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Alexandre Martinière, BPMP Montpellier
martinie@supagro.fr
https://www1.montpellier.inra.fr/wp-inra/bpmp/recherche/les-equipes/aquaporines/

Plant Membrane Nano-organization and cell signaling

Abstract

In a crowded environment, establishing interactions between different molecular partners can take a long time. Biological membranes have solved this issue, as they simultaneously are fluid and possess compartmentalized domains. This nanoscale organization of the membrane is often based on weak, local and multivalent interactions between lipids and proteins. However, from local interactions at the nanoscale, different functional properties emerge at the higher scale, and these are critical to regulate and integrate cellular signaling. Taking the plant osmotic signaling pathway as an example, we show that a single isoform of Plant Rho GTPase is recruited in membrane nanodomain and is sufficient to trigger secondary messenger that convey plant response. In addition, we found that Rho GTPase nanodomain differ in their composition depending of the upstream signaling events, suggesting that descript organization of membrane can encode for signal specificity. We are now trying to determine what type of molecular actor are controlling such structures.