

# Ex vivo soft-laser treatment inhibits the synovial expression of vimentin and [alpha]-enolase, potential autoantigens in rheumatoid arthritis

Jozsef Bakos , Geza Balint , Peter V. Balint , Klara Barabas , Katalin A. Kekesi and Tamas Lakatos

Physical Therapy\_91.5 (May 2011): p665.

## Abstract:

**Background.** Soft-laser therapy has been used to treat rheumatic diseases for decades. The major effects of laser treatment may be dependent not on thermal mechanisms but rather on cellular, photochemical mechanisms. However, the exact cellular and molecular mechanisms of action have not been elucidated.

**Objective.** The aim of this study was to investigate the ex vivo effects of low-level laser treatment (with physical parameters similar to those applied previously) on protein expression in the synovial membrane in rheumatoid arthritis (RA).

Design, Synovial tissues were laser irradiated, and protein expression was analyzed.

**Methods.** Synovial membrane samples obtained from 5 people who had RA and were undergoing knee surgery were irradiated with a near-infrared diode laser at a dose of 25 J/[cm.sup.2] (a dose used in clinical practice). Untreated synovial membrane samples obtained from the same people served as controls. Synovial protein expression was assessed with 2-dimensional polyacrylamide gel electrophoresis followed by mass spectrometry.

**Results.** The expression of 12 proteins after laser irradiation was different from that in untreated controls. Laser treatment resulted in the decreased expression of [alpha]-enolase in 2 samples and of vimentin and precursors of haptoglobin and complement component 3 in 4 samples. The expression of other proteins, including 70-kDa heat shock protein, 96-kDa heat shock protein, lumican, osteoglycin, and ferritin, increased after laser therapy.

**Limitations.** The relatively small sample size was a limitation of the study.

**Conclusions,** Laser irradiation (with physical parameters similar to those used previously) resulted in decreases in both [alpha]-enolase and vimentin expression in the synovial membrane in RA. Both proteins have been considered to be important autoantigens that are readily citrullinated and drive autoimmunity in RA. Other proteins that are expressed differently also may be implicated in the pathogenesis of RA. Our results raise the possibility that low-level laser treatment of joints affected with RA may be effective, at least in part, by suppressing the expression of autoantigens. Further studies are needed.