	Experiment title: Russian Grant Proposal: Study of the phenomenon of biocrystallization at the European Synchrotron Radiation Facility	**Experiment number**: MX/1861
Beamline: ID23-1	**Date of experiment**: from: 27/10/2016 to: 02/12/2016	**Date of report**: 15/12/2016
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Report:

Experimetal data and results were published in Russian Journal of Physical Chemistry B:

D.O. Sinitsyn, N.G. Loiko, S.K. Gularyan, A.S. Stepanov, K.B. Tereshkina, A.L. Chulichkov, A.A. Nikolaev, G.I. El-Registan, V.O. Popov, O.S. Sokolova, K.V. Shaitan, A.N. Popov, Yu.F. Krupyansky Biocrystallization of Bacterial Nucleoid under Stress // Russian Journal of Physical Chemistry B, 2017, Vol. 11, No. 5, pp. 833–838, ISSN 1990-7931, DOI: 10.1134/S1990793117050128

Abstract:

Structural, biochemical, and genetic changes caused by stress factors are known to be largely similar for cells of all modern organisms, which inherited the basic strategies of adaptation to different types of stress from their ancient ancestors. In the present work, the adaptation process is considered for the simplest example of the bacterial E. coli nucleoid. Experimental studies performed recently on prokaryotic bacterial cells, the simplest living organisms, have

demonstrated that, under unfavorable environmental conditions (for example, starvation), bacterial cells can use biocrystallization (Fig. 1-3), a special mechanism of protection of the genetic apparatus (nucleoid), generally untypical of living organisms. This mechanism helps to protect the nucleoid from damage and resume the activity of the bacterial cells later, upon improvement of the external conditions. The results of studying the structure of the nucleoid of E. coli bacteria (BL21-Gold strain (DE3)) subjected to starvation stress by using synchrotron radiation at the ESRF beamline ID23-1 are reported.

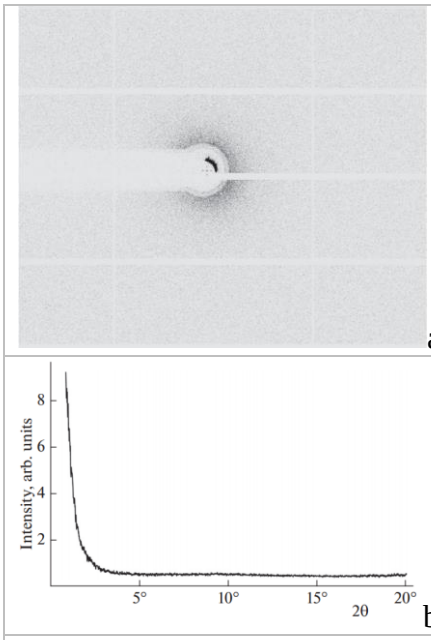

Fig. 1 (a)Diffraction pattern from a control sample of a stationary population of the strain BL21-Gold (DE3) of E. coli bacteria transformed with the plasmid pET-Dps and subjected to induction of increased expression of the Dps protein (b) Dependence of the scattering intensity on the angle 2θ.

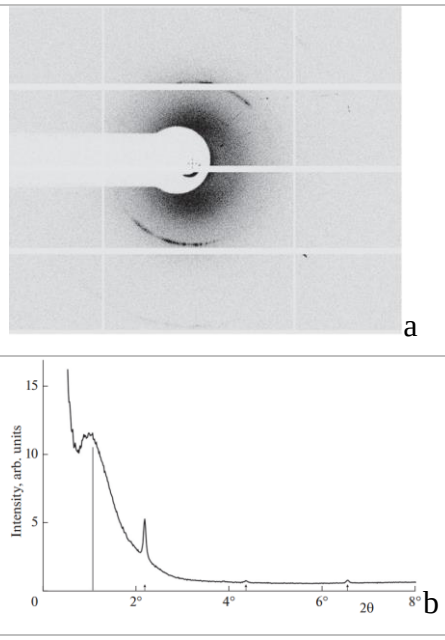

Fig. 2 (a) Diffraction pattern from a sample of the strain BL21-Gold (DE3) of starved E. coli bacteria transformed with the plasmid pET-Dps and subjected to induction of increased expression of the Dps protein. (b)Dependence of the scattering intensity on the angle 2θ

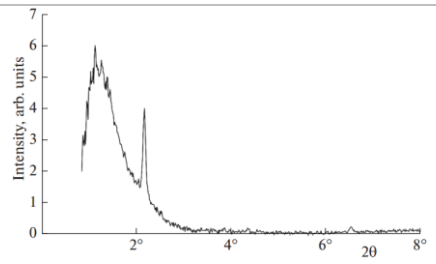

Fig. 3 Difference between the curves plotted in Figs. 2b and 1b.

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