

# Gibberellin biosynthesis in plants and fungi: A case of convergent evolution?

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As well as being phytohormones, gibberellins (GAs) are present in some fungi and bacteria. Indeed, GAs were first discovered in the fungus *Gibberella fujikuroi*, from which gibberellic acid (GA<sub>3</sub>) and other GAs are produced commercially. Although higher plants and the fungus produce structurally identical GAs, there are important differences in the pathways and enzymes involved. This has become particularly apparent with the identification of almost all of the genes for GA-biosynthesis in *Arabidopsis thaliana* and *G. fujikuroi*, following the sequencing of the *Arabidopsis* genome and the detection of a GA-biosynthesis gene cluster in the fungus. For example, 3 $\beta$ -hydroxylation occurs early in the pathway in *G. fujikuroi* and is catalyzed by a cytochrome P450 monooxygenase, whereas it is usually the final step in plants and is catalyzed by 2-oxoglutarate-dependent dioxygenases. Similarly, 20-oxidation is catalyzed by dioxygenases in plants and a cytochrome P450 in the fungus. Even where cytochr