

## Promotive Effects of Far-Infrared Ray on Full-Thickness Skin Wound Healing in Rats

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Exp Biol Med 228:724–729, 2003

### Abstract

The biological effects of far-infrared ray (FIR) on whole organisms remain poorly understood. The aim of our study was to investigate not only the hyperthermic effect of the FIR irradiation, but also the biological effects of FIR on wound healing. To evaluate the effect of FIR on a skin wound site, the speed of full-thickness skin wound healing was compared among groups with and without FIR using a rat model. We measured the skin wound area, skin blood flow, and skin temperature before and during FIR irradiation, and we performed histological inspection. Wound healing was significantly more rapid with than without FIR. Skin blood flow and skin temperature did not change significantly before or during FIR irradiation. Histological findings revealed greater collagen regeneration and infiltration of fibroblasts that expressed transforming growth factor- $\alpha$  (TGF- $\alpha$ ) in wounds in the FIR group than in the group without FIR. Stimulation of the secretion of TGF- $\alpha$  or the activation of fibroblasts may be considered as a possible mechanisms for the promotive effect of FIR on wound healing independent of skin blood flow and skin temperature.