

Structural Biology Research Center

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The Structural Biology Research Center (SBRC) was founded in May 2000, in the Photon Factory (PF), Institute of Material Structure Science (IMSS). The main tasks of the center include user support of synchrotron radiation X-ray crystallographic studies of bio-macromolecules, highly advanced technical development, and in-house structural biology research. Over 30 people now work at the center. About half of the SBRC members are engaged in beamline operation and development, with the remainder working in biological research. All of the necessary steps for in-house biological research can be carried out in the SBRC building, including protein expression, sample purification, crystallization, and biochemical and biophysical analyses of the targeted proteins.

Our research activities are mainly supported by scientific funds. The first high-throughput beamline, AR-NW12A, was built with funding from the PF supplemental budget during FY2000-2001. We were able to build a second up-to-date beamline, BL-5A, and also prepare various scientific equipment for protein expression, purification, and crystallization experiments using funding from the “Special Coordination Funds for Promoting Science and Technology” (FY2001-2003). During the five-year “Protein 3000 National Project (FY2002-2006)”, the SBRC promoted structural and functional analyses in the field of post-translational modification and transport, and determined 254 protein structures. To further assist the Protein 3000 Project, we set aside about 30% of the bio-macromolecular crystallography beam time at the PF for the project. During the “Development of System and Technology for Advanced Measurement and Analysis” project (FY2004-2007), we developed a micro-beam beamline, BL-17A, and a prototype of a next-generation X-ray area detector. The new five-year national project “Targeted Proteins Research Program (FY2007-2011)” is now in progress. The SBRC contributes to this project through two independent programs. The first involves structural and functional research on protein transport in cells, in close collaboration with the University of Tokyo and Kyoto University. The other involves beamline development in collaboration with SPring-8 and universities.

In addition to its own scientific research activities, the SBRC accepts many researchers from outside KEK who wish to collect diffraction data for their own macromolecular crystals under the PF Program Advisory Committee (PAC) system. Academic proposals and users have been increasing in recent years. Additionally, together with advances in structure-based drug design, pharmaceutical companies require a large amount of beam time. As a direct consequence, twelve Japanese companies have been using the bio-macromolecular crystallography beamlines at KEK-PF. Among these, Astellas Pharma Inc. financed the construction of a beamline, AR-NE3A, for their research.