A phosphorylation code of the *Aspergillus nidulans* global regulator VelvetA (VeA) determines specific functions.

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Abstract

The velvet protein VeA is a global fungal regulator for morphogenetic pathways as well as for the control of secondary metabolism. It is found exclusively in filamentous fungi, where it fulfills conserved but also unique functions in different species. The involvement of VeA in various morphogenetic and metabolic pathways is probably due to spatially and timely controlled specific protein-protein interactions with other regulators such as phytochrome (FphA) or velvet-like proteins (VelB). Here we present evidence that *Aspergillus nidulans* VeA is a multi-phosphorylated protein and hypothesize that at least four specific amino acids (T167, T170, S183 and Y254) undergo reversible phosphorylation to trigger development and sterigmatocystin biosynthesis. Double mutation of T167 to valine and T170 to glutamic acid exerted the largest effects with regards to sexual development and veA gene expression. In comparison to wild type VeA, which shuttles out of nuclei after illumination this VeA variant showed stronger nuclear accumulation than the wild type, independent of the light conditions. The interaction between VeA and VelB or FphA, respectively, was affected in the T167V, T170E mutant. Our results suggest complex regulation of

the phosphorylation status of the VeA protein.

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