AEC-NASA TECH BRIEF

AEC-NASA Tech Briefs describe innovations resulting from the research and development program of the U.S. AEC or from AEC-NASA interagency efforts. They are issued to encourage commercial application. Tech Briefs are published by NASA and may be purchased, at 15 cents each, from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Ultraviolet Microscopy Aids in Cytological and Biomedical Research

Ultraviolet microscopy has been used by cytologists and biochemists to study the morphological and physiological changes which occur in the living cell under varied culture conditions. The yeast cell was chosen as a suitable specimen for investigation because its content of ultraviolet-absorbing materials lies within the range of observation by ultraviolet microscopy, and its lack of motility is an important factor in the production of useful images with the available ultraviolet energy.

The yeast cells were cultured under conditions which produce a high concentration of the strongly ultraviolet-absorbing compound, S-adenosylmethionine, in the vacuole. The cells were induced to sporulate and ultraviolet photomicrographs were obtained. These showed that the vacuole is abolished at the onset of sporulation, and its contents may be observed temporarily within the old cell wall surrounding the spores. As sporulation progresses, the material is discharged into the culture medium and is not utilized. This is quite different from what occurs during budding, where the vacuolar material appears in the vacuole of the bud in a concentration indicating that parent and daughter share equally.

Ultraviolet photomicrographs of cells containing large, easily observed, cytoplasmic granules revealed that most of the granules disappeared during sporulation and that an ultraviolet-absorbing lipid substance lay between the spores, wetting them. It appeared, thus, that some of the granules were composed of, or contain, this lipid.

It is believed that the lipid material present in the granules takes part in the formation of the spore coat, especially the outer layer. Many more tests are being run to clarify this and other questions such as the role of deoxyribonucleic acid (DNA) during sporulation.

Notes:

1. This information would be of interest to biophysicists, microbiologists, biochemists, and physiologists, as it can be applied to other cytological and biochemical studies.
2. Additional details are contained in:
   (a) *Ultraviolet Microscopy of the Vacuole of Saccharomyces Cerevisiae during Sporulation,* Journal of Bacteriology. 88, 449–456 (1964), by G. Svihla, J. L. Dainko, and F. Schlenk.
   (b) *Biological and Medical Research Division Annual Report,* 1964, ANL-6971, pp. 21–22, Argonne National Laboratory, Argonne, Illinois. The Argonne report is available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151; $3.00 each (microfiche, $0.65).
3. Inquiries concerning this innovation may be directed to:

   Office of Industrial Cooperation
   Argonne National Laboratory
   9700 South Cass Avenue
   Argonne, Illinois 60439
   Reference: B67-10590

   Source: B. Svihla and F. Schlenk
   Biological and Medical Research Division
   (ARG-178)

Patent status:

Inquiries about obtaining rights for commercial use of this innovation may be made to:

Mr. George H. Lee, Chief
Chicago Patent Group
U.S. Atomic Energy Commission
Chicago Operations Office
9800 South Cass Avenue
Argonne, Illinois 60439

Category 04