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Building of cell plate during Cytokinesis in plant cell

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Cytokinesis in plant cells involves building a cell plate as the final step in generating two cells. The cell plate is built in the center of phragmoplast by fusion of Golgi-derived vesicles. This step imposes an architectural problem where ballooning of the fused structures has to be avoided to create a plate like structure. This is achieved by an unique mechanism vesicles are squeezed into dumbbell-shaped vesicle-tubule-vesicle (VTV) structures with the help of phragmoplastin, a homolog of dynamin. These structures are fused at their ends in a star-shaped body creating a tubulovesicular "honeycomb-like" structure in the center of phragmoplast.

Phragmoplastin was shown to interact with Cell-Plate-specific Callose synthase encoded by CalS1 gene. This protein further intracts with a UDP-glucose transferase forming a complex that produces copious amounts of callose needed to form the cell plate. Once the plate reaches the periphery of the cell, then cellulose synthase takes over and deposit cellulose microfibrils on the cell plate making a rigid cell wall. The identification of Phragmoplastin and Callose synthase complex alloed us to work out the mechanism by which cell plate is built during cytokinesis in plants.

Biography

Desh Pal S Verma is a full Professor at the Ohio State University, USA. He obtained his BSc degree in Biology and Chemistry, MSc degree in Botany from Agra University, India, and PhD degree in Plant Physiology and Biochemistry from the University of Western Ontario, Canada. He is a Fellow of the Royal Society of Canada and a Fellow of the Third World Academy of Sciences, Italy. His pioneering research work includes the identification and characterization of nudulins and phragmoplastin, and genes responsible for proline and callose biosynthesis in plants. He has served on the editorial boards for several international journals, edited 11 scholarly books, and published over 160 original research papers.

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