) is
1. *Malassezia furfur*
 2. *Lacazia loboi*
 3. *Candida albicans*
 4. *Pneumocystis jirovecii*
 5. none of the above choices
- f. Fungi that produce hyphal clamps are invariably classified as
1. Chytridiomycota
 2. Ascomycota
 3. Basidiomycota
 4. Zygomycota
 5. none of the above choices
- g. Karyospore production is most characteristic of fungi classified as
1. Chytridiomycota
 2. Zygomycota
 3. Ascomycota
 4. Basidiomycota
 5. none of the above choices
- h. Woronin bodies are considered to be diagnostic of
1. Chytridiomycota
 2. Zygomycota
 3. Ascomycota
 4. Basidiomycota
 5. none of the above choices

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- i. The production of dikaryotic spores is considered to be most characteristic of
1. Eucoscomycotina
 2. Holobasidiomycotina
 3. Heterobasidiomycotina
 4. Hemiascomycotina
 5. none of the above choices
- j. The majority of medically-important fungi are most likely
1. Hyphomycetes form-species with Ascomycota affinities
 2. Blastomycetes form-species like *Candida albicans*
 3. Fungi Imperfecti related to the rusts and smuts
 4. Species of Pyrenomycetes
 5. none of the above choices
- k. Most modern definitions of the term fungus do not include the word(s)
1. hypha/hypha/mycelia/mycelium
 2. spores
 3. absorptive
 4. phagocytic
 5. heterotrophic
- l. Asexual yeast fungi are included in the Fungi Imperfecti form-class
1. Blastomycetes
 2. Mycelia sterilia
 3. Hyphomycetes
 4. Coelomycetes
 5. none of the above choices
- m. Basidiomycota species that do not produce teliospores but do produce septate basidia have traditionally been classified in the ~~Myxomycota~~ class
1. Holobasidiomycetes
 2. Urediniomycetes
 3. Ustilaginomycetes
 4. Phragmobasidiomycetes
 5. none of the above choices

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n. The mycoses most associated with neutropenia are

1. histoplasmosis and coccidioidomycosis
2. pneumocystosis and cryptococcosis
3. aspergillosis and candidiasis
4. dermatophytosis and blastomycosis
5. none of the above choices

o. Heterothallic means

1. the alteration of haploid (N) and diploid (2N) generations by some fungi
2. the production of a conidium by differentiation of a pre-existing hypha
3. the strains of a fungus are sexually self-sterile
4. a fungus must be included in the Fungi Imperfecti
5. none of the above choices

2. Fill in the blanks (30 pts at 2 pts each).

- a. A professional phagocyte of the innate immunity system of humans, which has many granules, does not present antigens, and is an important protector against aspergillosis is the _____.
- b. _____ are professional phagocytes that are called gatekeepers, because they function as mediators between the innate and adaptive immune responses of humans.
- c. The predominant tissue structures produced in the CMI-competent patient, which appear as tumor-like masses of epithelia and lymphoid cells around the infecting fungus, are called _____.
- d. Fungi that are free-living or exo/endo-symbionts of humans and are generally, but not exclusively, severely pathogenic only in compromised hosts are traditionally called _____ pathogens.
- e. Probably the first predisposing factor to be associated with the rise of mycoses after World War II was _____.
- f. The elaborate membrane system seen near the dolipore septa of many Basidiomycota is called the _____.
- g. Many pathogenic fungi exhibit an altered vegetative thallus in human tissue compared to their normal thallus types when growing saprophytically (say in rich medium in a Petri dish culture). This phenotypic duality of vegetative form is termed _____.
- h. The endogenous mitospores of Zygomycota are termed _____.

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- i. Fungi versus fungal-like protists synthesize lysine via the _____
(spell out) biosynthetic pathway.
- j. Members of the Plectomycetes taxon produce ascocarps/ascoma known as _____
_____.
- k. Molds have vegetative thalli termed _____.
- l. The non-sporangial sexual fungi are classified in the ^{subphylum} ~~subphylum~~ _____
_____.
- m. Ascocarps/ascoma that have large portions of their exposed surfaces covered with asci are called _____.
- n. Cells of fungi which have two co-existing, nonfusing nuclei that contain genes conferring sexual compatibility (that allow karyogamy) are said to be _____
_____.
- o. The basidium type of many Basidiomycota, including the pored and gilled mushrooms, is termed the _____.

3. Short answers/definitions (20 points @ 4 points each) in no more than three complete sentences instead of phrases, diagrams, or lists.

- a. Thalloconidia and blastoconidia _____

_____.
- b. Clamp connections _____

_____.

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c. Phycomycetes _____

d. Spitzenkorper _____

e. Loculoascostroma _____

4. Essay 1 (10 pts): Currently two kinds of antifungals are used to treat the majority of fungal infections. Identify these two types, briefly describe their chemistry, identify their targets and then describe their modes of action. Please provide your responses on the attached sheets and write large enough for your responses to be easily read. Most likely this will mean your answer will be at least one page. Note: Answers that involve poor English or are very difficult to read will be graded on an 8-point versus a 10-point scale).

5. Essay 2 (10 points): In another similarly well-written essay explain on the answer sheets what might be meant by consideration of the phrase "number versus resistance versus virulence" with respect to mycoses having a pulmonary origin. In your discussion of resistance, please mention how the rates of progression might be differently manifested in normal, healthy, immunocompetent patients in comparison with those having immunological abnormalities, such as the reduction of PMNs or the reduction in CMI competency, and also how pathologies might differ.

6. Bonus (5 points): In one relatively short paragraph, define the word fungus and then point out two (2) problems that might arise from attempts to apply your definition to all organisms that seem to be fungi.