Contribution ID: **335** Type: **Poster**

Neutron structure analysis of NADH cytochrome b5 reductase

Monday, 17 September 2018 17:45 (15 minutes)

Redox proteins functions in many biological processes, such as metabolism, photosynthesis, respiration. The chemical reactions of redox proteins proceed with small structural changes involved in hydrogen atoms and/or valence electrons. Thus, high-resolution structure analysis revealing these small structural changes is necessary for understanding molecular mechanisms of redox reactions. NADH cytochrome b5 reductase (b5R) catalyzes the electron transfer from two electron carriers of NADH to one electron carrier of cytochrome b5 (b5). High-resolution X-ray structure analyses have been reported for b5R [1-2] and b5 [3] from porcine liver. Recently, we have performed high-resolution neutron crystal structure analyses of b5R. We succeeded in data collection of b5R (oxidized form) at high resolutions, 1.40 Å (at iBIX in J-PARC) and 1.45 Å (at BIODIFF in FRM-II), under cryogenic conditions. The logarithmic plot of average diffraction intensities against resolution shows gradual decrease from low to high resolutions in the BIODIFF data, in contrast the plot shows a flat line at the high resolution side in the iBIX data. We have performed the correction of diffraction intensities for the iBIX data using the BIODIFF data.

References

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Session Classification: Poster session 1

Track Classification: P3 Structure and dynamics in life sciences