CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Fan Yang

Project Number
S1324

Project Title
Identification of Bacterial Adhesion Antagonists for Contact Lens and Intraocular Lens

Abstract

Objectives/Goals
The objective of this study is to develop the strategies and to identify anti-adhesion compounds using one-bead one-compound library approach.

Methods/Materials
The inhibition of bacterial adhesion by compound-library was assessed by (I) 3-day incubation of fluorescent labeled S. epidermidis, S. aureus and P. aeruginosa with one-bead one-compound library; anti-adhesion compound-beads were picked up and re-incubated with mixed S. epidermidis, S. aureus and P. aeruginosa again for 3 days; (II) decoding of the anti-adhesion compound-beads by Procise 494 Protein Sequencer; (III) evaluation of compounds# anti-adhesion properties on TentaGel lenses; (IV) re-synthesis of anti-adhesion compounds in soluble form to evaluate compounds# toxicities.

Results
Three compounds have been identified possessing anti-adhesion properties on TentaGel lenses for at least six days and they have no toxicity to bacteria and human blood cells.

Conclusions/Discussion
Our experiments demonstrate the feasibility for compound-grafting-biomaterial to prevent the bacterial adhesion and biofilm formation. Long-lasting anti-adhesion compound grafting lenses may be developed in the future to fight lens related infection. One-bead one-compound library approach and novel screening assays developed in this study can also be applied to detect anti-adhesion compounds for the prevention of medical device related infections.

Summary Statement
Three compounds have been identified possessing anti-bacterial adhesion properties on TentaGel lenses for at least six days.

Help Received
Xiaobing Wang, PhD: Synthesized the one-bead one-compound library; mass spectrometry analysis; tutor for the synthesis of the compounds on Tenta Gel and Rink resin and compounds purification using RP-HPLC.