Root-Soil Boundary Zones

As Seen by the Electron Microscope

These micrographs show greatly enlarged views of the outer edges of root cells in contact with the soil. Of particular interest is the mucigel, a jelly-like coating on the outer surface of the roots. Mucigel, produced by the roots and perhaps also by microbes living in it, conforms to the surface contour of the soil particles it touches. Thus, intimate contact is provided for the transfer of soil nutrient ions and water from the soil to the roots.

To prepare specimens for these electron micrographs, barley seeds were grown in tubes filled with bentonite clay and perlmutite sand. The water content was adjusted to field capacity. After a few days the void spaces between soil particles were filled with liquid monomer, which hardens to a stone-like mass. Slices were then cut from these tubes with special diamond saws and knives. The slices used for these micrographs were between 100 and 500 angstrom units thick, roughly 1 to 2 millionths of an inch.

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