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The Biosynthesis of Kasugamycin, an Antibiotic against Rice Blast Disease, with Particular Reference to the Involvement of *rpoZ*, a Gene Encoding RNA Polymerase Omega Subunit

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Biosynthetic genes of kasugamycin (KSM), an aminoglycoside antibiotic produced by *Streptomyces kasugaensis*, forms a cluster within the chromosome. A cloned 22.4-kb cluster region contains almost all the enzyme-coding genes required for KSM biosynthesis together with *kac*^{338}, a gene for KSM acetyltransferase, and *kasKLM*, a set of genes encoding an ABC transporter, both of which participate in KSM self-resistance as well as *kasT* encoding a KSM-synthesis-specific transcriptional activator of the biosynthetic genes. Furthermore, *rpoZ*, encoding a 90-amino acid omega (ω) subunit of RNA polymerase (RNAP), is required for the simultaneous production of KSM and aerial mycelium, and *rpoZ*-disrupted wild-type *S. kasugaensis* produces neither KSM nor aerial mycelia. Transcriptional analysis of the biosynthetic genes and forcible expression of *kasT* in the mutant revealed that the presence of *rpoZ*, which results in formation of RNAP carrying the ω subunit, facilitates initiation of *kasT* transcription and is thus crucial for KSM production.

Key Words : *Streptomyces kasugaensis*, *rpoZ*, RNA polymerase ω subunit, kasugamycin biosynthesis