

# Role of Chromatin Remodeler SWR1 in Regulating Melanin Biosynthesis and Virulence in *Ustilago Maydis*

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## ABSTRACT

The fungus *Ustilago maydis* is responsible for smut disease in maize, driven by the regulated production of secondary metabolites, including melanin, which promotes virulence and survival. Our study examines the role of SWR1, an ATP-dependent chromatin remodeler, in controlling melanin biosynthesis. SWR1 influences chromatin structure, affecting DNA activity during development. Deleting the SWR1 gene increased *U. maydis* sensitivity to DNA damage, impaired growth, and altered cell morphology. Notably, the absence of SWR1 triggered pigment production under optimal conditions, suggesting its regulatory role over secondary metabolite genes at the chromatin level. This research is the first to link chromatin remodelers to stress-induced pigment production in fungi, crucial for resilience. Mating experiments on maize seedlings revealed that the  $\Delta swr1$  mutant strain had lower infection rates, with affected plants showing chlorosis, highlighting SWR1's importance in *U. maydis* virulence and plant infection. Overall, our findings illuminate the role of chromatin remodeling in fungal adaptation and pathogenicity, offering valuable insights for tackling crop diseases.

**Keywords:** *Ustilago maydis*, Chromatin remodeler, Fungal virulence, Fungal survival

## How to Cite

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