

**International Journal of Biomedicine | June 2021 - Volume 11, Issue Suppl_1:
Abstracts from the Third Russian International Conference "Cryo-electron
microscopy 2021: achievements and prospects"**

POSTER ABSTRACT PRESENTATIONS

**SESSION TITLE: STRUCTURE AND FUNCTIONS OF THE TRANSCRIPTION AND TRANSLATION
APPARATUS OF THE CELL**

DOI: 10.21103/IJBM.11.Suppl_1.P26

**Abstract P-26: *Staphylococcus Aureus* 30S Ribosomal Subunit in a Complex
with the Era GTPase: Sample Preparation for Cryo-EM**

Evelina Klochkova¹, Aydar Bikmullin¹, Shamil Validov¹, Natalia Garaeva¹,
Marat Yusupov², Konstantin Usachev¹

¹*Institute of Fundamental Medicine and Biology, Kazan Federal University,
Kazan, Russia*

²*Institut de Génétique et de Biologie Moléculaire et Cellulaire, Université de
Strasbourg, Illkirch, France*

Background: An essential in bacteria GTPase Era is a multifunctional protein that is involved in cell cycle regulation and appears to play a significant role in ribosome biogenesis. It is required for the maturation of the 30S ribosomal subunit.

Era consists of two domains: the GTPase N-terminal domain, conserved in the GTPase family, and a C-terminal RNA-binding KH domain. Era specifically binds to the 16S rRNA and stimulates processing of the small ribosomal subunit to its mature form.

Precise determination of nucleotide and amino acid sequences in the active site of binding will help in finding specific ways to prevent this interaction. In this way, it will be possible to disrupt the biogenesis of the ribosome and, thereby, stop or slow down protein synthesis in the bacterial cell. It is very important in the fight against pathogenic bacteria, such as *Staphylococcus aureus* (*S. aureus*).

Methods: The His-tagged Era (His-Era) protein from *S. aureus* was expressed in *E. coli* BL21 strain and purified by Ni-NTA and SEC. The 30S ribosomal subunits were collected after dissociation of the *S. aureus* 70S ribosomes in sucrose gradient (0 – 30%). Complex 30S-Era was obtained by mixing *in vitro* 30S subunits and His-Era, incubated for 15 min at 37°C and followed by Ni-NTA purification to remove unbound 30S subunits. The presence of a stable 30S-Era complex has been confirmed by SDS-PAGE and agarose gel electrophoresis. The final sample quality was analyzed by negative staining EM.

Results: For the first time *in vitro* 30S-Era complex from *S. aureus* was assembled and a sample was prepared for further structural studies by cryo-electron microscopy.

Key Words: GTPase • Era • ribosome • 30S subunit • *Staphylococcus aureus*

This work was supported by the Russian Science Foundation (Grant No. 21-74-20034).

**Corresponding author: Evelina Klochkova. E-mail: evelina.klochkova@gmail.com*

International Journal of Biomedicine. 2021;11 Suppl 1: S23.

doi: 10.21103/IJBM.11.Suppl_1.P26

©2021 International Medical Research and Development Corporation