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## Effects of laser treatment on the expression of cytosolic proteins in the synovium of patients with osteoarthritis.

Barabás K<sup>1</sup>, Bakos J, Zeitler Z, Bálint G, Nagy E, Lakatos T, Kékesi AK, Gáspár L, Szekanecz Z.

### Author information

#### Abstract

**BACKGROUND AND OBJECTIVE:** Low level laser therapy (LLLT) has been developed for non-invasive treatment of joint diseases. We have previously shown that LLLT influenced synovial protein expression in rheumatoid arthritis (RA). The aim of this study was to assess the effects of laser irradiation on osteoarthritic (OA) synovial protein expression.

**STUDY DESIGN/MATERIALS AND METHODS:** The synovial membrane samples removed from the knees of 6 OA patients were irradiated *ex vivo* using near infrared diode laser (807-811 nm; 25 J/cm<sup>2</sup>). An untreated sample taken from the same patient served as control. Synovial protein separation and identification were performed by two-dimensional differential gel electrophoresis and mass spectrometry, respectively.

**RESULTS:** Eleven proteins showing altered expression due to laser irradiation were identified. There were three patients whose tissue samples demonstrated a significant increase ( $P < 0.05$ ) in mitochondrial heat shock 60 kD protein 1 variant 1. The expression of the other proteins (calpain small subunit 1, tubulin alpha-1C and beta 2, vimentin variant 3, annexin A1, annexin A5, cofilin 1, transgelin, and collagen type VI alpha 2 chain precursor) significantly decreased ( $P < 0.05$ ) compared to the control samples.

**CONCLUSIONS:** A single diode laser irradiation of the synovial samples of patients with osteoarthritis can statistically significantly alter the expression of some proteins *in vitro*. These findings provide some more evidence for biological efficacy of LLLT treatment, used for osteoarthritis. *Lasers Surg. Med.* © 2014 Wiley Periodicals, Inc.