Investigation of the lateral arrangement of phospholipid monolayers with respect to the adsorption of hyaluronan

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The unmatched tribological performance of articulated joints is due to both the properties of the cartilage itself and the assumed self-organization of the molecules in the synovial fluid (SF) and at the surface of cartilage [1]. The components of the SF account for the response of synovial tribological system to different load and shear conditions by re-structuring and thereby providing extremely low friction coefficients under low and high pressures up to several tens of MPa and different shear rates [2]. It is known that phospholipids form lamellar structures on cartilage surfaces and are able to reduce friction and wear [3]. The question is open how these structures are influenced by the adsorption of the biopolymer hyaluronan (HA) as it is one of the main components of the SF.

To elucidate interaction between phospholipids and hyaluronan, we performed x-ray reflectivity and grazing incidence diffraction measurements on Langmuir layers of Dipalmitoylphosphatidylcholine (DPPC) and investigated how the adsorption of HA changes the arrangement of the lipids. We varied the molecular weight (MW) of hyaluronan and the salt concentration in the subphase, in order to determine the influence of these parameters of the interaction. Our data indicate that the adsorption of HA to DPPC monolayer strongly decreases with the increase in the MW of HA. Further divalent ions in the subphase strongly enhanced the binding of HA to DPPC. 4

References

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Оценка развитости поверхности газочувствительных оксидных материалов с помощью фрактальной размерности

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Поверхность оксидного материала, а, следовательно, и гетерофазная граница оксидный материал – воздушная среда не является плоской. Рельеф данной поверхности определяется как химическим составом