

## **Supramolecular Receptors in Chemical Biology: From Biomembrane assays to Drug Delivery Vehicles**

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Our research is focused on the development of artificial receptors exhibiting their activity in the vicinity of bilayer membranes. These receptors are being developed with an eye on their further utilization toward improved biomembrane assays, active transport of physiologically-relevant substrates, development of drug delivery vehicles and modulation of the membrane properties.

Specifically, multifunctional receptors based on the cyclen scaffold demonstrated high affinity to anionic pyrene-based dyes and were successfully utilized in the biocompatible membrane-leakage assay. This direction will be also discussed in terms of addressing other assays that are in high demand in the biomembrane community.

The receptors capable of active transport of substrates utilize  $\text{Na}^+/\text{K}^+$  gradient, maintained in cells by ATPase. The choice of target substrates is based on their relevance to therapeutic needs, for example, the active amino acid transporters provide a promising approach to the development of new therapy for Parkinson's Disease.

The receptors capable of selective transport of some electrolytes can alter the ionic composition of cellular cytosol or aqueous compartments of liposomes. These alterations, when properly applied, trigger a cascade of events which lead to significant changes in the membrane properties. Such approach allowed us to develop a model for the improved gene delivery and was applied to the development of nanoscale biocompatible reactors.

The methods of studies and specific techniques used in this research will be also discussed.