【Grant - in - Aid for Scientific Research on Innovative Areas(Research in a proposed research area)】

Biological Science

Title of Project : New aspect of the ubiquitin system : its enormous roles in protein regulation

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【Purpose of the Research Project】

Since identified as part of the energy-dependent protein degradation system, ubiquitin has been regarded as a component of degradation machinery. However, the ubiquitin system is now known to play a wide variety of roles in protein regulation besides degradation. Various kinds of ubiquitin modifications, which are generated by polymerization of ubiquitin in different ways in most cases and are might be called as "ubiquitin code", are found in eukaryotic cells as illustrated in Figure 1. It has been hypothesized that types of ubiquitin modifications determine how the system regulates proteins. Also, most-advanced experimental techniques are now required to accomplish ubiquitin research with high-quality. It is almost impossible to conduct such all advanced techniques in one laboratory. In this innovative area research, therefore, researchers in the field of ubiquitin and various ubiquitin-related biological phenomena conduct ubiquitin research together and cooperatively develop new research techniques which are inevitably required for the progress of upcoming ubiquitin biology.

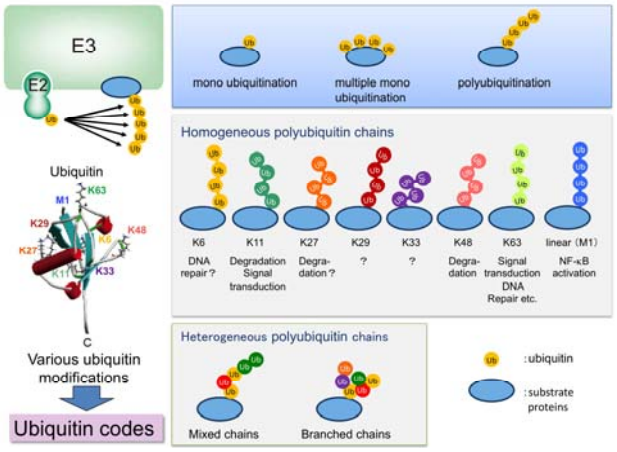

Figure 1. A wide variety of ubiquitin modifications and their biological roles

【Content of the Research Project】

In this research area, ubiquitin research in "post-degradation era" will be conducted from both functional and structural point of views.

1. In addition to conducting ubiquitin researches by fully utilizing research techniques and skills that we have already developed, we will develop new advanced techniques that are essential for future ubiquitin researches.

2. We will further dissect pathophysiological roles of the ubiquitin conjugation system by using newly developed research techniques.

【Expected Research Achievements and Scientific Significance】

1. We will establish world-leading advanced techniques to study ubiquitin and will clarify unidentified roles of the ubiquitin conjugation system in biology and medicine.

2. We believe that the outcomes of this research area (both biological achievements and technical development) will be beneficial to develop therapeutics to control the ubiquitin conjugation system and cure diseases including cancer.

【Key Words】

Ubiquitin, post-translational modifications and proteins

【Term of Project】 FY2012-2016

【Budget Allocation】 1,191,300 Thousand Yen

【Homepage Address and Other Contact Information】

http://ubiquitin.jp