

# LIFE SCIENCE

An undulator beamline, BL44XU, designed for the structural analysis of biological macromolecular assemblies, is now operational. This beamline allows for the collection of data from crystals with unit cells as large as 1500 Å. Other beamlines in the Life Science field have been improved in many ways and particularly user-friendly; data collection for MAD phasing is now becoming a routine. Six of the many outstanding findings resulted by using these beamlines are herein presented.

The atomic model of rhodopsin, one of the G-protein coupled receptors (GPCR), was determined using synchrotron radiation at SPring-8. GPCR protein genes are present at a count of more than 1000 in the human genome. The structural analysis of rhodopsin will provide a molecular basis for understanding the recognition of the target molecules by GPCR. The extracellular ligand-binding region of the metabotropic glutamate receptor (mGluR1), a key membrane receptor involved in the modulation of excitatory synaptic transmission in the central nervous system, was analyzed by the MAD method using beamlines BL45XU and BL24XU. The structure of the MutM protein, one of the DNA repair enzymes, was determined at 1.9 Å resolution by MAD phasing of the intrinsic Zn<sup>2+</sup> ion at beamline BL45XU. The structure of Ca<sup>2+</sup>-ATPase of the sarcoplasmic reticulum was determined at 2.6 Å resolution. Very thin crystals, typically less than 20 μm, were used for the structural analysis. The collection of data from such thin crystals was made possible by utilizing the brilliant X-rays at beamlines BL44B2 and BL41XU. Time-resolved X-ray diffraction studies of the purple membrane have been carried out at the SAXS station of BL45XU, allowing to study the structural transition from the M intermediate to the N intermediate of bacteriorhodopsin. An X-ray tomographic technique was used to study the morphology of human lung at high resolution. The synchrotron radiation computed tomography experiments were conducted at BL20B2 using a phosphor X-ray detector and a cooled CCD camera.

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