

PLASTICITY OF ROOT PERMEABILITY FOR NUTRIENT ACQUISITION

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Plant roots forage the soil to acquire water and nutrients for growth and development. This function is closely linked to their anatomy: water and nutrients move radially through the concentric layers of epidermis, cortex, and endodermis before entering the vasculature. This arrangement allows for three uptake scenarios: the “symplastic pathway”, where the outer cells actively take up nutrients, which are then transported from cell to cell through plasmodesmata; the “apoplastic pathway”, where nutrients are transported in the apoplast and blocked by the endodermal apoplastic barrier (Casparian strips); and the “coupled trans-cellular pathway”, where nutrients are transported sequentially from one cell to another by polarized influx and efflux carriers and are barred by the endodermal diffusion barrier (suberin lamellae). My group aims to functionally characterize these pathways for nutrient acquisition by a combination of physiology, cell biology and developmental approaches. We are particularly interested in suberin lamellae and plasmodesmata function and regulations for nutrient acquisition. Our recent work identified key regulators of suberin deposition and cell-to-cell transport in roots.

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