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BRIEF COMMUNICATION

Intercellular Communication in the Maize Root Endodermis

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Abstract. The endodermal cells of the maize roots are linked to each other via plasmodesmata mainly localized at the proximity of the Casparian band on the anticlinal walls. In this part of the walls was noticed the absence of the suberin lamella in the thickening endodermal cells.

The functional significance of endodermis is a crucial question in the problem of the transport of materials into roots.

Electron microscopic studies of the last years revealed the presence of plasmodesmata in all longitudinal walls of the endodermal cells (FALK and SITTE 1961, BONNETT 1968, HELDER and BOERMA 1969, CLARKSON *et al.* 1971, STAMBOLTSIAN 1972, KARAS and MCCULLY 1973, ROBARDS *et al.* 1973) except the region of the Casparian band. These intercellular connections maintain presumably the symplastic continuity between core and stele after thickening of the endodermal cells.

This communication is a part of the electron microscopic investigation of the development of the endodermis in the roots of *Zea mays* L. cv. CO 108 and TA 48 S (KLASOVÁ, in preparation).

Small segments of primary roots of the maize seedlings were fixed in 3% glutaraldehyde followed by 2% osmium tetroxide and embedded in Epon/Araldit. Transverse sections cut on a Tesla BS 490 A ultramicrotome were stained with uranyl acetate and lead citrate and examined in a Tesla 242 D electron microscope.

Present paper reports the occurrence of plasmodesmata in the longitudinal walls of the endodermis including the Casparian band (Fig. 1). These plasmodesmatal connections occur during all the developmental stages of the endodermal cells, *i.e.* the primary, secondary, and tertiary ones. A certain preference of their localization at the close vicinity of the Casparian band (on the outer portion of the anticlinal walls) has been observed (Figs. 2—4). In this region of the walls, absence of the suberin lamellae in the secondary and tertiary endodermis was usually noticed on the electron micrographs (Fig. 5).

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The facilities for the apoplast/symplast exchange are not unexpected near the site where diffusive movement is barred by the formation of the Casparian band. Absence of the suberin lamella and the presence of the plasmodesmata in the anticlinal walls could enable the passage of materials across the plasmalemma of the endodermal cells and probably also the plasmalemma which bounds the plasmodesmata. The tangential movement along the endodermal tissue could contribute at some extent to the whole radial translocation of solutes via "passage" cells and cytoplasmic connections after thickening of the endodermis.

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Figures at the end of the issue.

