

AAO Foundation Award Final Report

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Award Type	Biomedical Research
Project Title	Trans-mucosal Delivery of Drugs to the Periodontum – Fred F. Schudy Honorary Research Award
Project Year	2000
Institution	University of the Pacific, Arthur A. Dugoni School of Dentistry and University of Washington, School of Dentistry
Summary/Abstract	<p>In the future, proteins, which affect the rate of alveolar bone resorption or apposition may be manipulated to control tooth movement. Such proteins could be non-invasively delivered to the periodontum via liposomes used for transdermal delivery (containing dimyristoylphosphidylcholine (PDC)). We used slightly cationic unilamellar liposomes (diameter = 100nm) composed of poly(ethylene glycol)-modified phospholipids to avoid phagocytosis and PDC. The liposomes were fluorescently labeled externally with lissamine rhodamin B, and internally loaded with calcein. To test transmucosal uptake, we placed 1mL of liposome preparation topically on the isolated mucobuccal fold of the left maxillary first molar of anesthetized rats for 5 minutes (n=18) or 60 minutes (n=18) before washing with water. In the 60-minute group an additional 0.5mL of solution was placed after 30 minutes to prevent complete drying. The analogous area on the right side of each rat's maxilla acted as a control. Rats were sacrificed (in-groups of six) on days 2, 4, and 8. After sacrifice, the maxilla was removed and hemi-sected. Samples were fixed in alcohol formalin, dehydrated in a series of alcohol solutions, and embedded in methylmethacrylate. 7-10mm cross-sections were mounted on 1% gelatin slides and observed using fluorescence microscopy. Calcein was seen in the PDL of molar roots in all groups. Fluorescence was greatest after 60 min and degree of penetration increased from day 2 to 8. No rhodamine fluorescence was observed in any group suggesting that free calcein but not liposomes were transported across the mucosa. The results were reported at the 2001 IADR meetings.</p>