PHOTON FACTORY, IMSS, KEK

Merry Christmas and a happy new year! It is our great pleasure to deliver our facility page in this heartwarming season. On this occasion, we would like to introduce our two new activities, one being concerned with a national project and the other a scientific achievement on structural biology.

First, we introduce our participation in the new national project called "Elements Strategy." As is well recognized nowadays, the shortage of precious elements like rare earths and rare metals are hot issues worldwide, and it is therefore an urgent problem to discover new substitutive materials and methods. Last June, the ministry of education, culture, sports, science, and technology, Japan (MEXT), has selected four research institutes as special sites dedicated for the problem. PF is also involved mainly as an analysis site, through two main research fields; magnetic materials and electronic materials. Our three members, Prof. Y. Murakami, Prof. H. Kumigashira, and Prof. K. Ono, take the role of principal investigators in these fields. In particular, Prof. Kumigashira will be involved in the electronic materials mainly through photoemission. Prof. Ono, on the other hand, will investigate the magnetic materials using both synchrotron radiation and neutrons. Prof. Murakami will take the role of overall management. We will be specially supported by MEXT and are now planning to dedicate a part of our beam time to contribute to future progress in these fields of technology.

The next topic is on the cytokinesis, namely, the final stage of cell division, which is a universal phenomenon occurring at numerous places of the living objects. In spite of its significance, the details have not been clarified so far including the structure of the molecule indispensable for the cytokinesis, that is , the so-called ARF6-MKLP1 complex. The importance of this complex will be understood immediately from the fact observed by RNA interference, that the ratio of multi-nucleus cells increases without the manifestation of this complex. Recently, a joint research group of Tokyo University and PF, each of which is led by Prof. Kazuhisa Nakayama and Prof. Soichi Wakatsuki, respectively, has determined the X-ray crystal structure of this complex. According to this structure, MKLP1, sandwiched by two ARF6 molecules, extends a β-sheet and then connects a bundle of microtubules and a membrane surface at the cleavage furrow created between the two dividing cells. In the figure below, we show a schematic picture. The researchers are now planning to clarify the whole molecular process of the cell division, based on the present results. This study appears in EMBO Journal **31**, 2590 (2012).

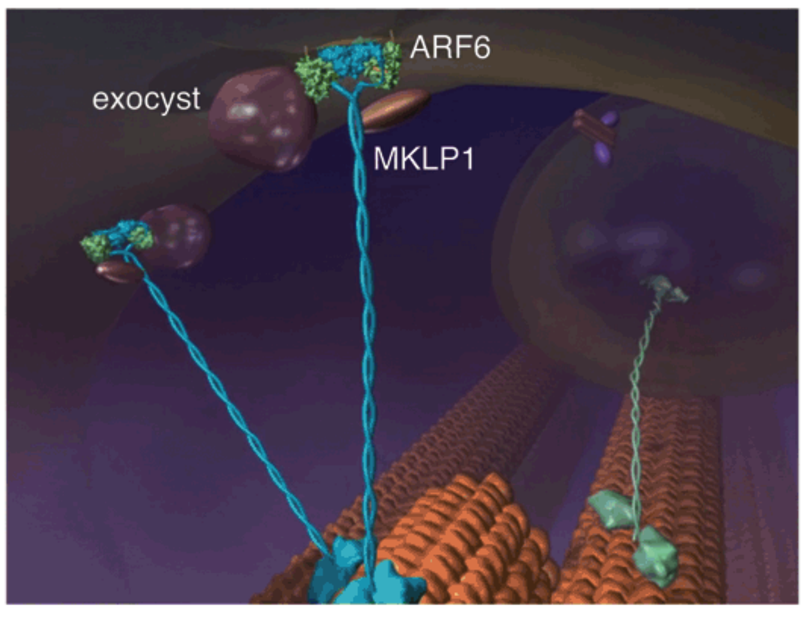

Fig. 1. ARF6-MKLP1 complex extending from the membrane surface (upper) to the microtubules (lower). The part of ARF6 (MKLP1) is shown by the light green (blue) color. The exocyst protein complex (light purple) is accumulated near the ARF6.

CALL FOR PROPOSALS: http://pfwww.kek.jp/users_info/users_guide_e/index.html