

POLLEN

Calcium channel helpers

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Glutamate is an important neurotransmitter in vertebrates. Its perception across synapses is mediated by transmembrane receptors. Plants also contain glutamate receptor-like (GLR) proteins, which function as non-specific channels with calcium permeability and have been involved in many biological processes, from immunity to metabolism. José Feijó and colleagues have identified molecular partners that are needed for proper function and subcellular localization of GLRs during pollen tube growth.

Arabidopsis contains 20 GLRs. A close inspection of individual and higher-order mutants for pollen-expressed GLRs suggested that their role is more complex than simple plasma membrane calcium

channels. A few of them could regulate calcium homeostasis in pollen by redirecting the ion away from the cytosol and into intracellular reservoirs, which implies specific subcellular localizations.

Using analogy with animal systems, the authors focused on the CORNICHON (CNIH) family of proteins needed for trafficking of GLRs in vertebrates. Indeed, in a double *cnih* mutant, GLRs — but not other similarly targeted proteins, indicating some specificity — are not correctly sorted and end up trapped in the endomembrane network. Furthermore, the presence of CNIH proteins increases the GLR ion channel activity, even without its ligand, in electrophysiology assays.

This study shows that understanding biological functions is a fascinating never-ending game of molecular Russian nesting dolls, with many layers of complexity adding on top of each other: calcium is a necessary signal for pollination, GLRs modulate calcium fluxes, CNIH controls GLR localization and activity. Now may be the time to address how CNIH proteins are regulated.

Guillaume Tena

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