METAL OXIDE SURFACES APPLICATION FOR BIOLOGICAL MEMBRANE FORMATION

Inga Gabriūnaite[1*], Anastasija Aleksandrovič[1], Aušra Valiūnienė[1]

[1] *Faculty of Chemistry and Geosciences, Vilnius University, Vilnius, Lithuania*
** e-mail address: inga.gabriunaite@chf.vu.lt*

Phospholipid bilayer membrane (BLM) models on solid support is a convenient subject for investigating interactions between proteins and biological membranes. Recently, metal oxide surfaces have been applied for phospholipid membrane formation [1,2,3]. These substrates became attractive as solid supports for their commercial availability and low price. Metal oxides could be easily functionalised with self-assembled monolayers (SAMs) by silane chemistry. These SAMs act as anchoring units for immobilisation of the BLMs. Such membranes could be easily characterised with surface sensitive techniques, such as atomic force microscopy, electrochemical impedance spectroscopy, surface plasmon resonance.

In this paper inexpensive and commercially available fluorine doped tin oxide (FTO) was functionalised with either octadecyltricholorosilane (OTS), or a mix of OTS and methyltrichlorosilane (MTS). Vesicle fusion method was applied for the BLM formation. Membrane consisted of 60 mol% 1,2-dioleoyl-sn-glycero-3-phosphocholine (DOPC) and 40 mol% cholesterol (Chol). Biological relevancy of the membrane was tested using phospholipase A_2, melittin and α-hemolysin.

Overall, presented results confirmed, that phospholipid membrane was formed on FTO surface and it could be applied for the development of biosensors for toxin detection.

References

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