

## Expression of Mating Type Genes in Heterologous Basidiomycetes

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Mating processes in basidiomycetes are controlled by genes encoding two types of transcription factors (HD1 and HD2) and by genes encoding pheromones and pheromone receptors. For a successful mating reaction, an HD1 protein and an HD2 protein of different specificity have to interact and a pheromone with a pheromone receptor of different specificity. With now having cloned mating type loci from several different basidiomycetes, evolution of these loci and their genes can be addressed by sequence analysis as well as by transformation of genes into heterologous species.

Transformation of cloned mating type genes into strains of the same species with different mating type genes can activate mating type controlled development. The *A* mating type genes of *Coprinopsis scobicola* and of *Coprinellus disseminatus* were found to be functional in *Coprinopsis cinerea* in combination with the endogenous *A* mating type genes. Moreover, *B* genes of *C. disseminatus* in *C. cinerea* cause peg formation subapical to septa with *A*-induced clamp cells and fusion of clamp cells with the subapical peg. In several *C. cinerea* monokaryons, transformed *A* genes of *Schizophyllum commune* were not observed to induce clamp cells by interaction with endogenous *A* genes. However, in crosses of *C. cinerea* transformants carrying compatible *S. commune* *A* genes, clamp cell production has occasionally been observed. To our surprise, when using *S. commune* *A* genes or the homologous *b* genes of *Ustilago maydis* to transform a specific *C. cinerea* monokaryon, colonies of transformants may develop faster growing sectors with hyphae having clamp cells.

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