



TRANSPOL

Transport and Signalling Mechanisms in Polarized Cells

An Intersectorial Initial Training Network at the interface of Cell/Molecular Biology and Membrane Physics

Call: FP7-PEOPLE-ITN-2010

Project duration: 01.12.2010-30.11.2014



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TRANSPOL is an EU-funded interdisciplinary initial stage training network (ITN) at the interface of cell/molecular biology and membrane physics. This ITN aims specifically towards the molecular understanding of the functional relationship between intracellular trafficking and cellular signalling and their relevance to human diseases.

This ITN is an international operating training network. Participants are located in seven different countries (Germany, France, UK, Poland, Israel, Denmark, Switzerland plus two overseas countries: USA, Singapore).

TRANSPOL offers opportunities to young scientists who already have or are in progress of obtaining an outstanding MSc degree in biochemistry or strongly related natural science (e.g. biology, biophysics, molecular biology, biotechnology) at their home institution.

TRANSPOL is dedicated to the training of 14 early stage researchers (for 36 months) and 1 experienced researcher (for 24 months).

TRANSPOL consists of 10 full network participants and 4 associated partners

Network participants

1. Ruhr-University Bochum, Germany
Department of Biochemistry II
2. Institut Curie, France
Subcellular structure and cellular Dynamics
3. Cambridge University, United Kingdom
Cavendish Laboratories/Biophysics



4. Weizmann Institute, Israel
Biological Chemistry
5. University of Geneva, Switzerland
Department of Biochemistry
6. University of Southern Denmark, Denmark
Center for Biomembrane Physics
7. Internat. Inst. of Mol. and Cell Biology, Poland
Laboratory of Cell Biology
8. Silantes GmbH, Germany
9. University of Sheffield, United Kingdom
10. JPK Instruments Ltd. United Kingdom

Associated Partners

1. Yale University, USA
Department of Cell Biology
2. National University of Singapore, Singapore
Department of Biochemistry
3. Federation of European Neurosciences Societies, Netherlands
Academic Research Society
4. Bayer Health Care, Germany
Bayer Schering Pharma AG





Research Program

The aim of TRANSPOL research programs is to completely cover the initial part of a signalling cascade from the ligand/receptor interaction followed by the internalisation of the ligand/receptor complex and its continuous signalling properties during intracellular trafficking, but in particular focussing on the protein/lipid interface.

The research activities are divided into 15 individual projects

- P1. Mechanisms, functions, and exploitation of novel entry pathways into cells
- P2. Differential signalling of type I interferons through a common set of receptors
- P3. Stoichiometry and regulation of AMPA receptor-TARP complex formation in receptor trafficking and ion channel function
- P4. Dynamical study of shape and force generation by clathrin coats onto lipid membranes
- P5. Modelling protein-induced membrane curvature and endocytosis using coarse-grained simulations
- P6. Impact of lipid mechanics and lateral organization on membrane deformation and trafficking
- P7. Molecular mechanism of membrane shaping by human Guanylate Binding Protein 1 (hGBP1)
- P8. Role of membrane trafficking in the JAK/STAT signaling pathway activated by interferons



- P9. The role of the protein tyrosine phosphatase PTP-BL in polarized protein trafficking and Interferon signalling
- P10. The mechanisms of endosome-to-nucleus trafficking and its impact on transcriptional regulation
- P11. Testing and application of models to characterize cell adhesion, mechanics and signalling processes using atomic force microscopy
- P12. The role of Parkinson disease-linked LRRK2, ERM proteins and small GTPases in synaptic (dys) function
- P13. The roles of Ras/NO in neuronal polarity and protection: Relevance for Parkinson's disease associated LRRK2 signalling
- P14. The impact of intracellular signalling on the mechanical properties of cells measured with atomic force microscopy and optical stretcher- implications for metastasis and invasion
- P15. Application/improvement of an in vivo quantification of differentially expressed proteins SILAC (stable isotope labeling of amino acids in cell cultures)-technique

Transpol offers PhD positions for each of these projects. Project P2 is suited for an experienced researcher

Overview of the training program

TRANSPOL combines an interdisciplinary, multinational, highly intersectorial research program in a newly emerging supra-disciplinary



field at the interface of cell/molecular biology and membrane physics.

TRANSPOL comprises three private sector participants.

The TRANSPOL project will train young researcher in novel photonic tools like optical stretcher and optical tweezers technology as well as micro-rheology together with computer simulations and atomic force microscopy to understand the fundamental mechanical and dynamic properties of lipid membranes.

In addition, TRANSPOL offers in-depth training in cell biology, protein- and lipid-biochemistry, protein design and systems biology. TRANSPOL has designed a structured 3-year curriculum providing the following hallmarks:

1. A joined academic and industrial training program
2. A combination of local and network wide European training
3. A training in scientific and complementary skills including soft skills
4. An in-depth scientific training focused on a specific PhD topic

For Job offers and further details please refer to the TRANSPOL website:

<http://www.ruhr-uni-bochum.de/mol-neurobio/TRANSPOL/Transpol.htm>

or contact the TRANSPOL office:

transpol@rub.de

