T4: Evolution of shoot systems in land plants

Mitsuyasu Hasebe[1,2], Keiko Sakakibara[1,2], Hisako Sakaguti[1,3], Ryosuke Sano[1], Tomoaki Nishiyama[1] and Tomomichi Fujita[1]

[1] National Institute for Basic Biology, Okazaki 444-8585, Japan
[2] Department of Molecular Biomechanics, The Graduate University for Advanced Studies, Okazaki, 444-8585 Japan
[3] Graduate School of Science and Technology, Shinshu University.

E-mail: mhasebe@nibb.ac.jp

Basal genetic tool kits of body plan in arthropods and vertebrates were likely established in their common bilaterian ancestor more than 500 million years ago. Green plants landed more than 450 million years ago, and the basic body plan of land plants, the shoot system composed of a stem and leaves, was established in their early stage of evolution. To trace the origin and evolution of the molecular mechanisms of shoot system, homologues of the *SHOOTMERISTEM LESS* (*STM*) gene, which is a major regulator of shoot initiation and maintenance in flowering plants, were characterized in the moss *Physcomitrella patens* and the fern *Ceratopteris richardii* in addition to the assessment of polar auxin transport in the moss. Basic function of *STM* and polar auxin transport are preserved among their doploid generation, although the moss does not form any shoot-like structure in its diploid generation. This suggests that basal genetic tools for shoot system in land plants were established in the shoot-less common ancestor of land plants. On the other hand, STM expression and polar auxin transport were not detected in the haploid leafy shoots of the moss, suggesting that diploid shoot systems of the vascular plants and haploid shoot systems of the moss were established in parallel with different molecular mechanisms.