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Fine Structures Concerning Storage Protein Accumulation in Developing Cotyledon of Broad Bean (*Vicia faba* L.)

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Abstract:

Developing leguminous seeds are laid down the reserves accumulation in the parenchyma cells of the cotyledone. The sequence of protein accumulation of developing broad bean seeds has been followed by scanning and transmission electron microscopy. At the early maturation stage, protein was initially deposited in central vacuoles. The central vacuoles were rapidly subdivided to form many smaller protein-filled vacuoles. These vacuoles were surrounded by developed rough endoplasmic reticulum (RER). From the middle of maturation and on, the developed RER system was maintained in the cytoplasm. Transmission eletron microscopy revealed that vacuoles filled up with reserve protein were seen to be surrounded by increased RER and highly electron-dense vesicles. These vesicles increasd during protein accumulation and have some relation with protein transport. The terminal of RER becomes a dilated structure, in which protein bodies appear to be formed. However, this structure decreased at a later stage of maturation. The protein vesicles become the mature protein bodies at the last stage of maturation. Starch grain formation was rapidly proceeded in plastids at during the middle of maturation. It is suggested that protein accumulation of developing broad bean seeds is closely related with RER, and that protein bodies are formed by two pathways : subdivision from central vacuoles, and the protein deposition in the dilated RER.

Keywords:

Broad bean, Cotyledon, Protein accumulation, Protein body, Rough endoplasmic reticulum, Ultrastructure, Vacuole

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