

CRE treated mice. As results indicated that the immune-suppressive effect of CRE extract work on the mitigation of allergic contact dermatitis.

C201

Histochemical and Ultrastructural Identification of Enzymatically Isolated Calcium Oxalate Crystals in the Leaf of Ipomoea batatas

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In situ distribution, histochemical identification, ultrastructural configuration and energy dispersive x-ray spectrometric analysis of intracellular crystals of calcium oxalate in the leaf of sweet potato (*Ipomoea batatas*) were studied by light and scanning electron microscopy. Leaf segments were cleared in the mixture of sodium hydroxide and chloral hydrate, and observed with light microscope. Calcium oxalate crystals were isolated by incubation of segmented leaf tissue in the enzyme mixture of macerozyme, cellulase and pectinase. Isolated protoplasts were bursted by adding of water and mild agitation. Isolated crystals were purified by sucrose density gradient centrifugation. Histochemical identification of the crystals were carried out with silver nitrate-rubeanic acid methods to investigate the hydrate form of calcium oxalate. Ultrastructural identification and energy dispersive x-ray crystallography with scanning electron microscope have been carried out to investigate the topography and ionic configuration of the crystals.

C202

Development of the Secondary

Plasmodesmata in C₄ Photosynthetic Cell Interfaces

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Features of the plasmodesmata (PD), especially on Kranz bundle sheath-mesophyll (BS-M) interfaces, were examined from seed leaves to maturity in order to monitor and follow changes occurring during leaf development in C₄*Salsola* species. In addition to cotyledons, leaves on growing plants were placed in four categories by the developmental stage and size as follows: primordial (< 0.5 mm), immature (3-4 mm), young (7-9 mm), and mature (> 1.5 mm). The etiolated leaf primordia exhibited only simple primary PD in extremely thin primary walls, while the immature leaves developed still simple PD but the cell walls began to thicken unevenly on areas where PD were not established. Formation of the secondary PD was initiated soon after the immature stage but before young leaves. Highly branched complicated PD were well distinguished during leaf maturation. Numerous secondary PD were developed in the pit fields and conspicuous median cavities formed from several anastomosing PD. The most interesting feature was noticed in the BS-M interface of the cotyledons. Numerous, median cavity forming secondary PD occurred frequently in thin walls as those found in the mature leaves. However, no primary pit fields were detected on the cell wall during cotyledon growth. Higher and complicated plasmodesmatal connections at the BS-M cell interfaces in cotyledons, young, and mature leaves suggest BS-M routes as the predominant symplastic pathway that suffice the rapid movement of C₄-acids required for the growth.

C203

Expression of the Beet Curly Top Geminivirus L4 Gene Produces Viruslike Symptoms in Transgenic Arabidopsis

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Transgenic Arabidopsis expressing the L4 gene from beet curly top geminivirus (BCTV), under the control of cauliflower mosaic virus 35S promoter, developed virus-disease-like phenotypes. Plants transformed with 35S::L4 and 35S::L4::myc gene constructs both produce viruslike symptoms but 35S::L4::myc induces more severe and typical virus symptoms. And the produced levels of L4 gene transcripts were similar to transgenic plants expressing the L4 gene. Thus, the abnormal plant phenotypes result from the translation of the L4 gene. These results support the hypothesis that L4 open reading frame of BCTV encodes a protein involved in the development of disease symptoms during viral infection. Here, we show the internal and external structures of transgenic plants, and we also report the BCTV L4 protein expression in cellular and subcellular levels by cellular and molecular approaches.

C204

Ultrastructure and Cytochemistry of Spermatial Development and Fertilization in Ceramiales (Rhodophyta)

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Spermatial development and fertilization process of ceramiales were investigated by electron microscopy. The spermatium consists of two parts, an ovoidal head and two appendages projecting from each distal end of long axis. The appendages originate from spermatangial vesicles (SVs) and follow a developmental sequence beginning as amorphous material and ending as fully formed fibrous structure compressed within the SVs. SV formation is due to contributions initially from endoplasmic reticulum and later from Golgi apparatus-derived vesicles. Chemical differentiation of the spermatial wall occurs early in its development. Calcofluor white does not label spermatial wall, indicating an absence of cellulose polysaccharides, which are abundant in vegetative cell wall. Liberated spermatia have an arrested prophase nucleus with a pair of polar rings. The cytoplasm of trichogyne is connected with that of spermatia at the fertilization canal, and is empty when the nuclear fusion between spermatium and carpogonium occurs.

C401

The Ultrastructure of Spermatozoa of the Ussurian Bullhead, *Leiocassis ussuriensis* (Teleostei, Siluriformes, Bagridae) with Phylogenetic Considerations.

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The fine structure of spermatozoa of *Leiocassis ussuriensis* was examined with scanning and transmission electron