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## **Light-emitting diode phototherapy at 630 +/- 3 nm increases local levels of skin-homing T-cells in human subjects.**

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### **Abstract**

#### **BACKGROUND AND AIMS:**

Red light phototherapy with laser sources has been used successfully for a number of indications. A new generation of quasimonochromatic 630 +/- 3 nm light-emitting diode (LED) systems has recently been yielding good results for the same indications, but no study has examined changes in visible red light irradiated skin at an immunological level. This study was thus designed to examine changes in skin-homing T-cell levels induced in normal human skin by visible red LED energy.

#### **SUBJECTS AND METHODS:**

Six adult male volunteers (35 approximately 48 years old) who satisfied all study criteria had the skin over the lateral aspect of the leg irradiated once per week for 8 weeks with a visible red (630 +/- 3 nm) LED-based system, with irradiance of 105 m/cm<sup>2</sup>, 15 minutes/session, and a radiant flux of 94 J/cm<sup>2</sup>. Skin biopsies were performed after the eighth treatment session, and cultures were prepared to assay the type and quantity of skin-homing T-cells using qualitative and quantitative polymerase chain reaction (PCR) techniques. Ultrastructural changes were also assessed with transmission electron microscopy.

#### **RESULTS:**

Transmission electron microscopy revealed mild fibroplastic changes in fibroblasts, with no acute inflammatory changes throughout the treatment session. Qualitative PCR showed the presence of both Th-1 and Th-2 T-cells, and quantitative PCR showed an increase in the numbers of both types of skin-homing T-cells, much more so for Th-2 than for Th-1.

#### **CONCLUSIONS:**

Visible red LED irradiation appears to activate the skin-homing immune system.

<http://www.ncbi.nlm.nih.gov/pubmed/16641531>