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ESRF

Experiment Report Form

The double page inside this form is to be filled in by all users or groups of users who have had access to beam time for measurements at the ESRF.

Once completed, the report should be submitted electronically to the User Office using the **Electronic Report Submission Application:**

http://193.49.43.2:8080/smis/servlet/UserUtils?start

Reports supporting requests for additional beam time

Reports can now be submitted independently of new proposals – it is necessary simply to indicate the number of the report(s) supporting a new proposal on the proposal form.

The Review Committees reserve the right to reject new proposals from groups who have not reported on the use of beam time allocated previously.

Reports on experiments relating to long term projects

Proposers awarded beam time for a long term project are required to submit an interim report at the end of each year, irrespective of the number of shifts of beam time they have used.

Published papers

All users must give proper credit to ESRF staff members and proper mention to ESRF facilities which were essential for the results described in any ensuing publication. Further, they are obliged to send to the Joint ESRF/ ILL library the complete reference and the abstract of all papers appearing in print, and resulting from the use of the ESRF.

Should you wish to make more general comments on the experiment, please note them on the User Evaluation Form, and send both the Report and the Evaluation Form to the User Office.

Deadlines for submission of Experimental Reports

- 1st March for experiments carried out up until June of the previous year;
- 1st September for experiments carried out up until January of the same year.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report, in English.
- include the reference number of the proposal to which the report refers.
- make sure that the text, tables and figures fit into the space available.
- if your work is published or is in press, you may prefer to paste in the abstract, and add full reference details. If the abstract is in a language other than English, please include an English translation.

ESRF	**Experiment title:** Archaeal Signal Recognition Particle	**Experiment number**: MX-688
Beamline: ID 23-1	**Date of experiment**: from: 09-07-2007 8:30 to: 09-07-2007 16:00	**Date of report**: 16-11-2007
Shifts: 1	**Local contact(s)**: Dr. Joanne MCCARTYY	*Received at ESRF:*

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Report:

We analysed cryo-cooled crystals of the S-domain of SRP from the Archaeon *M.jannaschii* - consisting of 7S.S RNA, SRP19 and full-length SRP54 in its free form and bound to a signal sequence on beam line ID23-1, ESRF, Grenoble in experiments conducted 9th July 2007. The crystals of the free S domain of SRP (0.4 x 0.4 x 0.1 mm^3) diffracted only to 8 Å. The crystals of the S domain bound to a signal sequence (0.05 x 0.05 x 0.02 mm^3) diffracted to 3 Å. Diffraction data were processed using the programs MOSFLM and XDS. The crystals belong to space group I222 with cell parameters a = 109 Å, b = 126 Å, c = 201 Å. We solved the structure by molecular replacement using the previously solved structure of the SRP54-SRP19-RNA complex from *M.jannaschii* (1), collected at beamline ID 23-1, ESRF. The model was built in O and refined by CNS and REFMAC against all data from spacings between 20-3.2 Å. The R_{work} and R_{free} for the final model are 24.5% and 27.7%, respectively (completeness for range: 99.86%).

1. Hainzl, T., Huang, S. & Sauer-Eriksson, A. E. (2007) *Proc Natl Acad Sci U S A* 104, 14911-6.

Interaction of SRP54 GTPase domain and SRP RNA in the free signal recognition particle

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The signal recognition particle (SRP) is a ubiquitous protein-RNA complex, which targets proteins to cellular membranes for insertion or secretion. A key player in SRP-mediated protein targeting is the evolutionarily conserved core consisting of the SRP RNA and the multi-domain protein SRP54. Communication between the SRP54 domains is critical for SRP function, where signal-sequence binding at the M domain directs receptor binding at the GTPase domain (NG domain). These SRP activities are linked to domain rearrangements, for which the role of SRP RNA is not clear. In free SRP, a direct interaction of the GTPase domain with SRP RNA has been proposed, but has never been structurally verified. In this study, we present the crystal structure at 2.5 Å resolution of the SRP54-SRP19-SRP RNA complex of *Methanococcus jannaschii* SRP. The structure reveals an RNA-bound conformation of the SRP54 GTPase domain, in which the domain is spatially well separated from the signal peptide binding site. The association of both the N and G domains with SRP RNA in free SRP provides further structural evidence for the pivotal role of SRP RNA in the regulation of the SRP54 activity.