The Effects of Blue Light on Human Fibroblasts and Diabetic Wound Healing, Purbhoo-Makan, et. al. *Life*, September 12, 2022

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Level of Evidence: 5

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Although antibiotic therapy has led to a world-wide decline in infection related morbidity and mortality, antibiotic resistance continues to grow. The purpose of this article was to highlight the importance of blue light photobiomodulation (PBM) in treating diabetic wounds. PBM is a non-invasive, non-thermal, low-level light application used to induce cellular, photochemical and photophysical responses. This paper specifically focuses on the role of blue light therapy in order to treat diabetic wounds. Low doses of blue light promote wound healing whereas high doses of blue light (<50 J/cm^2 between the 410 nm to 430 nm range) impair cellular proliferation. Given the rising incidence of diabetes, amputation, drug resistance, financial burden, and decreased quality of life, this research article emphasizes the importance of blue light therapy to combat this persistent problem. Blue light is relatively inexpensive and easily applicable. The exact mechanism of blue light therapy's impact on wound healing has not yet been discovered, however, numerous theories have been proposed:

1. Blue light is sensed by many microbes and regulates bacterial motility. Consequently, it may suppress biofilm formation and inactivation of the bacteria.

2. In combination with red and NIR light, PBM can provide antimicrobial and regenerative effects.

3. Blue light can impact mitochondrial activity due to stimulation of flavins and flavoproteins. Flavins, located within the mitochondrial complex I are essential for the reduction of oxygen to superoxide, and are activated by blue light.

4. Small increases in reactive oxygen species leads to an increase in cell proliferation whereas a large increase induces apoptotic signaling pathway.

As of yet, no study has identified the perfect wavelength for blue light therapy for diabetic wound healing. Further research needs to be conducted given the promising benefits this therapy may provide.
