hindrance, such coupling with any other residue. It is not justifiable, for instance, to attribute the aggregation in a 'pore' or stacked ring format (Mueller & Rudin, 1968) to significant hydrogen-bonding forces.

Extensive intramolecular hydrogen-bonding can occur, however, in α -helical format, and it is possible to construct a model wherein 60% of the residues are thus bound. Experiments suggest that this structure may obtain in an interfacial monolayer, where the area/molecule at high pressure corresponds well with the theoretical value, and also in other non-aqueous systems such as alcohol, wherein a considerable degree of helicity is indicated by circular-dichroic results (P. Bayley, personal communication). These results are discussed in connexion with the ion-gating properties of alamethicin.

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Chitin Synthesis in *Mucor rouxii*

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Evidence has been obtained that chitin, a cell-wall component of *Mucor rouxii*, is synthesized from UDP-*N*-acetylglucosamine. Cell-free extracts of *M. rouxii* were shown to catalyse the synthesis of UDP-*N*-acetyl[¹⁴C]glucosamine from [¹⁴C]glucosamine, through a succession of intermediary steps involving kinase, transacetylase, mutase and pyrophosphorylase activities. Cell-free extracts also catalysed the incorporation of *N*-acetyl[¹⁴C]glucosamine into a chromatographically immobile acid- and alkali-insoluble polymer. This polymer was identified as chitin, being composed entirely of *N*-acetylglucosamine units. No evidence was obtained for any substantial synthesis of chitosan, a polymer of glucosamine, which is also a component of the *M. rouxii* cell wall.

Fractionation of the cell-free extracts by differential centrifugation revealed that the chitin synthetase activity was distributed among pellets sedimented at 2000g, 10000g and 100000g. Isolated cell walls were particularly rich in chitin synthetase activity. For most of this investigation particles

sedimented at 100000g were used. It was shown that chitin synthesis was stimulated by the presence of *N*-acetylglucosamine, ATP, soluble chitodextrins and a lipid fraction isolated from the fungus. Mg²⁺ was a requirement for chitin synthesis, which proceeded at optimum rate at pH 6.2–6.5 and 22–24°C. The enzymic activity of 100000g particles was most stable to storage when the particles were frozen in phosphate buffer. Chitin synthetase activity of germinating spores of *M. rouxii* increased rapidly from a time in the growth cycle coincident with the emergence of the germ tubes.

Free Lipids and Carbohydrates of *Agaricus bisporus* Mycelium

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Mycelium of the cultivated mushroom, *Agaricus bisporus* (J. Lange) Pilat, grown in stationary culture at 25°C for about 3 months in 2% (w/v) malt extract buffered with 0.1% CaCO₃, was harvested by filtration (wet weight 57 g) and washed with 0.9% NaCl. An acetone-dried powder was ground in sand with chloroform-methanol (2:1, v/v) and chloroform-methanol (1:2, v/v) and filtered. The combined acetone and chloroform-methanol filtrates were dried and washed (Folch, Lees & Sloane-Stanley, 1957) to yield an aqueous fraction (1 mmol of glucose equivalent) and lipid fraction (300 mg).

Paper chromatography of the aqueous fraction in ethyl acetate-acetic acid-formic acid-water (18:3:1:4, by vol.) and detection with AgNO₃-NaOH showed three well-separated carbohydrates with *R_F* values identical with those of glucose, trehalose and mannitol. The identifications were confirmed by chromatography in other systems, by the fact that trehalose on hydrolysis produced only glucose and by the non-reducing reaction of mannitol to aniline phthalate. Moreover trehalose and mannitol have been found in the sporophores of many basidiomycetes, including *A. bisporus* (fruiting stage) (Hughes, Lynch & Somers, 1958; Rast, 1965).

The lipid fraction was applied to a silicic acid column, which was eluted with chloroform (40% of total lipid), chloroform-acetone (1:1, v/v) (20% of lipid), acetone (10% of lipid) and chloroform-methanol (1:1, v/v) (20% of lipid). T.l.c. of the chloroform eluate in light petroleum-diethyl ether-acetic acid (85:15:2, by vol.) show triglyceride, both 1,2- and 1,3-diglyceride, monoglyceride, free fatty

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