

γ -Butyrolactone Autoregulators and Their Receptors from *Streptomyces* species

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γ -Butyrolactone autoregulators are *Streptomyces* hormones having a common 3-hydroxymethyl butanolide skeleton. Based on minor but essential structural differences in C-2 side chains, they are classified into three groups: A-factor type, virginiae butanolide (VB) type, and IM-2 type. The VB signal in *S. virginiae* is transmitted into the cells via binding to a VB specific receptor, BarA, and the IM-2 signal in *S. lavendulae* is transmitted via binding to an IM-2 specific receptor, FarA. Several lines of evidence derived from gel-shift assays, surface-plasmon-resonance analyses, DNase I footprinting and S1 nuclease analyses have revealed that, in the absence of an autoregulator, both BarA and FarA act as a transcriptional repressor by binding to specific DNA sequences overlapping the -10 to -35 region of target genes. The binding was usually abolished by binding with autoregulators, which resulted in transcriptional derepression of target genes. Filter binding - PCR method as well as DNA sequencing around receptor genes resulted in the discovery of several target genes under the control of receptors. Signal transduction pathway/mechanism derived from the VB-BarA system of *S. virginiae* and IM-2-FarA system of *S. lavendulae* will be presented.