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Summary of Doctoral Dissertation

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Ren Junling

Title of Doctoral Dissertation

Characterization of the Rho-related Rop/RAC GTPase and a plasma membrane protein in cell polarity regulation in the moss *Physcomitrella patens*

(細胞極性制御に関わるヒメツリガネゴケ Rop/Rac G タンパク質と膜タンパク質の解析)

Polarity is an intrinsic feature for all life forms ranging from single-cell to the complex multicellular organisms. Correct control of cell polarity is essential for their development. Although all eukaryotes employ the basic set of evolutionarily conserved core mechanisms to regulate cell polarity including the small GTPases, cytoskeleton, targeted membrane delivery and so on, yet in plants, it is still largely unknown including how the polar domain of membrane was established, what kind of targeted membrane delivery occurred. The moss *Physcomitrella patens* has been used as a good model system owing to its advantages such as easy observation, the completion of genome sequence, and high frequency of gene targeting. Also, apical cells of the moss show polar tip growth and the brood cells which were formed under stress lose cell polarity. Thus, using the moss as a model system, I conducted the following experiments in my thesis; 1) Conserved function of Rho-related Rop/RAC GTPase signaling in regulation of cell polarity in *Physcomitrella patens*. 2) An evenly distributed protein control cell polarity by affecting the number, position and growth direction of the protrusion or branch.