

## Influence of polyacrylic acid nanoparticles on the elastic properties of RBCs membranes in patients with diabetes mellitus type 2

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### Abstract

The influence of polyacrylic acid (PAA) derived nanoparticles, a star shaped macromolecules with hydrodynamic radius of 14 nm, on the structure and mechanical properties of red blood cells (RBCs) membranes in patients with diabetes mellitus type 2 by AFM method has been studied. Their behavior has been compared to that of linear PAAs with different degrees of polymerization. Significant changes in the structure of RBCs membranes did not occur and traces of polymer chains or nanoparticles were not found. It was shown, that changes of the elasticity modulus were observed after cells incubated in the presence of linear PAA with  $M_n = 20000$  Da and 225000 Da, due to the interaction of polymer chains with the components of the cell membrane. The star shaped NPs with  $M_n = 57000$  Da lead to the smallest changes in the structure and properties cells membrane. Thus, these NPs can be recommended for drug delivery applications.

**Keywords:** Red blood cells, nanoparticles, poly(acrylic acid), elasticity modulus, atomic force microscopy

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