古山祐貴

カビの共生細菌がカビとの共生時にのみ生産する nonribosomal peptides の発見

微生物の持つ二次代謝関連遺伝子の多くは一般的な実験室条件下では休眠状態にある。これらの二次代謝遺伝子を活性化するためには未知の環境因子や刺激が必要であると予想される。近年はこの活性化シグナルの 1 つとして微生物間相互作用が注目されている。今回はゲノムマイニングを駆使し、植物病原菌であるクモノスカビの共生細菌である *Burkholderia rhizoxinica* がカビとの共生状態にあるときにのみ生産する nonribosomal peptide を見出したという論文を紹介する。

紹介論文

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Abstract

The bacterial endosymbiont (*Burkholderia rhizoxinica*) of the rice seedling blight fungus (*Rhizopus microsporus*) harbors a large number of cryptic biosynthesis gene clusters. Genome mining and sequence similarity networks based on an encoded nonribosomal peptide assembly line and the associated pyrrole- forming enzymes in the symbiont indicated that the encoded metabolites are unique among a large number of tentative pyrrole natural products in diverse and unrelated bacterial phyla. By performing comparative metabolic profiling using a mutant generated with an improved pheS Burkholderia counterselection marker, we found that the symbionts' biosynthetic pathway is mainly activated under salt stress and exclusively in symbiosis with the fungal host. The cryptic metabolites were fully characterized as novel pyrrole-substituted depsipeptides (endopyrroles). A broader survey showed that endopyrrole production is a hallmark of geographically distant endofungal bacteria, which produce the peptides solely under symbiotic conditions