Petr Dráber

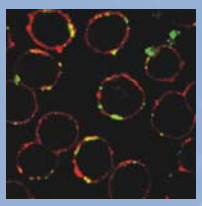
draberpe@img.cas.cz

Laboratory of Signal Transduction

Plasma membrane in mast cell signaling

Petr Dráber, DSc / Head of Laboratory
Lubica Dráberová, PhD / Research Scientist
Daniel Smrž, PhD / Research Scientist
Anna Kofferová, PhD / Sabbatical Leave
Romana Budovičová, MD / Research Assistant
Hana Mrázová / Technician, Secretary
Dana Lorenčíková / Technician
Lukáš Kocanda / Technician
Viktor Bugajev, MSc / PhD Student
Filip Franko, MSc / PhD Student
Petr Heneberg, MSc / PhD Student
Pavel Lebduška, MSc / PhD Student
Iva Polakovičová, MSc / PhD Student
Gouse M Shaik, MSc / PhD Student
Magda Tůmová, MSc / PhD Student
Martin Machyna, Bc / Diploma Student
Michal Šimíček / Diploma Student

Telemetry used for continuous measurement of body temperature in the course of allergy reaction



Non-apoptotic phosphatidylserine (PS) externalization induced by aggregation of GPI-anchored glycoprotein Thy-1. RBL cells were treated with anti-Thy-1 monoclonal antibody for 15 min. Externalized PS was detected with FITC-labelled annexin V (green) and Thy-1 with cyanine 3-labelled secondary antibody (red). PS was distributed in distinct patches showing only partial overlap with Thy-1.

Research topics

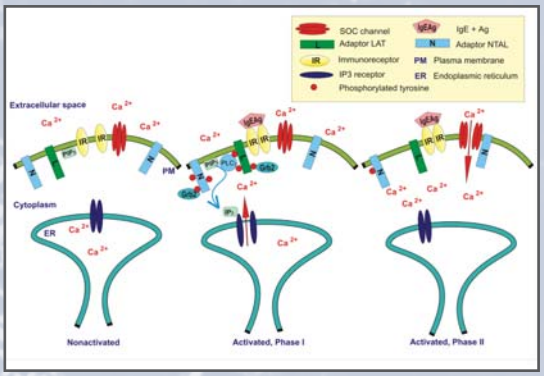
Our current studies are focused on understanding the role of plasma membrane components and actin cytoskeleton in initial stages of mast cell activation induced by engagement of the high affinity IgE receptor (FcεRI) and/or cytokine receptor, c-Kit. Using bone marrow-derived mast cells from mice deficient in the transmembrane adaptor proteins LAT and/or NTAL and mast cell lines with enhanced or decreased amount of NTAL and/or another adaptor protein Grb2 we analyzed the role of these proteins in tyrosine phosphorylation of the FcεRI and other substrates, and calcium response. Furthermore, we analyzed topography of these and other plasma membrane components, including GPI-anchored proteins, using immunofluorescence microscopy, FRET and electron microscopy on isolated membrane sheets. Interestingly, aggregation of GPI-anchored proteins induced externalization of phosphatidylserine (PS) which was not dependent on secretory response or apoptosis. We have proposed that this mechanism could contribute to „inside-out" signaling in response to pathogens and other external activators. Furthermore, we have produced several antibodies specific for signaling molecules, including LAT, PLSCR1, STIM1 and PTP20.

Current grant support

Ministry of Education, Youth and Sports (Center of Molecular and Cellular Immunology, 1M0506); GA CR (301/06/0361); GA AS CR (KAN200520701)

Selected recent papers

1. Heneberg P, Lebduška P, Dráberová L, Korb J, Dráber P. Topography of plasma membrane microdomains and its consequences for mast cell signaling. **Eur J Immunol.** 2006;36:2795--806.
2. Smrž D, Dráberová L, Dráber P. Non-apoptotic phosphatidylserine externalization induced by engagement of glycosylphosphatidylinositol-anchored proteins. **J Biol Chem.** 2007;282:10487-97.
3. Dráberová L, Shaik G M, Volná P, Heneberg P, Tůmová M, Ledbuška P, Korb J, Dráber P. Regulation of Ca^{2+} signaling in mast cells by tyrosine-phosphorylated and unphosphorylated non-T cell activation linker. **J Immunol.** 2007;179:5169-80.
4. Dráber P, Dráberová L, Henberg P, Šmíd F, Farghali H, Dráber P. Preformed STAT3 transducer complexes in human HepG2 cells and rat hepatocytes. **Cell Signal**. 2007;19:2400-12.
5. Lebduška P, Korb J, Tůmová M, Heneberg P, Dráber P. Topography of signaling molecules as detected by electron microscopy on plasma membrane sheets isolated from non-adherent mast cells. **J Immunol Methods.** 2007;328:139-151.



The role of transmembrane adaptor NTAL in early and late stages of mast cell signalling