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# The A-factor Regulatory Cascade That Leads to Secondary Metabolism and Morphological Development in *Streptomyces*

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A-factor (2-isocapryloyl-3*R*-hydroxymethyl-γ-butyrolactone) is the representative of the γ-butyrolactones that control secondary metabolism or morphogenesis, or both. It triggers aerial mycelium formation and production of almost all secondary metabolites, including streptomycin, in *Streptomyces griseus*. AfsA probably catalyzes condensation of a glycerol derivative and a β-keto acid, synthesizing A-factor. A-factor produced in a growth-dependent manner binds the A-factor receptor (ArpA) that has bound and repressed *adpA* and dissociates ArpA from the DNA, thus inducing the *adpA* transcription. AdpA, a transcriptional activator belonging to the AraC/XylS family, then switches on a number of genes required for secondary metabolism and morphogenesis. The overall picture of the A-factor regulatory cascade, together with X-ray crystallography of ArpA and unique characteristics of AdpA, will be presented. Autorepression of *adpA* by cooperative binding of AdpA to neighboring sites is also presented. The regulation of secondary metabolism and/or morphological differentiation by γ-butyrolactones is common among the soil-inhabiting, Gram-positive, bacterial genus *Streptomyces*.