Abstract

Background: Macrophages play a major role among the inflammatory cells that invade muscle tissue following an injury. Low-level laser therapy (LLLT) has long been used in clinical practice to accelerate the muscle repair process. However, little is known regarding its effect on macrophages. Objective: This study evaluated the effect of LLLT on the mitochondrial activity (MA) of macrophages. Method: J774 macrophages were treated with lipopolysaccharide (LPS) and interferon – gamma (IFN-γ) (activation) for 24 h to simulate an inflammatory process, then irradiated with LLLT using two sets of parameters (780 nm; 70 mW; 3 J/cm² and 660 nm; 15 mW; 7.5 J/cm²). Non-activated/non-irradiated cells composed the control group. MA was evaluated by the cell mitochondrial activity (MTT) assay (after 1, 3 and 5 days) in three independent experiments. The data were analyzed statistically. Results: After 1 day of culture, activated and 780 nm irradiated macrophages showed lower MA than activated macrophages, but activated and 660 nm irradiated macrophages showed MA similar to activated cells. After 3 days, activated and irradiated (660 nm and 780 nm) macrophages showed greater MA than activated macrophages, and after 5 days, the activated and irradiated (660 nm and 780 nm) macrophages showed similar MA to the activated macrophages. Conclusions: These results show that 660 nm and 780 nm LLLT can modulate the cellular activation status of macrophages in inflammation, highlighting the importance of this resource and of the correct determination of its parameters in the repair process of skeletal muscle.

Keywords

macrophages; low-level laser therapy; muscle repair; rehabilitation.