

Research Project

Tracking of Phosphoinositide Pools - A Key Signalling Component in Cancer and Inflammation (EMRC/ECORES/08-EUROMEMBRANE)

Third-party funded project

Project title Tracking of Phosphoinositide Pools - A Key Signalling Component in Cancer and Inflammation (EMRC/ECORES/08-EUROMEMBRANE)

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Organisation / Research unit

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Project start 01.01.2009

Probable end 31.12.2011

Status Completed

We propose a unique consortium (TraPPs) between leading European groups in phosphoinositide (PI) signalling, lipid probe chemists and advanced microscopy centers. PI signalling plays a central role in membrane dynamics modulating cell polarity, vesicular trafficking, migration, growth, proliferation, differentiation, and more. TraPPs will provide a quantitative, dynamic and refined view of phosphoinositide flux, required lipid modifying enzymes, e.g. PI3Ks, lipases, and lipid phosphatases. To this end novel activatable PPI probes will be synthesized and loaded into cells; lipid-modifying enzymes will be targeted dynamically to distinct cellular locations; lipid-interacting proteins shall be manipulated to display their free or lipid-bound state; and the activity state of phospholipid-modifying enzymes will be quantified by imaging the formation of enzyme-substrate complexes in living cells. We will use well-defined cellular, genetic fly and mouse models validating the uncovered molecular mechanisms in terms of cell migration, cell-cell contact changes, vesicular trafficking and epithelial-mesenchymal transitions, which together will elucidate cellular signaling processes relevant to cancer and inflammation. We expect a quantum leap in knowledge to the subject of PI signaling since to our knowledge this massive accumulation of expertise and close collaboration has never been realized for this field in Europe before.

Keywords advanced imaging techniques, Imaging, chemistry, chemical biology, Phosphoinositides, Lipid Signaling, Inflammation, Cancer, lipid dynamics, PI3K, Molecular Biology, phosphoinositides

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