

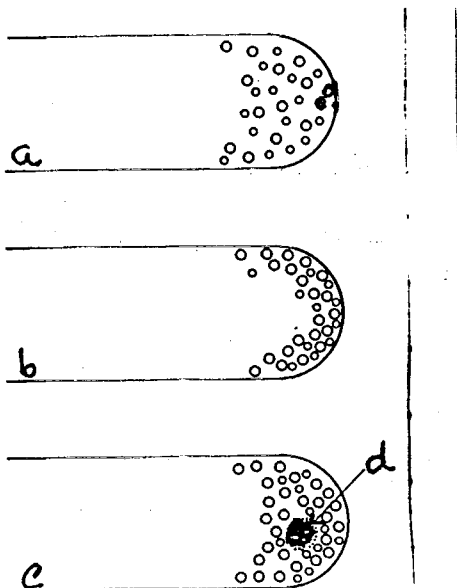
EXAM II
 April 2, 1993
 MIC 321

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 point per blank; 22 pts total)

1. Identifications of structures, their essential basic function and their taxonomic significance. In the blanks provided identify if requested, and with no more than one or two mycological terms, each structure (or structure indicated by arrow(s)), and then with a short phrase describe its function (e.g. cytokinesis; asexual reproduction, meiosporangium, etc.) and/or its relevance to phylogeny (classification) at the rank requested.

a.



a. phylum (one only)

b. phylum (one only)

c. phylum (one only)

d. structure as seen at light
microscopic level

Diagrammatic representation of the organization of apical vesicles in hyphal tips of different groups of fungi. (After Grove and Bracker (1970). Reproduced by permission of the American Society for Microbiology.)

NAME _____

b.

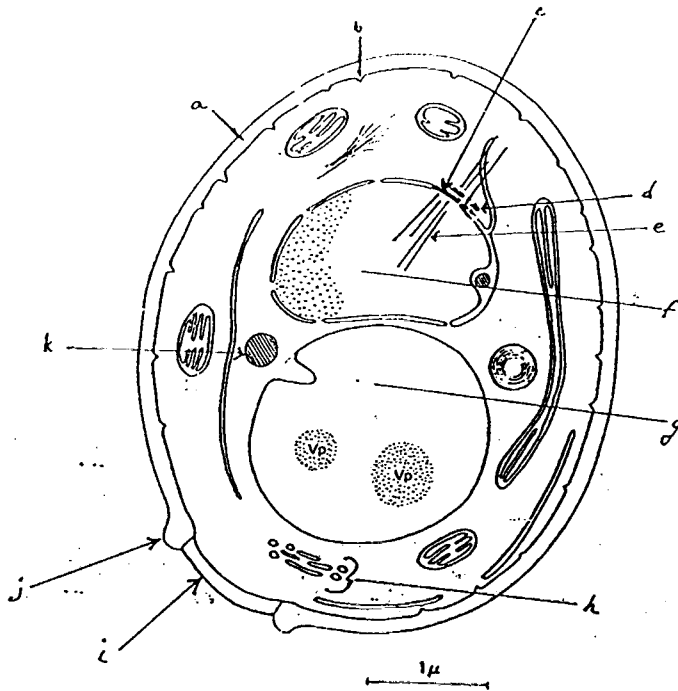


Diagram of a resting cell of baker's yeast (*Saccharomyces cerevisiae*).

a. main structural polysaccharide _____

b. structure _____

c. structure _____

d. structure _____

e. structure _____

f. structure _____

g. structure _____

h. structure _____

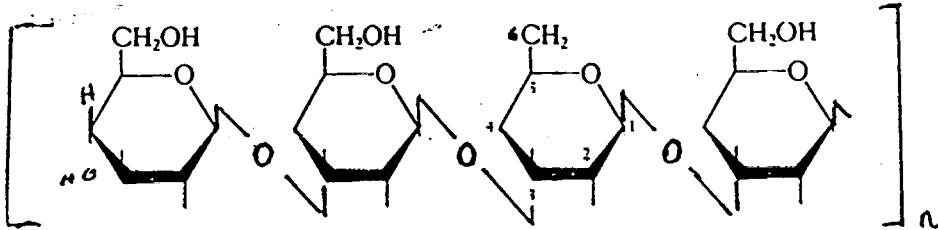
i. main structural polysaccharide _____

j. structure _____

k. structure _____

l. order _____

c.



a. structure _____

b. phylum (one only) _____

d.

