

**Functional Analysis of Newly-found Actin Structure
Involved in Chloroplast Photorelocation Movement**

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【Outline of survey】

Chloroplasts move towards weak light to absorb more light to perform efficient photosynthesis but escape from strong light to avoid photodamage of chloroplasts. Arabidopsis plants deficient in the avoidance response cannot survive under direct sunlight in mid summer. Light condition, such as fluence rate and wavelength changes frequently according to the circumstances where plants live, so that to make full use of light is the first priority matter for plant life. Plants use light as information to monitor environmental conditions as well as energy source for photosynthesis. For that purposes chloroplasts monitor the light environment through blue light receptor, phototropin family proteins. Recently we found an actin fine structure that involves on chloroplast photorelocation movement. Our study will focus on the function of the actin structure for chloroplast movement.

【Expected results】

Actin filaments involve not only in muscle function in animals but also in various physiological phenomena such as organelle movement both in animal and plant cells. Two types of actin-dependent organelle movement are reported so far, one is dependent on molecular motor myosin and the other is depend on actin-network system mediated by ARP2/3 proteins. The actin structure that we found in chloroplast movement is the third category of actin-dependent systems. Our study will be able to clarify the mechanism of chloroplast movement, and, moreover, add a new concept on actin function how successfully organisms have evolved and developed the actin-dependent organelle movement.

【References by the principal investigator】

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- Oikawa *et al.* (2003) CHOLOROPLAST UNUSUAL POSITIONING1 is essential for proper chloroplast positioning. *Plant Cell*, 15, 2805-2815.

【Term of project】 FY2008– 2012

【Budget allocation】

159,800,000 yen (direct cost)

【Homepage address】

None