JAXA-GCF Project--- High-quality Crystals Grown in Space for Structural Biology

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Japan Aerospace Exploration Agency has been conducting the project (JAXA-GCF) for obtaining high-quality protein crystals to contribute to the progress in structural biology twice a year since 2003 using microgravity environment.

In this project, we construct a user-friendly space experimental frame work and provide regular flight opportunities. In technical point of view, we contrived gel-tube method [1] which worked as an effective crystallization device both in space and on the ground, based on the counter-diffusion technique [2]. We also provide techniques for efficient preliminary optimization of crystallization conditions using 1-dimensional simulation and for harvesting and cryoprotecting crystals before X-ray diffraction experiment. As a result, the success rate of the crystallization has become increased significantly.

We conclude that, using space environment, we have developed technologies for growing high-quality protein crystals for understanding 3-dimensional protein structure.

[1] Tanaka H. , et al., *J. Synchrotron Rad,* 2004, **11**, 45-48. [2] Garcia-Ruiz JM., Moreno A., *Acta Cryst*., 1994, **D50**, 484-490.

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