

Developing a Novel Inhibitor for Cdc14 in the Fungus *Aspergillus niger*

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Fungal pathogens are a major cause of crop damage. In these fungi, Cdc14 could be a critical phosphatase for regulating cell division by ending the mitotic process, as demonstrated by studies in *Saccharomyces cerevisiae*. Due to Cdc14's absence in higher plants and noncritical role in animals, an inhibitor which can reduce its activity could function as a potential fungicide. In this project, I developed an inhibitor for Cdc14 in the fungal pathogen *Aspergillus niger* (AnCdc14), a pathogen that causes black mold on crops. After characterizing the catalytic specificity of AnCdc14, I designed multiple inhibitors that modeled the specificity. A combination of bioinformatic and biochemical approaches was used to determine the most effective inhibitor: one that contained four benzene rings and functioned through irreversible inhibition. Through computer modeling, I optimized this inhibitor to improve its affinity for AnCdc14. This modified inhibitor can be tested *in vitro* and *in vivo* for its efficiency in preventing *A. niger* growth and eliminating its pathogenicity. Due to high conservation of Cdc14 among fungi species, the inhibitor I created could be tested in multiple fungi, such as *F. graminearum*. Eventually, these results could be developed into a new antifungal compound that broadly prevents plant fungal infections.