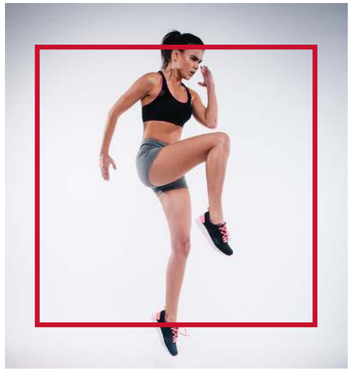
TOTAL BODY & MIND TRANSFORMATION

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

HYPERTHERMIC CONDITIONING

Exposure to **heat stress** delivers **similar health benefits as exercise** does:

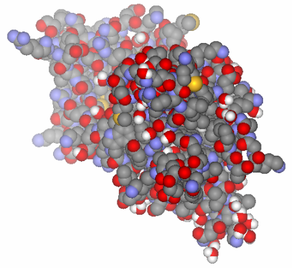


EFFECTS ON THE THE BODY

- INCREASED **CORE BODY TEMP.**
- INCREASED **METABOLISM**
- INCREASED **HEART RATE**
- INCREASED **PERSPIRATION**
- ACTIVATION OF **HSPs (HEAT SHOCK PROTEINS)**
- **GROWTH HORMONES**

HYPERTHERMIC CONDITIONING

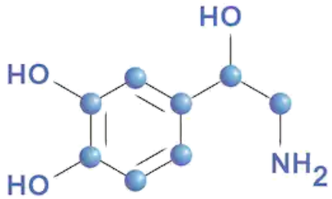
EFFECTS ON THE THE BRAIN



Increase the Expression of BDNF

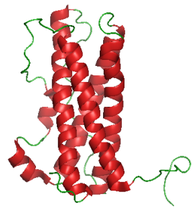
(Brain Derived Neurotrophic Factor)

Important growth factor for growing new neurons.
BDNF plays important roles in memory, learning, mood disorders, food intake and energy metabolism



Increase NOREPINEPHRINE

Improves attention and focus



Increase PROLACTIN

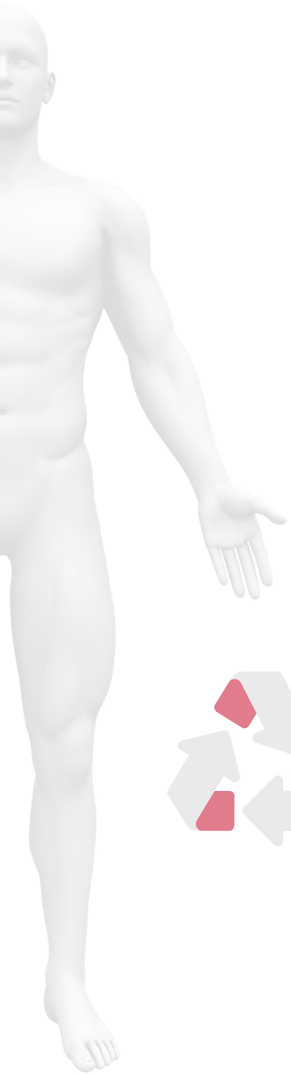
Causes your brain to function faster

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

HYPERTHERMIC CONDITIONING CAN INCREASE YOUR CORE BODY TEMPERATURE BY UP TO **4 DEGREES F / 2.5 C.***

* LANDSBERG L, YOUNG JB, LEONARD WR, LINSENMEIER RA, TUREK FW. DO THE OBESE HAVE LOWER BODY TEMPERATURES? A NEW LOOK AT A FORGOTTEN VARIABLE IN ENERGY BALANCE. TRANSACTIONS OF THE AMERICAN CLINICAL AND CLIMATOLOGICAL ASSOCIATION. 2009;120:287-295.

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE



Hyperthermic Conditioning **Increases Metabolism by 10% - 13% for Each Degree** the Core Body **Temperature Increases**

INCREASE IN BODY TEMPERATURE IS ASSOCIATED WITH A HIGHER METABOLIC RATE, AND **SPEEDS UP METABOLIC RATE***.

