

植物の成長と共生を制御するストリゴラクトンの二面的機能:その起源と進化

Dual function of strigolactones as plant hormones to control growth and as signaling molecules to induce symbiosis: its origin and evolution

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研究成果概要

Plant hormones are plant-derived small molecules that can regulate its own growth and development at an extremely low concentration. One group of the plant hormones, strigolactones (SLs), not only regulate the plant development, but also function as critical rhizosphere signals to mediate the symbiosis with arbuscular mycorrhizal fungi, which facilitates the inorganic nutrient uptake in exchange for plant-derived carbon. Throughout evolution, various SLs of different chemical structures were produced by various plants, thus it is an important question how the biosynthetic routes of these diverse SLs are established.

Here we focus on the key biosynthetic enzymes in the currently established SL biosynthesis pathway and investigated their evolutionary origin via phylogenetic analysis. Also, we simulated the structure of homologs from different species and their interactions with various candidate substrates, trying to identify the key amino acid residue changes that determines the substrate specificity. The phylogenetic analyses and AlphaFold structural predictions were carried out in the ICR's supercomputer system, and we are still at a stage obtaining data for publication.