

Therapeutic Application of Light and Electromagnetic Fields to Reduce Hyper-Inflammation Triggered by COVID-19

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Abstract : COVID-19-related morbidity is associated with exaggerated inflammation and cytokine production in the lungs, leading to acute respiratory failure. The cellular mechanisms underlying these so-called 'cytokine storms' are regulated through the Toll-like receptor 4 (TLR4) signaling pathway and by reactive oxygen species (ROS). Both light (photobiomodulation) and magnetic fields (e.g., pulsed electromagnetic field) stimulation are non-invasive therapies known to confer anti-inflammatory effects and regulate ROS signaling pathways. Here we show that daily exposure to two 10-minute intervals of moderate-intensity infra-red light significantly lowered the inflammatory response induced via the TLR4 receptor signaling pathway in human cell cultures. Anti-inflammatory effects were likewise achieved by electromagnetic field exposure of cells to daily 10-minute intervals of either pulsed electromagnetic fields (PEMF) or to low-level static magnetic fields. Because current illumination and electromagnetic field therapies have no known side effects and are already approved for some medical uses, we have here developed protocols for verification in clinical trials of COVID 19 infection. These treatments are affordable, simple to implement, and may help to resolve the acute respiratory distress of COVID 19 patients both in the home and in the hospital.

Keywords : COVID 19, electromagnetic fields therapy, inflammation, photobiomodulation therapy

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