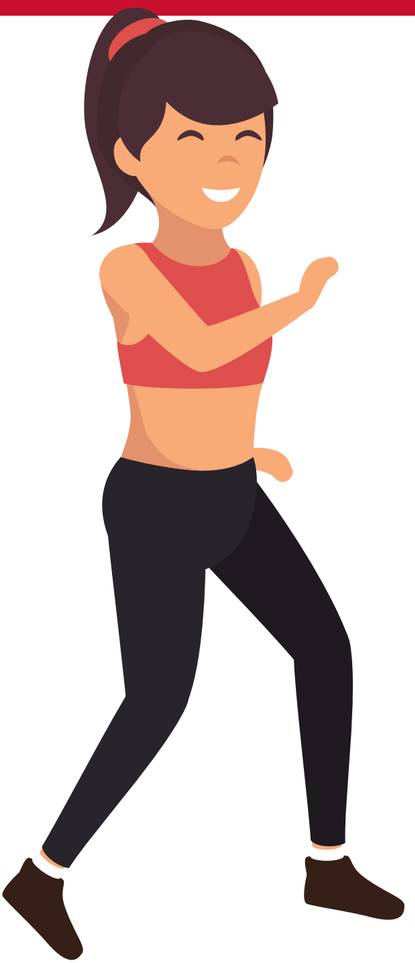
* Landsberg L, Young JB, Leonard WR, Linsenmeier RA, Turek FW. Do the Obese Have Lower Body Temperatures? A New Look at a Forgotten Variable in Energy Balance. Transactions of the American Clinical and Climatological Association. 2009;120:287-295.

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

HYPERTHERMIC CONDITIONING SESSIONS PROVIDE **CALORIC BURN AND ENERGY EXPENDITURE EQUIVALENT TO A 30 MINUTE WALK*.**

* Faulkner, S.H., Jackson, S., Fatania, G., Leicht, C.A., The effect of passive heating on heat shock protein 70 and interleukin-6: A possible treatment tool for metabolic diseases?

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE



A **SAUNA SESSION IS A PHYSICAL STRAIN & JUST AS EXHAUSTING AS MODERATE EXERCISE**... ITS LONG-TERM POSITIVE EFFECTS ARE **SIMILAR TO SPORTS ACTIVITIES**

* **The blood pressure and heart rate during sauna bath correspond to cardiac responses during submaximal dynamic exercise.** S.Ketelhut, R. G.Ketelhut. Complementary Therapies in MedicineVolume 44, June 2019

HYPERTHERMIC CONDITIONING IMPROVES DETOX PATHWAYS

SWEAT EXCRETION is, in some case vastly **SUPERIOR** route of excretion for certain **HEAVY METALS** than urine

- **ALUMINUM** IS EXCRETED **5-TIMES** HIGHER IN SWEAT THAN URINE.
- **CADMIUM** IS EXCRETED **10.6-TIMES** HIGHER IN SWEAT THAN URINE.
- **LEAD** IS EXCRETED **14-TIMES** HIGHER IN SWEAT THAN URINE.

* **Blood, urine, and sweat (BUS) study:** monitoring and elimination of bioaccumulated toxic elements. Genuis SJ1, Birkholz D, Rodushkin I, Beesoon S.Arch Environ Contam Toxicol. 2011 Aug;61(2):344-57. doi: 10.1007/s00244-010-9611-5. Epub 2010 Nov 6.

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

REDUCE RISK OF DIABETES

HSP's Reduce Blood Sugar Level and
Increase Insulin Sensitivity by **30%**

* Kokura, S. et al. International Journal of Hyperthermia; Int J Hyperthermia. 2007 May;23(3):259-65.

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

Cardiovascular Improvements

HC INCREASES **FAVORABLE BLOOD CIRCULATION** PROFILES AND **VASCULAR ADAPTATIONS** SIMILAR TO TREADMILL RUNNING.*

* Kate N Thomas, André M van Rij, Samuel J E Lucas, and James D Cotter, Lower-limb hot-water immersion acutely induces beneficial hemodynamic and cardiovascular responses in peripheral arterial disease and healthy, elderly controls, Am J Physiol Regul Integr Comp Physiol 2017 Mar 21;312(3):R281-R291. Epub 2016 Dec 21.

HYPERTHERMIC CONDITIONING

Regular Hyperthermic Conditioning **Reduces Risk of Cardiovascular Disease** (40%) & **Stroke** (50%)

*Laukkanen T, Khan H, Zaccardi F, Laukkanen JA. Association Between Sauna Bathing and Fatal Cardiovascular and All-Cause Mortality Events. JAMA Intern Med. 2015;175(4):542–548. doi:10.1001/jamainternmed.2014

BENEFITS OF HEAT EXPOSURE

HYPERTHERMIC CONDITIONING

Sauna use reduces

the risk of all-cause mortality

2-3x a week =**27% reduced risk**

4-7x a week = **40% reduced risk**

*Laukkanen T, Khan H, Zaccardi F, Laukkanen JA. Association Between Sauna Bathing and Fatal Cardiovascular and All-Cause Mortality Events. JAMA Intern Med. 2015;175(4):542–548. doi:10.1001/jamainternmed.2014

