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Control of Secondary Metabolism by Serine/Threonine Kinases

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The bacterial genus *Streptomyces* contains 30 to 40 serine/threonine and tyrosine kinases. AfsK, one of the serine/threonine kinases in *S. coelicolor* A3(2), autophosphorylates at Thr-168 upon sensing some external signal and activates its own kinase activity. Phosphorylated AfsK then phosphorylates Thr-41 of AfsR, a unique transcriptional factor having an ATPase activity. Phosphorylation of AfsR increases its DNA-binding activity. AfsR binds the promoter of *afsS* and activates its transcription. The ATPase activity of AfsR is probably necessary for open complex formation competent for transcriptional initiation. The space between -35 and -10 elements of *afsS* is 20-bp. AfsR sits exactly on the promoter elements. When the space is shorted, AfsR no more binds the *afsS* promoter, which suggests that AfsR activates the transcription of the target genes by a mechanism similar to that of the MerR family.