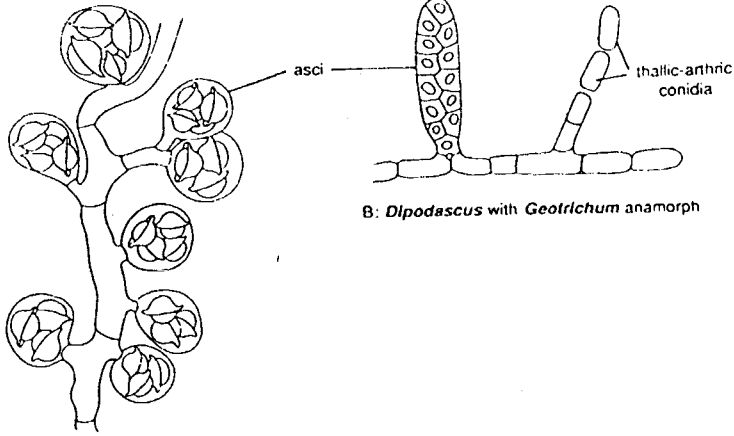


Division scars in *Schizosaccharomyces pombe*.

a. cell wall architectural type for this yeast _____

b. family _____

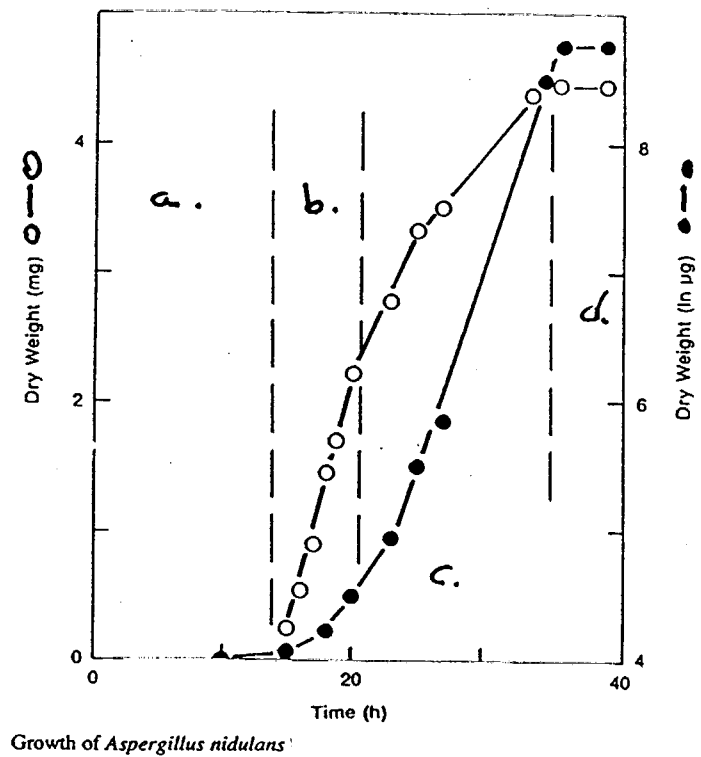
e.

A: *Saccharomycopsis*

a. class of these Ascomycota _____

b. Why? _____

2. (10 pts) *Aspergillus niger* spores were used to inoculate a liquid medium that was then incubated for 40 hours. Dry weight measurements were taken periodically and plotted in two different ways. On the answer sheets provided, describe what is implied by each plot in the context of the vertical lines and with your knowledge of how mold colonies develop in 2 and 3 dimensional space.



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3. (8 pts at 1 pt each) Fungal cell wall chemistry has suggested that certain polysaccharides in pairs are often good correlates of the modern taxonomic groupings that now define the "fungal way of life" at the phylum or subphylum level. Identify as required the phylum or subphylum associated with each cell wall category necessary to complete the table presented below.

Cell wall composition and taxonomy of "fungi".

	<u>Cell wall category</u>	<u>Taxon Requested</u>	<u>Taxon</u>
I.	Cellulose & β -glucan	Phylum	_____
II.	Cellulose & Chitin	Phylum	_____
III.	Chitin & Chitosan	Phylum	_____
IVa.	Chitin & β -glucan	Phylum	_____
b.	Chitin & β -glucan with evidence for fucose and xylose	Subphylum	_____
c.	Chitin & β -glucan with evidence for galactose & galactosamine	Subphylum	_____
V.	Mannan & β -glucan	Subphylum	_____
VI.	Chitin & Mannan	Subphylum	_____

