(※本報告書は英語で記述してください。ただし、産業利用課題として採択されている方は日本語で記述していただいても結構です。)

CROSS TOKAI Experimental Report J-PARC	承認日Date of Approval 2015/9/15 承認者Approver Jun-ichi Suzuki 提出日Date of Report 2015/9/1
課題番号 Project No. 2014A0060 実験課題名 Title of experiment Structural Analysis of Functional Nucleosome with Variant Histone 実験責任者名 Name of principal investigator Masaaki Sugiyama 所属 Affiliation Research Reactor Institute, Kyoto University	装置責任者 Name of responsible person Dr. Shin-ichi Takata 装置名 Name of Instrument/(BL No.) TAIKAN/BL-15 実施日 Date of Experiment 04/12/2014-07/12/2014

試料、実験方法、利用の結果得られた主なデータ、考察、結論等を、記述して下さい。(適宜、図表添付のこと)
Please report your samples, experimental method and results, discussion and conclusions. Please add figures and tables for better explanation.

1. 試料 Name of sample(s) and chemical formula, or compositions including physical form.

H2A nucleosome (canonical): DNA and histone (protein) complex in 0% D_2O, 3mg/mL, 0.5mL
H2A nucleosome (canonical): DNA and histone (protein) complex in 65% D_2O, 3mg/mL, 1.0mL
H2A nucleosome (canonical): DNA and histone (protein) complex in 100% D_2O, 3mg/mL, 1.0mL
H2A.Z1 nucleosome (variant): DNA and histone (protein) complex in 0% D_2O, 3mg/mL, 0.5mL
H2A.Z1 nucleosome (variant): DNA and histone (protein) complex in 65% D_2O, 3mg/mL, 1.0mL
H2A.Z1 nucleosome (variant): DNA and histone (protein) complex in 100% D_2O, 3mg/mL, 1.0mL

2. 実験方法及び結果 (実験がうまくいかなかった場合、その理由を記述してください。)
Experimental method and results. If you failed to conduct experiment as planned, please describe reasons.

SANS with contrast variation method, CV-SANS, is a powerful technique to observe the partial structures of complex materials consisting of domains/molecules with different scattering length densities, SLDs. The scattering intensity from the solution is proportional to the square of the scattering contrast between solute and solvent, $\Delta\rho^2 = (\rho_{solute} - \rho_{solvent})^2$, where ρ_{solute} and $\rho_{solvent}$ are the SLDs of the solute and solvent, respectively. , Nucleosomes consists of different biomolecules which have different SLDs: The SLDs of histones and DNA are 0.221 (fm/Å^3) and 0.394 (fm/Å^3), respectively. Here, the SLDs of H_2O and D_2O are −0.056 (fm/Å^3) and 0.636 (fm/Å^3). Therefore, in a 65% D_2O solution, because the SLD of the DNA is matched to that of the 65% D_2O solvent, we can erase the scattering due to DNA and selectively observe the structure of

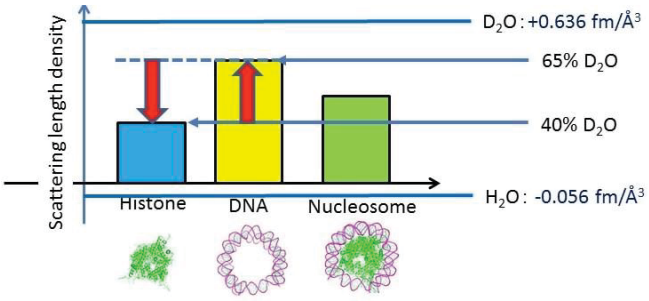

Fig.1. Scattering length density map of nucleosome

2. 実験方法及び結果（つづき） Experimental method and results (continued)

the histone octamer in a nucleosome. Moreover, in a 40% D_2O solution, we selectively observe the DNA by the same concept of contrast matching with the exchange of the roles.

Figure 2 shows scattering profiles of canonical and variant nucleosomes in 100% D_2O solution. There was no upturn in the low q-region, indicating that the prepared samples were no aggregation and monodispersed. The contrast was checked with the root of the zero-angle scattering intensities: $\Delta\rho \sim I(0)^{1/2}$. Figure 3 shows $I(0)^{1/2}$ as a function of D_2O ratio. The matching point of the sample is 52% D_2O as expected from the calculation. It means that, in 65% D_2O solution, we can observe histone structure selectively. as expected. The further analysis is in progress.

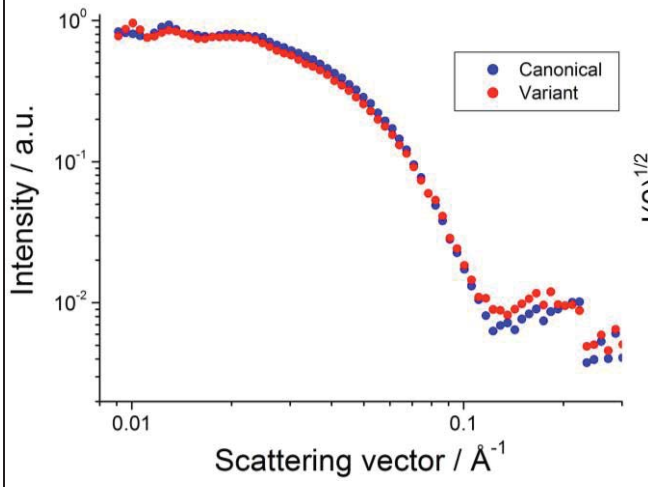

Fig.2. Scattering profiles of nucleosomes in 100% D_2O solution.

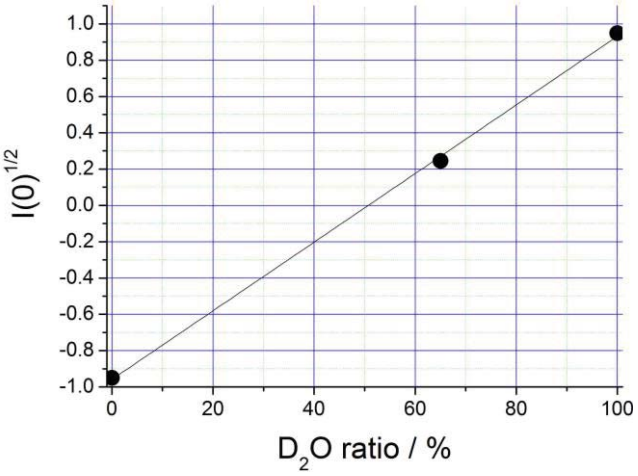

Fig.3. Zero-angle scattering intensity as a function of D_2O ratio in solution.