

THE EFFECTS OF SILVER NITRATE ON TRANSCRIPTIONAL REGULATION OF GENES INVOLVED IN METAL TRANSPORT IN *MICROSPORUM GYPSEUM*

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ABSTRACT

The use of silver nitrate for the treatment of burns, chronic wounds, and for ophthalmologic use was recognized by the US Food and Drug Administration in the 1920s. However, with the discovery of penicillin and other antibiotics in the 1940s, the use of silver declined substantially. In recent years interest in the antimicrobial properties of silver has once again resurfaced due to the increasing number of bacteria that exhibit resistance to commonly used antibiotics. Instances of microbial resistance to silver have been reported in both bacteria and some fungi. A good understanding of how bacteria evade silver toxicity has been gained through studies on the mechanisms of resistance in bacteria. Little work, however, has been done to investigate the response of dermatophytic fungi to silver. Dermatophytic fungi degrade keratin, and thus opportunistically cause infection in hair, skin, and nails. In this pilot study we chose the dermatophytic, filamentous fungus, *Microsporum gypseum*, to study transcriptional changes of eight loci in response to AgNO₃ exposure. The minimum inhibitory concentration of AgNO₃ against *M. gypseum* was determined to be 0.15 mM. Varying patterns of transcriptional increase in response to concentrations of AgNO₃ up to 0.25 mM were observed in five of the loci chosen for this study, *CCCI*, *CTR2*, *MT1*, *MT*, and *MGYG_0670*. This study provides some insight into the mechanism by which *M. gypseum* evades the toxic effects of silver.