

# Nanochemistry and biotechnology

## Zigzag patterns on the surface of BSA+AlCl<sub>3</sub> films

**Glibitskiy D.M.**<sup>1</sup>, **Cheipesh T.A.**<sup>2</sup>, **Gorobchenko O.A.**<sup>3</sup>, **Zibarov A.M.**<sup>4</sup>,  
**Nikolov O.T.**<sup>3</sup>, **Roshal A.D.**<sup>2</sup>, **Semenov M.A.**<sup>1</sup>, **Glibitskiy G.M.**<sup>1</sup>

*1 A. Ya. Usikov Institute for Radiophysics and Electronics, National Academy of Sciences of Ukraine, 12, Academician Proskura Str, Kharkiv 61085, Ukraine.  
E-mail: dima.glib@gmail.com*

*2 Institute for Chemistry, V.N. Karazin Kharkiv National University, 4 Svobody Sq, Kharkiv 61022, Ukraine.*

*3 Department of Molecular and Medical Biophysics, School of Radiophysics, Biomedical Electronics and Computer Systems, V.N. Karazin Kharkiv National University, 4 Svobody Sq, Kharkiv 61022, Ukraine.*

*4 Chemical faculty, V.N. Karazin Kharkiv National University, 4 Svobody Sq, Kharkiv 61022, Ukraine.*

Aluminum as a biologically active substance can be the cause of an allergy or Alzheimer's disease. The aim of this work was to determine the effect of different concentrations of aluminum on geometric parameters (average segment length  $L_{\text{mean}}$ ) of zigzag patterns, which form on film textures obtained from BSA solutions.

For the concentrations used in the experiment, the amount of aluminum bound to BSA is much less than that of free aluminum molecules in the solution [1].

The results of the study are presented in the table.

[AlCl <sub>3</sub> ], mmol/l	Zeta-potential	Fluorescence, %	$L_{\text{mean}}$ , $\mu\text{m}$
0	-16.0±1.2	100±3	38.8±6.8
0.025	-11±1.6	127±3	23.5±1.4
0.05	-6.4±0.7	112±3	25.2±3.6

The increase in the intensity of fluorescence in the presence of Al<sup>3+</sup> can be explained by a change in the conformation of the protein molecules caused by a change in the zeta potential or pH. Perhaps the change in the geometric parameters of zigzags on the film is also associated with a change in the protein conformation.

1. Zatta P., Via L.D., Noto V.D. Binding studies on aluminum(III)–albumin interaction // Archives of Biochemistry and Biophysics.-2003.-**417**.-P. 59-64.