

---

## **18-BETA-GLYCYRRHETINIC ACID CAUSES INCREASED PIGMENT PRODUCTION AND DECREASED ADHERENCE IN METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS BIOFILMS**

Alan J. Weaver, Jr., Dept. of Chemistry & Biochemistry, Montana State University, Bozeman  
Abigail Van Vuren, Dept. of Chemistry & Biochemistry, Montana State University, Bozeman  
Dr. Valerie Copie, Dept. of Chemistry & Biochemistry, Montana State University, Bozeman  
Dr. Martin Teintze, Dept. of Chemistry & Biochemistry, Montana State University, Bozeman  
Dr. Mary Cloud B. Ammons, Dept. of Chemistry & Biochemistry, Montana State University, Bozeman

Dr. Jovanka Voyich, Dept. of Microbiology & Immunology, Montana State University, Bozeman

Infections caused by Methicillin Resistant Staphylococcus aureus (MRSA) are an ever growing concern in the health care field. While MRSA is most known for its resistance to beta-lactams (i.e. penicillin), it has also acquired resistance to a number of other antibiotics. MRSA plays a major role in chronic wounds due to its ability to form a biofilm, resulting in severe infections. Biofilms are naturally more resistant to antibiotics than planktonic cells which can be due to their extracellular polymeric substance and slow growing nature, as well as metabolic differences. This has resulted in biofilms becoming a major focus in the biomedical field. As MRSA rapidly acquires resistance to currently available antibiotics, there is an urgent need to develop novel antimicrobials. 18 $\beta$ -Glycyrrhetic acid (GRA) is a compound isolated from *Glycyrrhiza glabra* and has been shown to be an effective antimicrobial against Staphylococcal planktonic cells; however, investigations on biofilm activity appear to be lacking. Our studies show GRA to have minimal to no effect on biofilm bacterial counts; however, post-treatment observations included an increase in yellow pigment and decreased adherence of biofilms. *S. aureus* pigments play an important role in virulence, including oxidative stress that may be introduced by antimicrobials like GRA. Crystal violet staining of GRA treated biofilms showed a quantified reduction in adherence compared to controls. This suggests that GRA may cause biofilm dispersal and therefore increased susceptibility to current antimicrobials. 1H NMR metabolomics is being conducted to investigate these results and other metabolic changes in GRA treated biofilms.