Roles of cortical microtubules and microtubule-associated proteins in gravity-induced growth modification of plant stems

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Resistance to the gravitational force is a critical response for terrestrial plants to survive under 1 *g* conditions. The ground-based experiments using conditions of centrifugal hypergravity have indicated that development of a short and thick body is a main mechanism that enables plants to grow against the gravitational force. We have also shown that regulation of cortical microtubule orientation by the action of microtubule-associated proteins such as MAP65 is involved in hypergravity-induced growth modification. From these results of hypergravity experiments, it is expected that plants would develop a long and thin body by changing orientation of cortical microtubule under microgravity conditions in space. To confirm this hypothesis, we will examine growth modifications of Arabidopsis hypocotyls in space. We also analyze the changes in dynamics of cortical microtubules and microtubule-associated proteins by observing Arabidopsis hypocotyls expressing GFP-fused tubulins and microtubule-associated proteins with a fluorescence microscope in the Kibo. The results obtained in the present space experiment will contribute to understanding the roles of cortical microtubules and microtubule-associated proteins in gravity-induced growth modification of plant stems.