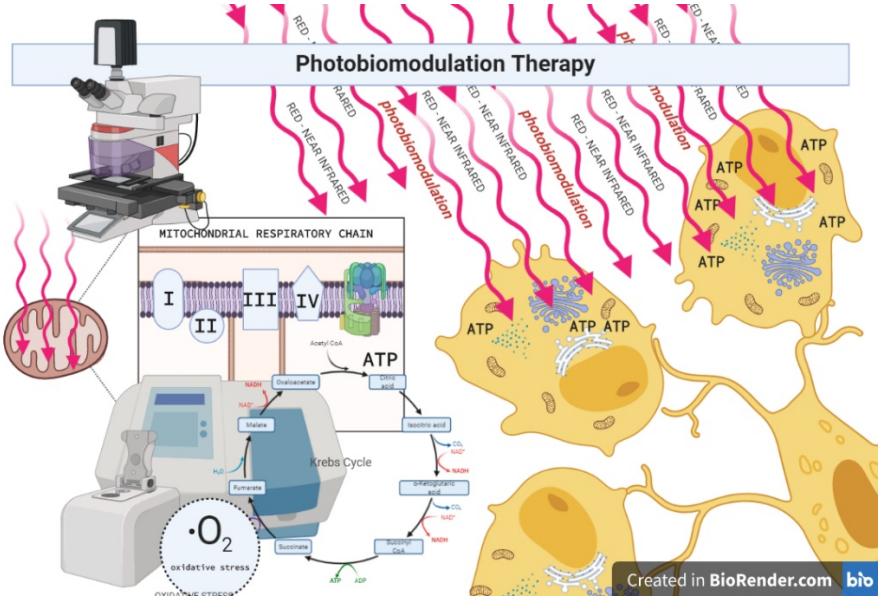
# TISSUE REGENERATION

## Effects of laser light on tissue regeneration




The processes of tissue regeneration can have different extent and modalities in different animal species and in different tissues.
The literature shows that photons at the red and near infrared (NIR) wavelengths can affect key cellular pathways of all life-forms, by interacting with specific photoacceptors located within the cell. Through this mechanism, photobiomodulation (PBM), as this medical subject heading is defined, can modify cellular metabolism by increasing mitochondrial ATP production.
Basically, when a photon interacts with a specific photoacceptor, its energy is absorbed to generate high-energy electrons. The excited molecule can lose its energetic status in the form of heat or fluorescence emission or the absorbed light energy can be transferred to a photosystem molecule as an excited electron or state. In this way, the photosystem converts the photon's energy into chemical energy. Consequently, photons can affect animal cell behaviour, by modulating enzyme activities and growth factor production as well as by modulating cytokine and neurotransmitter production.
However, the mechanisms by which PBM works are multifaceted and are involved in versatile biological actions such as cell proliferation, differentiation, survival and death. Our aim is the study of optimal parameters of NIR laser light for light-tissue interaction to lead to accelerate and improve the process of regeneration. Model organisms are the annelid *Dendrobaena veneta* and the non-vertebrate chordate *Branchiostoma lanceolatum*. Macroscopic observations, histology, immunohistochemistry, in situ hybridization, and study of gene expression are the applied techniques.

**Keywords**: fotobiomodulation; wound healing; mitochondria; regeneration; laser therapy
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