BENEFITS OF HEAT EXPOSURE

HYPERTHERMIC CONDITIONING

SAUNA SESSIONS 4-7 TIMES A WEEK,

LOWERED THE RISK OF DEMENTIA BY 66%

...AND LOWERED

THE RISK OF ALZHEIMER'S DISEASE BY 65%

* Laukkanen, T., Kunutsor, S., Kauhanen, J., Laukkanen, J.A., Sauna bathing is inversely associated with dementia and Alzheimer's disease in middle-aged Finnish men Age Ageing first published online December 7, 2016

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

ELEVATE CORE BODY TEMP: EXTEND YOUR LIFESPAN

UP TO 30%

The genetics of ageing. Cynthia J. Kenyon. Nature , volume 464, .pages 504–512 (25 March 2010)

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

FOXO3 GENE INCREASES YOUR CHANCES TO LIVE TO BE 100 YEARS OLD BY

270%

FOXO3A genotype is strongly associated with human longevity. Bradley J. Willcox. Proc Natl Acad Sci U S A. 2008 Sep 16; 105(37

HYPERTHERMIC CONDITIONING PROMOTES BDNF & THERMOGENESIS

BDNF STIMULATION REDUCES OBESITY & DECREASES APPETITE

Lack of BDNF cause significant problems, including dramatically increase appetite (HYPERPHAGIA) and severe obesity

Cell Metab. 2015 Jul 7;22(1):175-88. doi: 10.1016/j.cmet.2015.05.008. Epub 2015 Jun 11.
Discrete BDNF Neurons in the Paraventricular Hypothalamus Control Feeding and Energy Expenditure.

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

INCREASE FITNESS ENDURANCE UP TO 32%

J Sci Med Sport. 2007 Aug;10(4):259-62. Epub 2006 Jul 31.
Scoon GS, Effect of post-exercise sauna bathing on the endurance performance of competitive male runners.

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

EXERCISE TRAINING IN 104-DEGREE HEAT BOOSTED CYCLISTS' **VO2 MAX BY 5%**

...AND IMPROVED ONE-HOUR TIME-TRIAL PERFORMANCE BY **6%**

Heat acclimation improves exercise performance. Santiago Lorenzo, John R. Halliwill, Michael N. Sawka, and Christopher T. Minson. J Appl Physiol (1985). 2010 Oct; 109(4): 1140–1147. Published online 2010 Aug 19. doi: 10.1152/japplphysiol.00495.2010

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

HC causes **17 percent boost in muscle strength**.

GREAT FOR RECOVERY FROM SURGERY OR TO MAINTAIN MUSCLES WITHOUT EXERCISE.

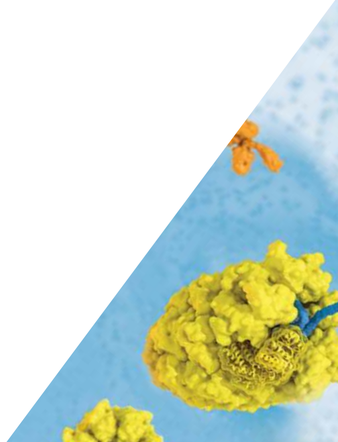
Passive heat acclimation improves skeletal muscle contractility in humans. Am J Physiol Regul Integr Comp Physiol. 2017 Jan 1; Racinais S, Wilson MG, Périard JD.

Heat Shock Proteins (HSPs)

- **Heat shock proteins are increased under stressful conditions.** **Heat stress is the most robust method of increasing their production**...*Exercise and fasting also increases HSP production.*

- Sitting in a **163 °F sauna for 30 minutes** **increases HSP levels by 50%** – these **levels stay elevated for 48 hrs.**

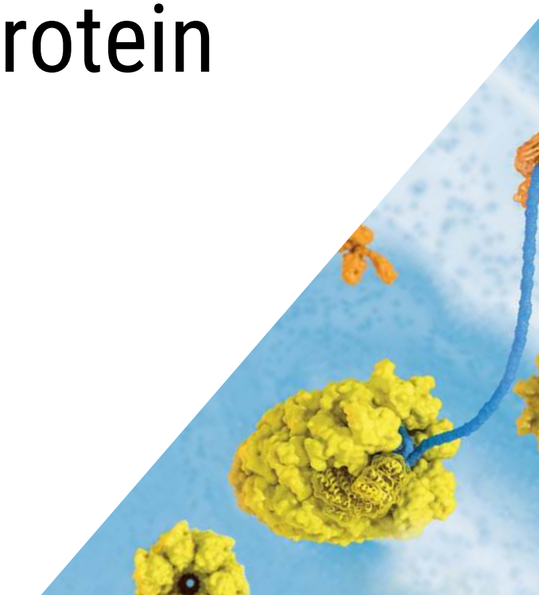
- **People who use the sauna more frequently tend to get an even better HSP response**



Heat stress and cardiovascular, hormonal, and heat shock proteins in humans, Iguchi M1, Littmann AE, Chang SH, Wester LA, Knipper JS, Shields RK., J Athl Train. 2012 Mar-Apr;47(2):184-90.

