Red Light Therapy / Photobiomodulation **Effects**

Anti-inflammatory - Red/NIR light positively affects inflammation by inhibiting several cellular pathways and expression of enzymes, including COX-1 and COX-2, that are involved in inflammatory conditions.

Athletic performance - RLT is exceptional at improving the overall health of your *mitochondria*, which has massive implications from producing energy to overall health (staving off all diseases and cancers). Your muscles are packed with mitochondria, because muscles are energy-intensive tissues. Thus, by RLT improving the efficiency and effectiveness of your mitochondria, it **improves the overall capacity of your muscular strength, endurance and recovery.**

Anxiety & Depression - A recent review of all existing studies with red/near-infrared light therapy (RLT) on anxiety and depression disorders demonstrates that RLT offers a "promising treatment" for major depressive disorder, anxiety, suicidal ideation, traumatic brain injury and post-traumatic stress disorder. Some of the proposed mechanisms by which RLT can help are by boosting mitochondrial health, improving blood flow to the brain, reducing inflammation and reactive oxygen species, enhancing levels of serotonin and decreasing levels of nitric oxide.

Bone & Joint Health – For bones: Red/NIR light appears to stimulate energy production in cells,increase bone factors, enhance blood vessel formation and blood flow to the affected area, modulates inflammation and enhances production of collagen. The net result = **stronger bones and more collagen**!
For joints: Red/NIR light can help with joint issues (ie, osteoarthritis) by: decreasing pain, modulating inflammation, improving circulation to the joint and stimulation of healing and cellular repair mechanisms in the joint itself. These are all powerful benefits to maintain or improve joint health!

Brain/nerve health - There appears to be neuroprotective effects of laser and light-emitting diodes (LED) in diverse neurological conditions, such as traumatic brain injury (TBI), ischemic stroke, Alzheimer's disease, Parkinson's disease, as well as age-related cognitive decline. Besides these therapeutic effects at the molecular level, there is also considerable evidence of changes occurring at the behavioral level such as cognitive enhancement, antidepressant effects, and improved sleep.

Fat Loss - Stubborn fat is difficult to lose for several reasons: 1.) Poor blood circulation (This makes it difficult for the fat cells to dump their fats into the bloodstream for energy.); 2.) Becomes hyper-sensitive to insulin (Once muscle cells become desensitized to insulin, the body shuttles the calories you eat to your fat cells, where there is unlimited storage.); 3.) Receptors in fat cells cause them to become resistant to releasing fat. Numerous studies demonstrate that RLT positively affects both blood circulation and stimulating the release of fatty acids from fat tissue. This means that fat will actually come off your body!

Hair Health - Red and near-infrared light apparently promotes the transition of hair follicles from the *telogen phase* back to the *anagen phase*, which facilitates increased duration in the growth phase and, thus, hair growth! Not only that, but RLT can also increase the growth rate in the anlagen phase while disallowing premature catagen phases, leading to a healthier head of hair. Other mechanisms by which RLT may help hair health includes improving particular growth factors, modulation of inflammation, improved health and efficiency of mitochondrial functioning and/or positive effects on nitric oxide levels and blood flow to the area.

Immune System - There are two potential mechanisms in which red light therapy (RLT) may reverse or prevent shrinking of the thymus: (1.) by inducing melatonin production & (2.) stimulation of bone marrow stem cells that can replenish the thymus. This theory puts forward a compelling hypothesis that RLT can alter thymic shrinking, improve immune functioning in the aging population and even extend lifespan.

Pain - Studies have revealed that **RLT can produce anti-inflammatory effects that are comparable to non-steroidal anti-inflammatory drugs** (NSAIDS), but without the negative side effects of degrading your stomach lining and small intestines. And just like RLT helps improve fat loss by improving circulation to the fat cells lacking blood flow, RLT improves micro-circulation at the site of pain, improving nourishment to the nerves and muscles. End result = less pain. Red/NIR light has been shown to be beneficial for, but not limited to, the following conditions: *low back pain, knee pain, neck pain, plantar fasciitis, tennis elbow, fibromyalgia, osteoarthritis, chronic tooth pain, sacroiliac joint pain, tendinitis/myofascial pain and chronic joint disorders.*

Skin Health - Red light stimulates both collagen and elastin production, repairs damage from UV rays and also promotes healing of wounds. This is accomplished by stimulating collagen synthesis and fibroblast formation, reducing inflammation, improving the efficiency of energy production of the mitochondria and facilitating DNA repair.

Sleep - Studies show that red/NIR light therapy (RLT) has a positive impact on the hormone produced by your pineal gland in the brain that promotes sleep, *melatonin*. Not only can this assist individuals that are experiencing poor quality of sleep (ie, trouble falling asleep, fragmented sleep, etc.), but RLT can also dramatically benefit quality and quantity of sleep in insomniacs.

Thyroid - Scientific research has demonstrated powerful results of RLT for autoimmune hypothyroidism. Currently, RLT is one of the only treatments that has the capability to potentially reverse, or at least mitigate progression of, autoimmune hypothyroidism.