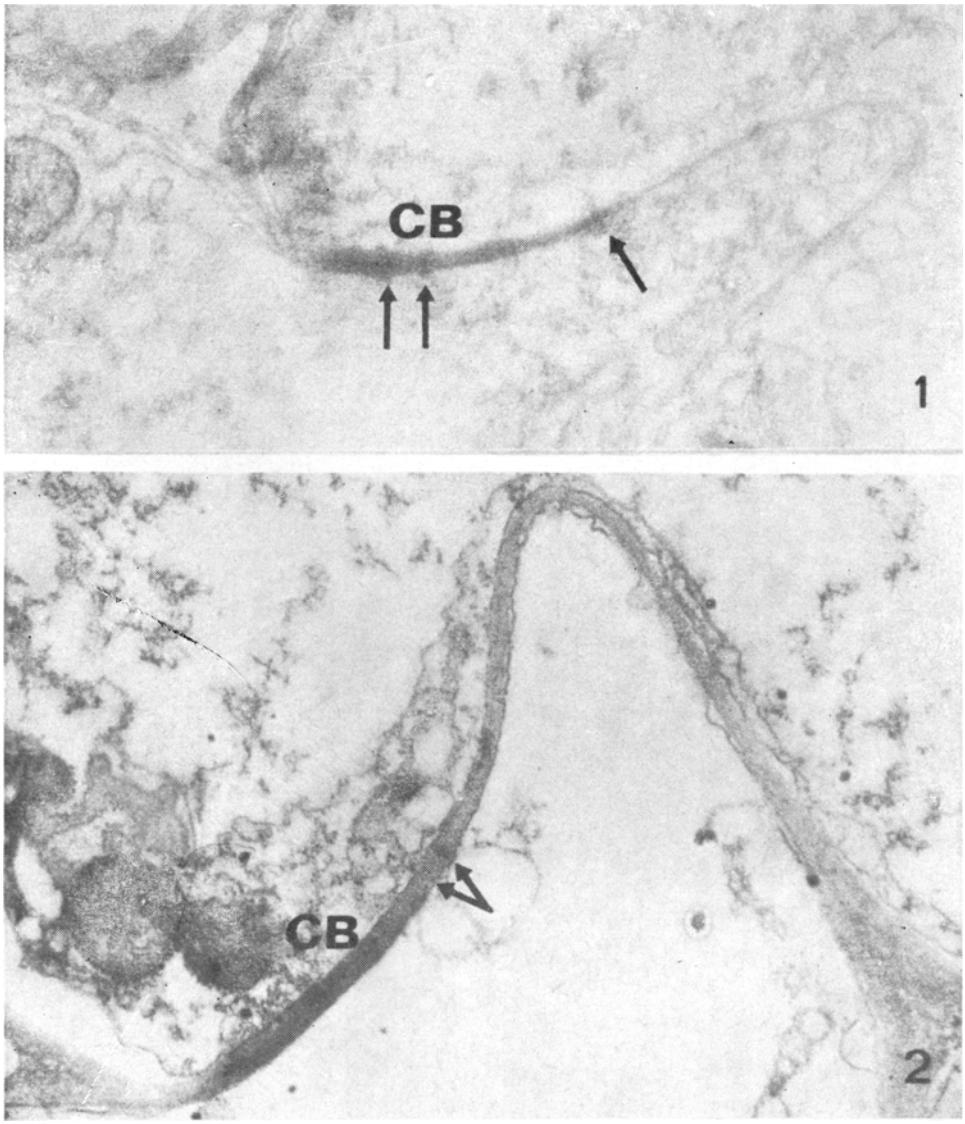

Fig. 1. Anticlinal wall of an endodermal cell with the Casparian band (*CB*) and plasmodesmata (arrows) in the region of the Casparian band and beside it. Magn. 20 000 ×. All subsequent electron micrographs are details from the anticlinal walls of endodermal cells.
Fig. 2. Note plasmodesmata (arrows) in the proximity of the Casparian band in a primary endodermal cell. Magn. 20 000 ×.

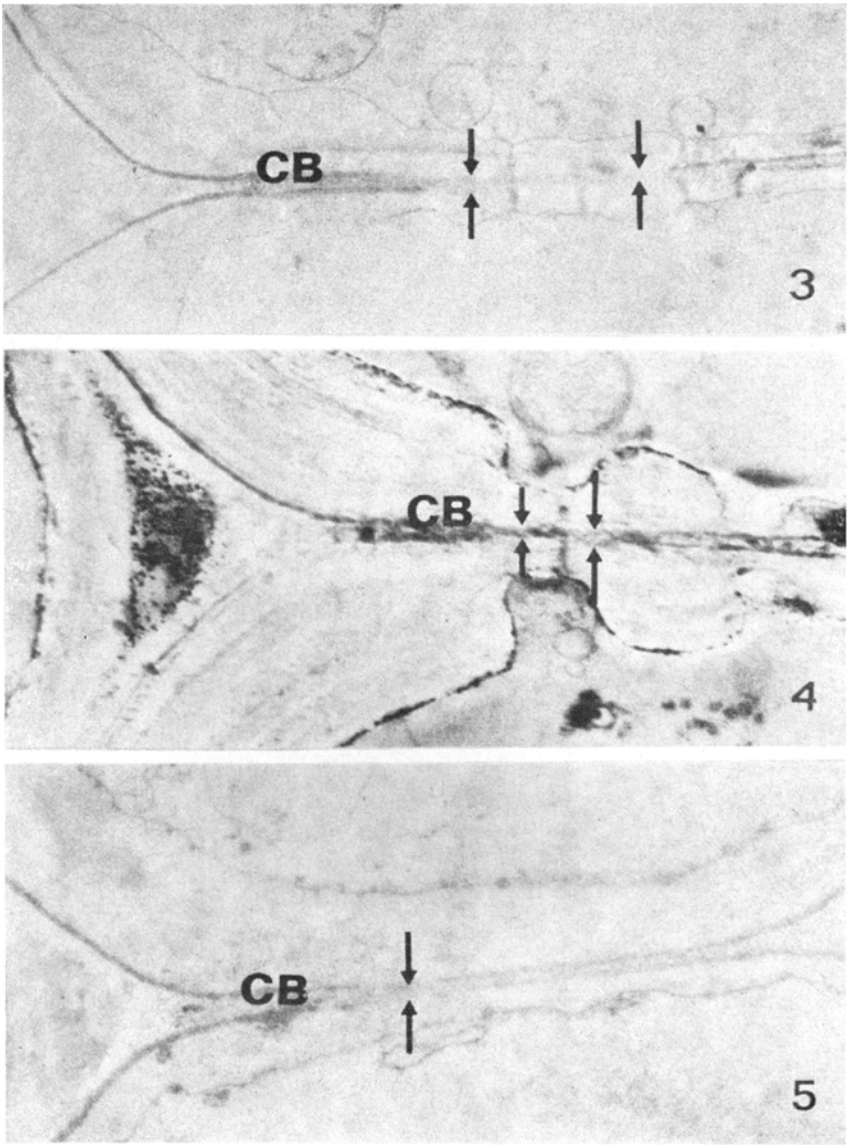

Fig. 3. A group of plasmodesmata near the Casparian band after the deposition of the suberin lamella. Local absence of the suberin lamella (arrows) is evident in this part of the wall. Magn. 13 000×.
Fig. 4. Note the pits with plasmodermata and the absence of suberin lamella (arrows) in the region adjoining to the Casparian band in the tertiary thickening endodermal cell. Magn. 13 000×.
Fig. 5. Demonstration of the absence of the suberin lamella (arrows) beside the Casparian band in the thickening endodermal cell. Magn. 13 000×.