Project number 18

Identification of SWI/SNF interacting proteins and their anti-cancer and anti-aging functions

［1］**Research group**

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Expenditure report of research funds：

Consumable goods: 100,000 YEN

［2］**Research setup**

SWI/SNF family of nucleosome remodeling complex plays important roles in transcriptional regulation, in which BAF and PBAF complexes harbor either BRG1 or BRM as the ATPase for the remodeling process. Recently, we have identified novel roles of these complexes in DNA damage repair and transcriptional silencing in response to DNA double-strand breaks (Watanabe et al. *Cancer Res.* 2014, Kararougkas et al. *Mol Cell* 2014). In order to understand the molecular mechanisms of the processes, we started proteome analysis of BAF and PBAF in response to DNA damage. Here we are concentrating on the proteomics of PBAF, especially its variant factor BAF180. In the previous year we determined some of the BAF180 binding proteins by immune-precipitating proteins interacting with anti-BAF180 antibody and determined the IP products with nano-LC-MS/MS mass spectrometry.

［3］**Research outcomes**

（3－1）**Results**

We determined 27 protein bands immune-precipitated with anti-BAF180 antibody (Fig. 1) and identified over 100 proteins within them.

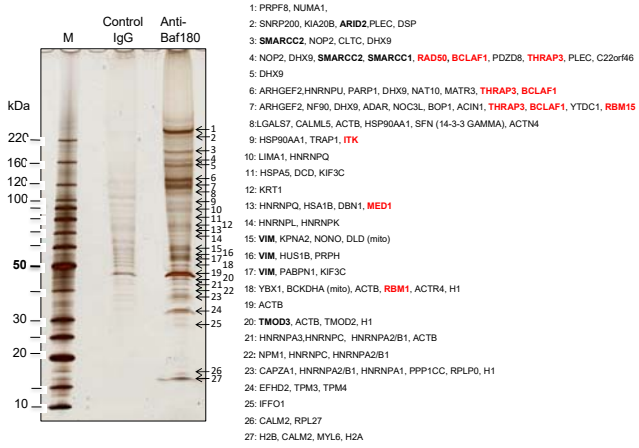

Fig. 1 Proteins identified from immunoprecipitation with anti-BAF180 antibody by mass-spectrometry

Among the putative interacting proteins identified by the method there are nucleosome remodeling factors belonging to PBAF, ARID2 (BAF200) and core factors of SWI/SNF complex including both PBAF and BAF, SMARCC2 (BAF170) and SMARCC1 (BAF155) were identified. We identified several DNA repair or DNA damage response proteins under the proteins. RAD50 is a component of MRE11-RAD50-NBS1 complex immediately responding to DNA double-strand breaks. Another protein related to DNA damage response is BCLAF1, which has been reported to be involved in DNA repair via interaction with γH2AX. We identified a domain in BCLAF1, where it interacts with BAF180. It suggests a role of BAF180 in DNA double-strand break response and a possible involvement of PBAF in the repair process.

（3－2）**Future perspectives**

Interactions of BAF180 with BCLAF1 and other DNA repair proteins suggest a direction of future research in fairly complicated nucleosome remodeling mechanisms related to DNA repair.

［4］**List of Papers** None.