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# Membrane-protein biophysical interactions: Electrokinetic and light scattering studies in the presence of polylysine and wheat germ agglutinin in model membranes

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The mechanism of interaction between proteins and phospholipids in biological membranes has been shown to play an important role in the regulation of both the structural and dynamic properties of biomembranes and of the biological function of membrane proteins.

In an attempt to characterize the electrokinetic properties of human erythrocyte membranes and extrinsic proteins, the action of poly-L-Lysine (PL) and wheat germ agglutinin (WGA) to erythrocyte ghosts has been investigated. Polylysine-lipid molecular interactions are mainly due to the electrostatic binding between the polar headgroups of phospholipid and polylysine molecules, according to the literature data. Polylysine has broad biomedical applications (Zhang and Liu, 2017). Lectin (WGA) is often used as a biological probe for membrane stability, as well as for analyzing the surface components of the biological membrane with considerable potential to improve biomedical field (Balčiūnaitė-Murzienė and Dzikaras, 2021). Binding of lectin to the erythrocyte membrane causes significant topographic changes in the location of the respective receptor sites. This is accompanied by changes in the cell surface electric charge. The determination of the electric charge and its changes after the lectin-membrane contact can serve as a manner to register changes in the erythrocyte membrane.

Significant alterations in the cell electrokinetic potential under the influence of the PL polycations in a low ionic strength medium have been found. The electrostatic effect is significantly reduced in the presence of doses of 20 - 600 μg PL / mL, which is accompanied by a sharp decrease in aggregation between erythrocyte membranes. Polyvalent ions of wheat germ agglutinin strongly affect their electrostatic effect on the outer membrane surface of erythrocyte ghosts at doses of 20 - 200 pg WGA/mL. Upper concentrations of lectin treatment do not alter the electrophoretic motility of erythrocyte ghosts. This process is accompanied by a lack of changes in aggregation between membranes at high doses of lectin exposure.

The aim of this work is the evaluation of the action of the poly-L-Lysine and wheat germ agglutinin on the electrokinetics of erythrocyte membranes. The results of biophysical techniques indicate that the upper interactions are related to the reduction of zeta potential due to the decrease in the negatively exposed groups on the membrane surface upon polycation and lectin interaction with the hemoglobin-free cells.

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