

Van Winkle, W. B. Preliminary observations
of the ultrastructure of the slime mutant.

The growth and gross morphological features of slime have been presented by Emerson (1963 Genetics 34: 162). The heterocaryon (fz;sg;arg-1, cr, aur, or-1) + (al-s, nic-1, lys-3,x-1) (FGSC#327), as well as the methods for sustaining slime, were kindly supplied by V. W. Woodward. Growth on agar facilitated the isolation of the hyphlets. Hyphlets 24-48 hours old were fixed in 2.5% glutaraldehyde and portfixed in OsO_4 , both buffered with 0.1M Sorensen's buffer. Following staining in aqueous uranyl acetate and ethanol dehydration, specimens were embedded in Araldite for electron microscopy.

Electron microscopic examination reveals that the majority of hyphlets from spheroplasts are devoid of cell walls. The absence of cell walls no doubt allows for good fixation by the glutaraldehyde. Cells are found to be multinucleate with obvious connections between the nuclear envelope and the rough endoplasmic reticulum. Prominent granular nucleoli are present, usually one per nucleus. To date, only rough endoplasmic reticulum has been observed in slime. Occasionally, the endoplasmic reticulum is found in large lamellar arrangements of 3-5 layers of membranous structures. Oblique or glancing sections of endoplasmic reticulum show numerous polyribosomes associated with the membranes.

Mitochondria of the typical elongate form are very common; however, some do exist in doughnut-like configurations. The cristae of the mitochondria terminate in square ends or in bulbar shaper. Serial sections have revealed that what appear to be several mitochondria in single sections are actually different lobes of single large mitochondrio. In younger hyphlets myelin whorls involving both the inner and outer mitochondrial membranes have been observed. Some mitochondrio are seen to have "buds" of the outer membrane extending into the surrounding cytoplasm.

An outstanding feature of slime hyphlets is the abundance of dense granular organelles, morphologically identical to microbodies (peroxisomes). These organelles range in diameter from 0.13μ to 0.18μ and, in many cases, are dumbbell-shaped and associated with rough endoplasmic reticulum sections. Ultrastructural demonstration of the presence of various enzymes in peroxisomes, mitochondrio and endoplasmic reticulum is currently being attempted. (Robert Welch Foundation Grant F-060.)

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