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Synthetic glycolipids: Insertion into cell membrane, dynamics and interaction with natural antibodies

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Synthetic glycolipid-like constructs dispersible in biological media and capable of incorporating into cell membranes have the ability to create novel artificial glyco-landscapes on living cells. The variety of smart spacers of different lengths allows us to localize glycans in the periphery zone of cell glycocalyx, in its depth or in tight proximity to the lipid bilayer. The ability of inserted constructs to interact with antibodies is dictated by their position and presentation in the glycocalyx. It is noteworthy that human natural anti-Gb3 antibodies interact with synthetic analog of Gb3, but do not bind natural Gb3 glycolipids in composition of cell membrane. In addition, we investigated kinetics of the insertion, as well as dynamics of the glycolipid constructs exchange between mammalian cells and bacteria.

Recent Publications

1. S Henry, E Williams, K Barr, E Korchagina, A Tuzikov, et al. (2018) Rapid one-step biotinylation of biological and non-biological surfaces. Sci. Reports 8:2845.
2. P E Volynski, R G Efremov, I Mikhalev, K L Dobrochaeva, A B Tuzikov, et al. (2017) Why human anti-Galα1–4Galβ1–4Glc natural antibodies do not recognize the trisaccharide on erythrocyte membrane: molecular dynamics and immunochemical investigation. Mol. Immunol. 90:87–97.
3. S Henry, H Perry and N Bovin (2017) Applications for kodecytes in immunohematology. ISBT Science Series VOXS. 0:1–9.

Biography

Nicolai Bovin is Professor of Chemistry in Academy of Sciences (Russia) and Professor of Molecular Engineering in Auckland University of Technology (New Zealand). He has published >400 papers in per-reviewed journals.

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