

# A plastic pill for periodontal problems

14 September 2006

Rutgers scientists announced a revolutionary new treatment for killing the bacteria that attack gum tissue during periodontal disease, while also promoting healing and the regeneration of tissue and bone around the teeth.

Eight to 12 percent of Americans have periodontal disease serious enough to require some type of advanced treatment, such as surgery. Left untreated, the condition can lead to tooth loss.

The breakthrough technology – a polymer-based drug delivery system that may be implanted in pockets between the teeth and the gum – developed at Rutgers, The State University of New Jersey, was presented at the 232nd National Meeting of the American Chemical Society in San Francisco by Michelle Johnson, a graduate student in the research group of paper co-author Kathryn Uhrich, a professor of chemistry and chemical biology at Rutgers.

"There has never been anything like this available to clinicians and it will certainly find a very prominent role in periodontal therapy in the future," said Mark Reynolds, chair of the department of periodontics at the University of Maryland Dental School, who collaborates with Uhrich on the research.

The new polymer or "plastic" material, when inserted between tooth and diseased gum, treats the bacterial infection, inflammation and pain with pharmaceuticals incorporated into the material itself, Johnson explained. It employs salicylic acid, the active ingredient in aspirin, for the swelling and discomfort, and three antimicrobials each with a different release rate – compounds of clindamycin, chlorhexidine and minocycline.

Once implanted, the polymer gradually breaks down to release the salicylic acid, which relieves pain and reduces inflammation, and the antimicrobials which inhibit infection at a sustained pace, Uhrich added.

Periodontal disease occurs when plaque that forms on the tooth surface spreads and grows below the gum line. The plaque carries with it bacteria that can irritate, inflame and eventually destroy the tissues and bone that support the teeth. Spaces or pockets form between the teeth and gums and become sites of infection which can damage the supporting structures of the teeth.

Reynolds explained that after removing the damaged tissue, periodontists often try to separate the gum tissue from the bone and tooth structure using barrier materials that remain in place for about six weeks to facilitate healing and tissue regeneration.

"The polymers that Kathryn Uhrich and her team have pioneered and developed are unique in that they can serve as barriers while also repressing any inflammatory response, setting the stage for nature to not only heal these areas, but also to regenerate the tissues that have been lost to the disease," Reynolds said.

Reynolds is testing the new biomaterial in a number of animal systems to assess tissue reactions and better define the timeline of its decomposition and drug release. He says that human clinical trials may be two or more years away depending on approvals from the U.S. Food and Drug Administration.

Source: State University of New Jersey

APA citation: A plastic pill for periodontal problems (2006, September 14) retrieved 20 June 2021 from <https://medicalxpress.com/news/2006-09-plastic-pill-periodontal-problems.html>

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