



VABILO NA PREGLOV KOLOKVIJ / INVITATION TO THE PREGLO COLLOQUIUM

Prof. dr. Alexander Kros

Faculty of Science, Leiden Institute of Chemistry, Supramolecular & Biomaterials
Chemistry, Gorlaeus Laboratories, Leiden; e-mail: a.kros@chem.leidenuniv.nl

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**Velika predavalnica Kemijskega inštituta / Lecture Hall at the
National Institute of Chemistry; Hajdrihova 19, Ljubljana**

Understanding membrane fusion using a biomimetic model system

Fusion of lipid bilayers, or membranes, is a ubiquitous process. It occurs in the cells of our body during cargo exchange by membrane vesicles and during viral infection, but also in industrial processes such as yeast production. While many proteins like SNAREs have been identified that play crucial roles in membrane fusion, the molecular mechanism of fusion remains unclear. This fascinating process is unexpectedly complex and our aim is to understand the details of this process using a biomimetic model system which has all the characteristics of natural membrane fusion; targeted docking, followed by lipid and content mixing in the absence of leakage.

We developed a model system composed of a complementary pair of lipidated peptides able to form a heterodimeric coiled coil motif at the membrane interface similar to natural SNARE subunits.^{1,2,3} The different steps of membrane fusion are currently studied using biophysical and biochemical techniques with a special focus on peptide-peptide and peptide-lipid interactions. Unravelling of the molecular mechanism of membrane fusion using a multi-faceted approach of complementary techniques will result in a unique, in depth view of the process of membrane fusion.

To date, it is a major challenge to achieve efficient and targeted liposome delivery directly into the cytoplasm of live cells, circumventing endocytotic pathways. In this respect, we recently studied and achieved membrane fusion between liposomes and live cells. Future applications are foreseen in drug delivery, nanoreactors and membrane engineering to name but a few.

1) H. Robson Marsden, N.A. Elbers, P.H.H. Bomans, N.A.J.M. Sommerdijk, and **A. Kros***. A Reduced SNARE Model for Membrane Fusion. *Angewandte Chemie Int. Ed.* **2009**, *48*, 2330–2333.

2) F. Versluis, J. Voskuhl, B. van Kolck, H. Zope, M. Bremmer, T. Albregtse and **A. Kros***. Induced membrane fusion through in situ modification of plain liposomes with lipidated coiled coil forming peptides. *J. Am. Chem. Soc.* **2013**, *135*, 8057–8062.

3) H.R. Zope, F. Versluis, A. Ordas, J. Voskuhl, H.P. Spaink and **A. Kros***. *In vitro* and *In vivo* supramolecular biomembrane engineering using a lipidated coiled-coil motif. *Angew. Chem. Int. Ed. Eng.* **2013**, *52(52)*, 14247–14251.

Vljudno vabljeni! / Kindly invited!