Targeted antimicrobial therapy against dental caries

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Struggle in the dark w/o knowing the answers

- Cariogenic Bacteria
- Antimicrobials
- Xylitol etc
- Sugars
- Tooth Decay
- Fluoride
Various antimicrobial therapies

- Mechanical removal with frequent cleaning
- High concentration of fluoride
- CHX
- Listerine
- Triclosan
- Povidone-iodine
- Bleaching agents
- Antibiotics
- Antimicrobial peptides
Remember this?
Problem with current antimicrobial treatments

• Broad spectrum killing to disrupt normal microbial flora
What would be the better way to approach the problem?
Seeking A Better Solution

A targeted approach

[Diagram showing targeted bacteria being treated or removed.]
How to achieve a targeted therapy?

- Vaccination (active or passive)
- Replacement with non-acidic S. mutans
- Enhancement of base-producing bacteria
- Targeted phage therapy

The new technologies being developed by us
- Targeted quorum sensing therapy
- Smart bomb (STAMPs)
- Herbs
Playing a genetic game with bacteria
Quorum sensing in dental plaque

Wild-type

S. mutans quorum sensing mutant (luxS)
Playing a genetic game with bacteria

*Overdose S. mutans with quorum sensing (QS) signal*

Untreated *S. mutans*  
Overdosed *S. mutans*  with QS signal CSP
The New Technology Platform at C3 Jian
Specifically Targeted Anti-Microbial Peptide
STAMP™

Antimicrobial peptide * Linker peptide * Targeting peptides

Targeted bacteria

Untargeted general biofilm population
The killing molecule: antimicrobial peptide

Mode of Action of peptide antibiotic on gram-positive bacteria
(pore formation)
The targeting molecules

- Species-specific antibody
- Species-specific minibody
- Species-specific signaling peptides
- Phage landing gears
- Phage display peptides
- Sex pheromones
A STAMP in action

Selective killing of *S. mutans* over *S. sanguis*

*S. mutans*  *S. sanguis*

Selective killing of *S. mutans* over *S. sanguis*
Conversion of a bad plaque to a good plaque

Smart bombs against *S. mutans*

An antibiotic-probiotic approach
Some exciting findings

• Elimination of *S. mutans* greatly reduce other cariogenic bacteria in dental plaque

• Elimination of cariogenic bacteria greatly reduced or stop demineralization

• Targeted killing of cariogenic bacteria re-balance microbial ecology, achieving long term protective effects
A medical approach to dentistry

Diagnosis  Treatment/prevention
The power of ancient wisdom:
A licorice derived herbal formula
See Dee’s report