Blue light-mediated inactivation of Enterococcus faecalis in vitro.

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Source
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Abstract
In dentistry, residual infection remains a major cause of failure after endodontic treatment; many of these infections involve Enterococcus faecalis. In the current study, we explored the possibility that blue light activated photosensitizers could be used, in principle, to inactivate this microbe as an adjunct disinfection strategy for endodontic therapy. Three blue light absorbing photosensitizers, eosin-Y, rose bengal, and curcumin, were tested on E. faecalis grown in planktonic suspensions or biofilms. Photosensitizers were incubated for 30 min with bacteria then exposed to blue light (450-500 nm) for 240 s. Sodium hypochlorite (3%) was used as a control. After 48 h, the viability of E. faecalis was estimated by measuring colony-forming units post-exposure vs. untreated controls (CFU/mL). Blue light irradiation alone did not alter E. faecalis viability. For planktonic cultures, blue light activated eosin-Y (5 μM), rose bengal (1 μM), or curcumin (5 μM) significantly (p<0.05) reduced E. faecalis viability compared to exposure to the unirradiated photochemicals. For biofilm cultures, concentrations of light-activated eosin-Y, rose bengal, and curcumin of 100, 10, and 10 μM respectively, completely suppressed E. faecalis viability (p<0.05). Although the current results are limited to an in vitro model, they support further exploration of blue light activated antimicrobials as an adjunct therapy in endodontic treatment.