Migrating and dividing somatic nuclei

A. Bakerspigel

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Abstract
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Van Winkle, W. B. Preliminary observations on the ultrastructure of the slime mutant. The growth and gross morphological features of slime have been presented by Knowles (1966 Genetics 34: 162. The heterocaryon \((f_{-} s p r o a g e l e s, c, t, o u r, o r l+) + (a l^{+}, n i c e^{l}, l y s_{-} 3 x-4), \) \(F G S C^{l} 327,\) as well as any methods for sustaining slime, were kindly supplied by W. V. Woodward. Growth on agar facilitated the isolation of the hyphlets. Hyphlets 24-48 hours old were fixed in 2.5% glutaraldehyde and postfixed in \(O_{3}O_{4},\) both buffered with 0.16M 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 will not allow 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 mitochondria. In younger hyphlets myelin whorls involving both the inner and outer mitochonial membranes have been observed. Some mitochondria 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 0.13\(\mu\) to 0.18\(\mu\) and, in many cases, are dumbbell-shaped and associated with rough endoplasmic reticulum sections. Ultrastructural demonstration of the presence of various enzymes in peroxisomes, mitochondria and endoplasmic reticulum is currently being attempted. (Robert Welch Foundation Grant F-060.}

Bakerspigel, A. Migrating and dividing nuclei in somatic cells of Neurospora. Recent HCl-Giemso and Azure A-S02 stained preparations have provided new observations on dividing nuclei in somatic cells of Neurospora crassa:

1) In contrast to the report by Wilson (1966 Neurospora News 10:6), division does not occur perpendicular to the longitudinal axis of the cell. In fact, nuclei in several stages of division can be found lying parallel to the longitudinal axis of germinating conidia and hyphal cells.

2) During the final separation of sister nuclei (telophase) two lagging chromosomes can be observed. One end of each of these chromosomes is attached to the nucleus. Their free ends are swollen or bulbous.

3) During early nuclear division the chromosomes appear to be looped, hooked or curved at one end. A ring-shaped chromosome has also been observed at this stage. The free ends of at least three chromosomes in metaphase complexes were observed to have swollen ends.

4) A migrating nucleus in a hypha can be oval in shape. A long slender intranuclear strand can be observed attached to the nuclear membrane. This strand may be "Y"-shaped and extends away from the septal pore through which the nucleus migrated, terminating in a small, densely stained body which is assumed to be the centriole. Such a strand may be composed of two portions, one of which is twice the length of the other. The region to which these strands are attached appear to be composed of tiny granules situated opposite each other on the nuclear membrane. In contrast to some previous reports, none of these strands were observed to extend in opposite directions.

5) Although chromosomal complexes and individual chromosomes were observed, no classical alignment of these chromosomes on a metaphase plate was noted. Wilson reported that a spindle occurs only between separating chromatids. Present observations suggest that a "spindle apparatus," similar to that described by the writer in Trichophyton mentagrophytes (Robinow and Bakerspigel 1965 p. 119-161, in Ainsworth and Sussman (eds), The Fungi, Vol. 1, Academic Press, New York), may operate in dividing, somatic nuclei of Neurospora crassa. = = = Department of Clinical Microbiology, Victoria Hospital, London, Ontario, Canada.

Morgan, D. H. Arginaseless mutants of Neurospora

The selection procedure for arginase mutants described by R. H. Davis, (1968 Report of the Fourth Neurospora Information Conference, Neurospora News 13: p. 13) was arrived at independently by the author while working in N. H. Horowitz's laboratory at Pasadena. Our procedures differed in only two respects: 1) I used Vogel's "N", with ammonia as nitrogen source, for the filtration and plating medium whereas Davis anticipated complications involving arginine uptake in the presence of ammonia and therefore used a nitrate minimal.