Laser Photobiomodulation: Models and Mechanisms

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J Laser Dent 2011;19(2):231-237

INTRODUCTION

The overwhelming clinical evidence of the clinical effectiveness of low level laser therapy (LLLT) therapy has been balanced by few reports of equivocal or non-efficacious studies.1-3 A major deterrent to the popularity of low-power lasers in various biomedical applications has been the lack of our understanding of precise mechanisms mediating the underlying biological responses. The aim of this article is to provide an overview of the various known biological mechanisms in LLLT and highlight the discovery of a recent mechanism describing LLLT-mediated activation of a latent growth factor complex, latent transforming growth factor-β1 (LTGF-β1) in stimulating oral wound healing.4 This review is divided into four sections as follows: (1) Current understanding of photobiomodulation (PBM); (2) Critical parameters for photobiomodulation; (3) The nexus of inflammation and healing; and (4) Novel PBM mechanism involving LLLT activation of LTGF-β.