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**MICROBIOLOGY & MOLECULAR GENETICS**

**Departmental Journal Club**

**MICR 6120**

**Monday**

**August 29th, 2016**

11:30am-12:20pm

RM 122 Classroom Bldg.

Presented by

Shelby Calkins

PHD Student

Title:   A new small molecule inhibits Streptococcus mutans biofilms in vitro and  in vivo

Authors:  W. Pan1, M. Fan1, H. Wu2, C. Melander3 and C. Liu1

Abstract:  Aims:  The aim  of this  study  was to  identify new small molecules that  can inhibit Streptococcus mutans  biofilms by in vitro and in vivo model.

Methods  and  Results:  We evaluated the effect of a small molecule 2-amino- imidazole/triazole  conjugate  (2-AI/T)   on   the   formation   of  Strep. mutans biofilms by  culturing  in  96-well plates.  Toxicity was  assessed through  cell culture and  intragastrically administering  to mice. The anti-biofilm  and  anti- caries effects were investigated in vivo. The inhibitive mechanism was detected by isobaric tag for relative and absolute quantification (itraq)  and RT-QPCR. In vitro and  in vivo study revealed that  2-AI/T significantly inhibited  biofilm formation  of  Strep. mutans  and  is more  so  than  inhibiting  planktonic  cells without   toxicity.   The   ribosome   and   histidine   metabolism   pathways   of Strep. mutans were significantly regulated by this compound. Conclusions:  These  results  suggest  that  the  2-AI/T  conjugate  is  a  potent inhibitor  that  can  be  potentially  developed  into  a  new  drug  to  treat  and prevent dental caries.

Significance and  Impact  of  the  Study:  This  is the  first study  to  use  small molecule from marine natural products, to protect from dental caries in vivo. It has potential  broad  range application  in clinical caries prevention,  or as a bioactive ingredient for food applications.