

This Week's Citation Classic

Whaley W G, Mollenhauer H H & Leech J H. The ultrastructure of the meristematic cell.
Amer. J. Bot. 47: 401-49, 1960.

This paper sets forth present knowledge concerning the fine structure of the meristematic cell and its components, the ground substance of the cytoplasm, the endoplasmic reticulum, mitochondria, the Golgi-apparatus, proplastids and amyloplasts, vacuoles and "lipid bodies," the cell membranes, the nucleus and its components, and the cell wall. It also deals with the microsomal fraction of meristematic cells, the relations of "lipid bodies" to vacuoles and the general structure of the various cell membranes. [The SC® indicates that this paper was cited 123 times in the period 1961-1977.]

W. Gordon Whaley
The Cell Research Institute
University of Texas, Austin
Austin, TX 78712

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"This paper had its origins in some research we began in M.D. Anderson Hospital and Tumor Institute in Houston in an attempt to demonstrate just where the tissues of inbred maize and their heterotic hybrids showed differences in the nature or number of

essential organelles. We soon discovered that —as earlier had been true in light microscopy —neither the fixatives nor the embedding agents utilized by the animal cytologists were successful for plant materials. This necessitated a long period of adaptation of different techniques all of which have now been supplanted by still superior ones.

"The material had its first exposure at an international congress in Montreal in 1959 and proved so far in advance of other work being done on plant materials that I was at once asked to substitute a discussion of it for the formal paper proposed by an English colleague of mine. The invitation from the American journal of Botany followed.

"The strength of the paper lies in its being the first demonstration of a substantial number of organelles in the plant cell and thus a closer equation of the plant cell and the animal cell. Its second strength resides in its depiction of these in a plant system in which progressive stages of differentiation can be followed, and it has led over the years to a multitude of observations which have turned attention back to the problems of differentiation which were harder to study earlier.

"As for problems, the utilization of newer techniques was slowly accepted by many cytologists and they were supplanted before we really overcame this matter. The paper did, however, stimulate several suggestions that certain systems would be better studied in plants than in animals and this has, I believe, led to a good deal of profitable research."