

p. 1: _____
p. 2: _____
p. 3: _____
p. 4: _____
p. 5: _____
p. 6: _____

Total: _____

Name _____

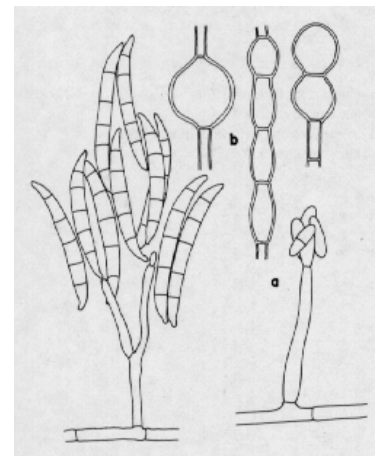
General Mycology -- BOT/MBIO 4810/5810
Midterm Exam 1 -- 100 points
23 February, 2005

Part I: True-false. Circle "true" or "false" for each statement. *If you circle false*, please explain why the statement is false. Note that it is not sufficient to just say the opposite; you must explain specifically what is wrong with the statement (4 points total).

1. True false Nearly all fungi possess cellulase and lignin peroxidase enzymes.
2. True false Spores produced when environmental conditions are unfavorable often remain dormant until an environmental signal indicates it is time to germinate.
3. True false Small molecules such as glucose can pass through the hyphal wall, but large molecules such as cellulose cannot.

Part II: Multiple choice / matching. Choose the single best answer for each question (6 pts total).

1. In the diagram at right, the asexual spores labeled "a" are:
a. conidia d. basidiospores
b. chlamyospores e. zygospores
c. sporangiospores
2. In the diagram at right, the asexual spores labeled "b" are:
a. conidia d. basidiospores
b. chlamyospores e. ascospores
c. sporangiospores
3. The main difference between chitin and cellulose is:
a. chitin has nitrogen; cellulose does not
b. chitin is a protein; cellulose is a polysaccharide
c. chitin contains lysine; cellulose does not
d. chitin makes up the cell membrane; cellulose makes up the cell wall
e. chitin occurs only in animals; cellulose occurs only in plants
4. If a radioactively labelled chemical intermediate in the pathway leading to chitin synthesis is added to a growing culture of a fungus, and it is incorporated, then a technique such as autoradiography would be expected to show the radioactive label most concentrated at the:
a. hyphal tips d. nucleoli
b. hyphal internodes (straight areas between branching-off points) e. mitochondria
c. nuclei



Total points (this page): _____

5. Which of the following is NOT among Whittaker's five kingdoms of life?
 a. Monera b. Protista c. Fungi d. Archaea e. Animalia
6. On agar, yeasts develop colonies that are superficially similar to bacteria colonies. If you examine the cells closely, however, you can tell which is which because:
 a. fungal cells lack walls, whereas bacterial cells have walls
 b. fungal cells have one or more nuclei, whereas bacterial cells lack nuclei
 c. fungal cells never have flagella, whereas most bacterial cells have flagella
 d. fungal cells have ribosomes, whereas bacterial cells do not
 e. fungal cells are typically smaller than bacterial cells

Part III: Compare and Contrast. Below are five pairs of terms or phrases. For each pair, describe one similarity and one difference between the two members (10 points total).

fungal nutrition -- animal nutrition

chlamydozoospores -- conidia

white wood rotting fungus -- brown wood rotting fungus

primary metabolite -- secondary metabolite

aerobic respiration -- anaerobic respiration

Part IV: Short answer. Point values are indicated after each question.

1. How does a fungus obtain food from its substrate? What does the fungus export, and what does it import? (4 points)

2. Fill in the following table (4 points):

	oomycete	ascomycete	zygomycete	basidiomycete
Hyphae septate or aseptate?				
Sexual spore type				

Total points (this page): _____

3. What are the four groups of “true” fungi? Name two other organisms that mycologists study but are not true fungi, and explain why mycologists study that organism (8 points).
4. Bryce Kendrick writes in chapter 11 of the *Fifth Kingdom* about an All-Taxa Biodiversity Inventory for fungi. Suppose Kendrick asks you to help him survey the fungal population in Oklahoma. Choose five habitats where you expect to find fungi, and *describe* (not just list) one way to isolate fungi from the habitat (10 points).
- i.
 - ii.
 - iii.
 - iv.
 - v.
5. Describe how to make a moist chamber, and explain why it reveals fungi that would otherwise be hard to find on a substrate (4 points).

Total points (this page): _____

6. Name four fungal secondary metabolites that are important to humans (4 points)

7. Describe how you would use aseptic technique to transfer a fungal culture from one plate to another (be sure and mention the location in the colony where you would select your fungal sample). (4 points)

8. Here is the recipe for Czapek Dox agar, a medium that is commonly used for growing fungi:

Formula	g/liter
Sodium nitrate	2.0
Potassium chloride	0.5
Magnesium glycerophosphate	0.5
Ferrous sulphate	0.01
Potassium sulphate	0.35
Sucrose	30.0
Agar	15.0

a. Is Czapek Dox agar defined or undefined? Explain your answer (3 points).

b. How might you modify Czapek Dox agar to make it more selective for fungi (and against bacteria)? (2 points)

9. List three environmental factors that determine the rate at which a fungus grows in culture (6 points).

10. Water agar is just what it sounds like: 15 g agar to a liter of water, with nothing else added. It promotes sporulation and sparse hyphal growth, while Czapek Dox agar promotes more hyphal growth and less sporulation. Explain this difference (3 points).

Total points (this page): _____

11. How do aerobic respiration and fermentation differ in terms of (8 points):

(a) use of O₂?

(b) fate of pyruvate produced during glycolysis?

(c) fate of NADH produced during glycolysis?

(d) ATP yield?

12. Name two industrially useful products of fungal fermentation (2 points).

13. What are the four species concepts that biologists recognize, and what is the basis for each concept? (8 points).

i.

ii.

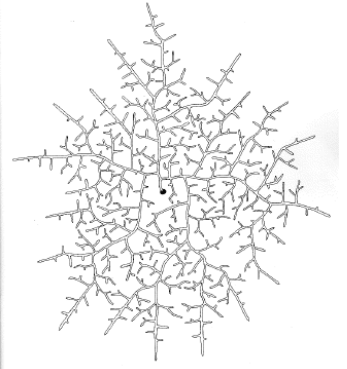
iii.

iv.

(there's more on the back!)

Total points (this page): _____

14. a. Look at the picture of a young colony (at right). Why does the assimilative stage of a fungus produce such a highly branched colony with so many tips? (3 points)



b. If you could look at the colony with a microscope, where would you expect to find the most spores? Explain your answer (3 points).

15. So far, we have seen film clips about beer production, the discovery of penicillin, and the culprit causing a marine disease in the Caribbean. Select one of the film clips, summarize what you learned from it, and describe how it relates to a concept we have covered in lecture. (Note that it says “describe” – I’m looking for more than just a mention). (4 points)