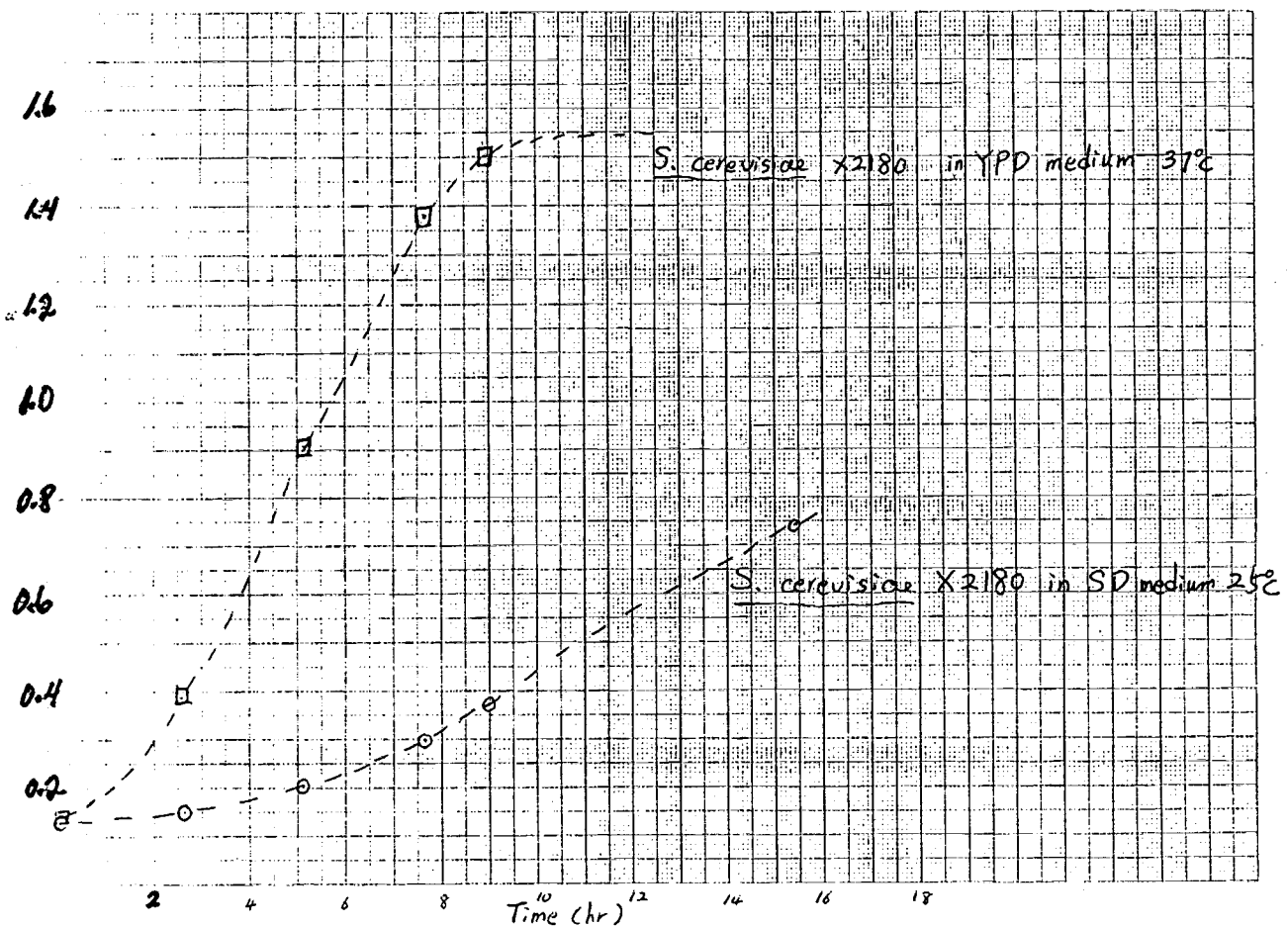
4. (15 pts) On the answer sheets provided, describe in at least one or two full, informative paragraphs what is known about chitin synthase genes, chitin synthases, and chitin deposition and localization in *S. cerevisiae*.
5. (15 pts) On the answer sheets provided, describe in at least one or two full, informative paragraphs the basic elements of the pathway in *S. cerevisiae* by which certain α or a specific gene products interact with certain haploid specific gene products to induce G1 arrest and morphological changes among cells of opposite mating types prior to conjugation (mating).

NAME _____

- 6a. (7.5 pts) *S. cerevisiae* strain x 2180 was grown under two different culture conditions and then growth curves were generated by measuring OD. at 600 nm as shown in the Figure presented below.

Using the culture data that suggests the lesser amount of growth, set up the equation needed for you to calculate the generation time at the maximum rate of growth. You do not need to solve the equation, since you may not have a calculator. However, do include all data in your equation to allow solution.

Finally in a sentence or two suggest the basis for the different growth curves for the same strain.



NAME _____

- 6b. Two different strains of *S. cerevisiae* having the genotypes listed below were mated and ascospores isolated from sporulated diploids.

Genotypes of strains crossed: 1) a, his4, rho-.
2) α , ade2, can^R, cdc10.

For your information the genes responsible for his4 and cdc10 are linked, whereas the genes for the other genotypes appear to be unlinked.

Based on this knowledge, predict the most likely (ideal) phenotypes of the isolated ascospores (Assume that no chromosomal crossover occurs and indicate + as wild type, - as mutant phenotype).

	ade	his	cdc10	rho
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1				
2				
3				
4				
5				
6				
7				
8				

7. (15 pts at 3 pts each) In one or two informative sentences only, define or otherwise describe what is meant by each of the following as related to *S. cerevisiae*.

a. $\alpha_1\alpha_2$ hypothesis

b. y/z endonuclease

NAME _____

c. schmoos

d. cassette model

e. yeast