

Joint International Laser Conference

21-23 September 2003, Edinburgh, Scotland

Volume 18 Supplement 1 2003

LASERS IN MEDICAL SCIENCE



ELA
EUROPEAN LASER ASSOCIATION



Springer

0149. SPECTROSCOPIC INVESTIGATIONS OF LIPOSOME-DYE COMPLEXES AND DISEASED HUMAN TEETH

Prabhakar Misra¹, Rajendra Singh²; ¹Department of Physics & Department of Endodontics, ²Howard University, Washington, DC, U.S.A.

Liposomes are able to transport highly toxic and concentrated drugs by way of adsorption, endocytosis and lipid exchange processes directly to specific targets in the human body. Applications include targeted release of encapsulated drugs in dermatology, radiology and general medicine; and directed treatment of systemic fungal infections experienced by cancer and AIDS patients. One of the main advantages of photo-induced liberation of a drug-dye complex from liposomes is that it can occur in a controlled manner. In the present study, the impact of visible wavelength photons from a Nd:YAG laser - of narrow pulse width and variable energy density- on phosphatidylcholine liposomes containing different organic dyes has been evaluated. A localized thermal model based on energy density and phase transition considerations has helped quantify the efficiency of dye release. On another spectroscopic front, extracted virgin and diseased teeth were irradiated with light in the 200–1000 nm wavelength region and the absorption and scattering data were compared for normal and cariously and periodontally affected teeth. All 250 samples from patients ranging between 15 and 75 years of age were stored in the dark in 10% neutral buffered formaldehyde solution. Each tooth was cut once sagittally with a water-cooled diamond coated band saw into thin 2–3 mm sections. Spectral scans were taken for each sample with a UV/VIS spectrophotometer in the range 200–1000 nm. Infected teeth samples exhibited characteristic absorption features in the 200–380 nm region; provided the effects of spectral saturation and light scattering were included in the analysis.