

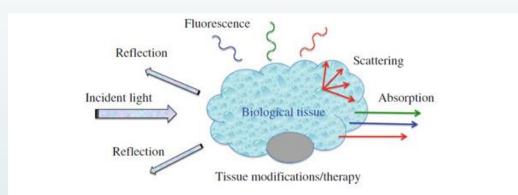




APPLICATIONS OF BIOPHOTONIC INNOVATIONS IN DENTISTRY

INTRODUCTION

Biophotonics refers to the detection, reflection, emission, modification, absorption, creation, and manipulation of photons as they interact with biological cells, organisms, molecules, tissues, and substances, supported by optical fibers, optical sources and photodetectors, test and measurement instrumentation, nanotechnology, microscopy, spectroscopy, and miniaturization methodologies.



APPLICATIONS:

2D and 3D imaging of cells, tissues, and organs

noninvasive measurements of biometric parameters

therapeutic photoni reatment of injured, diseased, or unwanted cells

surgical procedures such as laser cutting, issue ablation etc.

detection of injured or diseased cells and tissue

onitoring of wound healing and progres of therapeutic treatments

ADVANTAGES:



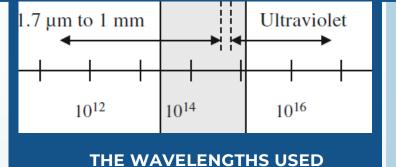




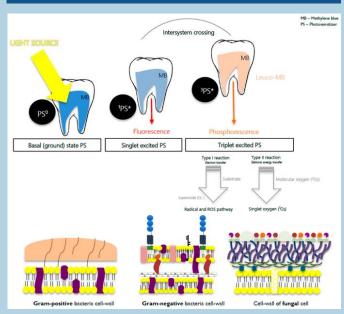








PHOTODYNAMIC THERAPY



PHOTOSENSITIZER EXCITED FOR DISINFECTION

INTERFEROMETRY



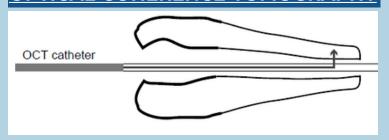
Moiré fringe patterns before biting forces on non-carious vs after instrumentation cervical lesions

QUANTUM DOTS

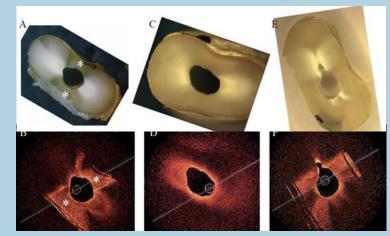


Poly lysine carbon quantum dots used as a root canal flushing agent to study its inhibitory effect on E. faecalis and their biofilms

OPTICAL COHERENCE TOMOGRAPHY



Schematic of an OCT catheter inside the root-canal

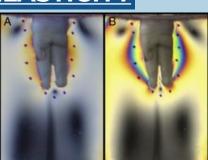


(A, C, E) Histology slides of three cross-sections and (B, D, F) OCT images of the same sites.

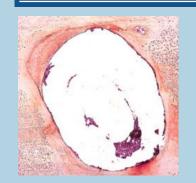
PHOTOELASTICITY

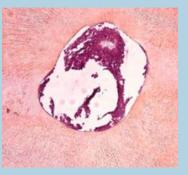


Stress distribution in a tooth with normal supporting bone



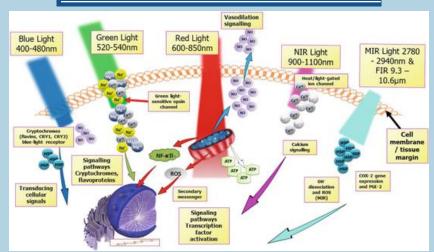
Stress distribution following instrumentation (protaper next)





bacteria/biofilm after irrigation with PIPS-activated NaOCI (A) and ultrasonically activated NaOCI (B) after photon-initiated photoacoustic streaming

PHOTOBIOMODULATION



REFERENCE:

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