BioISI Research Seminar

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The role of Arabidopsis thaliana phosphatidylinositol and lipid kinases in pollen tube growth and fertilization

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Polarized growth depends on an intricate and dynamic link between membrane secretion and signalling pathways. Phosphoinositides (PPIs) are minor membrane lipids which play an important role in this link. The immediate precursor of all PPIs is phosphatidylinositol and phosphorylation of the lipid head group by the action of phosphoinositide kinases results in the generation of several PPIs species.

We used a reverse genetics approach coupled to molecular and cellular analysis to investigate the function of the Arabidopsis pollen-expressed genes encoding FAB1 and DAG kinases (DGK). FAB1 produce phosphatidylinositol (3,5)-bisphosphate [PtdIns(3,5)P2] and have been implicated in endomembrane trafficking control and pH control in the vacuole. DGK phosphorylate diacylglycerol to form phosphatidic acid.

Data shows that pollen germination, tube growth, and polarity were not significantly impaired in homozygous mutant plants lacking FAB1 or DGK4. In vivo, mutant pollen fertilized ovules leading to normal seed set. Analysis of growth rates, endocytic events using FM4-64 and labelling of ROS revealed discrete differences between wild-type and mutant genotypes which can account for a function of these genes. Imaging of elongating tobacco pollen tubes transiently transformed with GFP constructs of FAB1 and DGK also revealed distinct protein localization.

For both FAB1 and DGKs, the results data obtained cannot be explained solely by their known catalytic activity of PPI and lipid production and highlight the need for comprehensive analysis of protein functional interactions

When: October 19 🕛 12h00

Where: Building C8, room 8.2.39
Faculdade de Ciências da Universidade de Lisboa -Campo Grande, Lisboa (Portugal)

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