生命科学セミナー

In vivo calcium dynamics in plant cells: a holistic view

Professor Alex Costa

Department of Biosciences, University of Milan, Italy

日時：　2月4日（月曜日）16：00～17：00

場所：　農学・生命科学研究棟　（京都大学北部構内）

セミナー室（2）　（1階　104号室）

In plants, increases in cytosolic Ca^{2+} concentration ($[Ca^{2+}]_{cyt}$), occurring in response to both biotic and abiotic stimuli, work as a key component of different signal transduction pathways. Depending on the stimulus, Ca^{2+} rises can display the form of a single transient, repetitive Ca^{2+} oscillations or sustained increase and are commonly designated as "Ca^{2+} signatures". Generation and shaping of Ca^{2+} signatures depends on fine-tuning of Ca^{2+} influxes and effluxes occurring at both the plasma membrane (PM) and membranes of the different subcellular compartments. The opening of PM Ca^{2+}-permeable influx channels (e.g. GLRs, CNGCs, OSCAs….) in response to different stimuli will release Ca^{2+} into the cytosol and cause the generation of a Ca^{2+} transient, while activity of active Ca^{2+} efflux transporters (e.g H^{+}/Ca^{2+} antiporters, Ca^{2+} ATPases…) will return the $[Ca^{2+}]_{cyt}$ to resting concentrations. Not only cytosol but also organelles and other subcellular compartments (e.g. chloroplasts, mitochondria, endoplasmic reticulum…) experience Ca^{2+} transients, hence putatively participating in the cellular Ca^{2+} homeostasis and potentially in the Ca^{2+} signature shaping process. To study these processes *in planta* the use of non-invasive state of the art imaging tools is required. In such a context the seminar will provide an overview of:
use of the genetically encoded ratiometric Förster Resonance Energy Transfer (FRET)-based Ca^{2+} sensor Cameleon in plant. Attention will be paid to present the developed Cameleon sensors for the analyses of Ca^{2+} dynamics in different subcellular compartments;
use of the presented technologies for the study of Ca^{2+} transporters involved in the regulation of cytosolic and organellar Ca^{2+} dynamics;
use of Light Sheet Fluorescence Microscopy (LSFM) for FRET-based Ca^{2+} imaging analyses in Arabidopsis root cells.

連絡先：　生命科学研究科　遺伝子特性学分野　河内孝之
tkohchi@lif.kyoto-u.ac.jp　075-753-6389