

Questions

1. What is driving force for apical extension
 - Not known but probably partly turgor pressure
 - Tips have high osmotic pressure
 - Tips blow out in dilute acids

2. Evidence for tip growth of molds?

Burgeffs experiment
~ 1900
etc.

3. How is wall synthesized to -> tip or bud growth?
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Evidence for *in situ* synthesis of cell wall microfibrils

- a. Cell fractionation studies - sugar nucleotide transferases for synthesis of β glucans & chitin present in plasma membrane
- b. Chitin synthase in Zygomycota has been demonstrated to be localized in hyphal tips
- c. Zoospores prior to encystment have no demonstrable preformed micro-fibrils in their cytoplasm
- d. EM tends to demonstrate that wall microfibrils are not carried to wall synthetic loci in apical vesicles.*

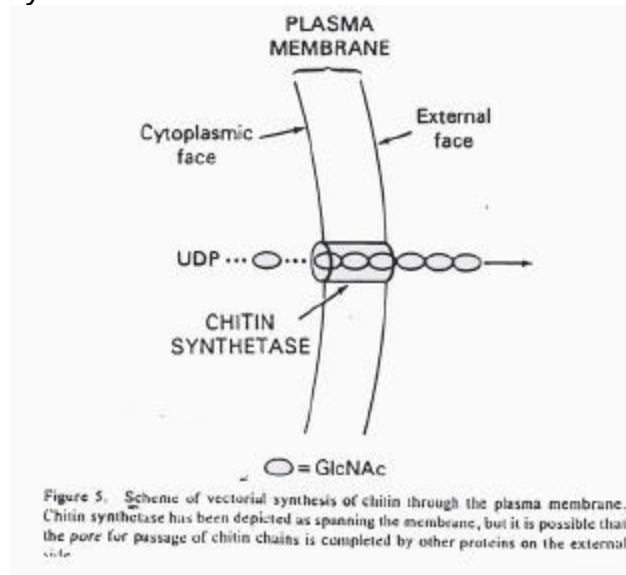
* Vesicles seem to be transporters of amorphous matrix materials.
Heteropolysaccharides
Mannoproteins
etc.

Evidence for *in situ* synthesis of cell wall microfibrils (cont)

e. Demonstration that at least some, if not all chitin is synthesized, most likely, in a vectorial way as demonstrated by unilateral formation of chitin by isolated plasma membrane.

Pretreatment of protoplasts with glutaraldehyde before lysis --> no effecting chitin synthesis

Pretreatment of disrupted membranes with glutaraldehyde inhibited vectorial synthesis



Indirect evidence for a role for hydrolytic enzymes in wall synthesis

- a. Wall hydrolytic enzymes can be isolated from hyphal tips and yeast buds
- b. Is a positive correlation between concentration of hydrolytic enzymes and rates of tip extension and hyphal branching
- c. Fungal hyphae have intrinsic ability to execute carefully controlled dissolution of own wall. e.g. - clamps, anastomosis, bud emergence, branch formation
- d. Hyphal tips highly susceptible to disruption, e.g., tips blow out in dilute acid solutions

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Possible implications

- 1. Fungal cell wall synthesis depends on a gradient of cell wall synthesis accompanying a gradient of cell wall lysis.
- 2. For this to occur lytic and synthetic components and machinery must be compartmentalized.

How?

Vesicles??

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