What do Heat Shock Proteins do?

- Responsible for maintaining the proper **3-dimensional structure of cellular proteins –**
- When a protein's 3-dimensional structure is altered, it tends to sit around much longer than it's supposed to (instead of being degraded) – this allows it to start forming protein aggregates with other proteins.
- **Protein aggregation** plays a causal role in many **neurodegenerative diseases**



INFLAMMATION

Inflammation plays a major role in the aging process and the **development of many age-related diseases (cancer, heart disease, Alzheimer's disease, etc.)**

Laukkanen, Jari A., and Tanjaniina Laukkanen. **Sauna bathing and systemic inflammation** European Journal of Epidemiology 33, no. 3 (December 2017): 351–53. doi:10.1007/s10654-017-0335-y.

INFLAMMATION

HYPERTHERMIC CONDITIONING lowers BLOOD LEVELS OF C-REACTIVE protein in a dose-dependent manner and increases anti-inflammatory biomarkers.

C-reactive protein is a leading blood marker of systemic inflammation and one of several blood proteins often referred to as acute phase reactants, participates in the body's inflammatory cascade.

Laukkanen, Jari A., and Tanjaniina Laukkanen. **Sauna bathing and systemic inflammation** European Journal of Epidemiology 33, no. 3 (December 2017): 351–53. doi:10.1007/s10654-017-0335-y.

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

HC attenuates **Skeletal Muscle Atrophy**

BY 37%

...also **improved Mitochondrial Biogenesis** and **increased Mitochondrial Function by 28%**

Daily heat treatment maintains mitochondrial function and attenuates atrophy in human skeletal muscle subjected to immobilization

Paul Samuel Hafen_02 MAY 2019 https://doi.org/10.1152/japplphysiol.01098.2018

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

HSPs' INCREASE MUSCLE RE-GROWTH

OVER 30%

Sesby, J T. et al. **intermittent hyperthermia enhances skeletal muscle regrowth and attenuate oxidative damage following reloading**. J Appl Physiol (1985). 2007 Apr;102(4):1702-7. Epub 2006 Nov 16.

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

INCREASE DELIVERY OF NUTRIENTS & PERFORMANCE OF MUSCLE GLYCOGEN BY UP TO 50%

Glycogen reserves provide energy to power the muscles

J Appl Physiol (1985). 1985 Nov;59(5):1350-4.Muscle metabolism during exercise in the heat in unacclimatized and acclimatized humans. King DS

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

HEAT INCREASES FLEXIBILITY

BY 205%

Heat acclimation improves exercise performance. Santiago Lorenzo, John R. Halliwill, Michael N. Sawka, and Christopher T. Minson. J Appl Physiol (1985). 2010 Oct; 109(4): 1140–1147. Published online 2010 Aug 19. doi: 10.1152/japplphysiol.00495.2010

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

INCREASE GROWTH HORMONE

UP TO 1600%

Sesby, J T. et al. intermittent hyperthermia enhances skeletal muscle regrowth and attenuate oxidative damage following reloading. J Appl Physiol (1985). 2007 Apr;102(4):1702-7. Epub 2006 Nov 16.

HYPERTHERMIC CONDITIONING PROMOTES BDNF & THERMOGENESIS

INCREASE BDNF TO PROTECT AGAINST NEURODEGENERATIVE DISEASES*

*such as **Alzheimer's, Parkinsons, Huntington, Dementia.** Help prevent protein aggregation & boost repair of damaged proteins

J Cell Commun Signal. 2014 Dec;8(4):293-310. **Heat shock proteins in neurodegenerative disorders and aging.** Leak RK.

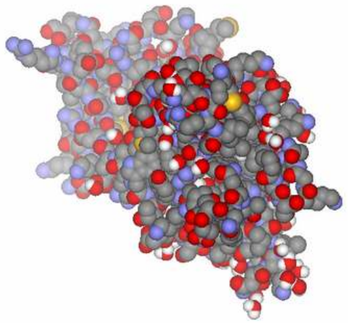
HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

INCREASE GROWTH OF NEW BRAIN CELLS

INCREASE SYNTHESIS OF BDNF BY OVER 300%

Goekint M. Influence of citalopram and environmental temperature on exercise-induced changes in BDNF. Neuroscience Letters [06 Mar 2011, 494(2):150-154]

HYPERTHERMIC CONDITIONING PROMOTES BDNF



EXERCISE AT HIGH ROOM TEMPERATURE INCREASES & RESULTS IN HIGHER BDNF LEVELS THAN AT LOW ROOM TEMP.

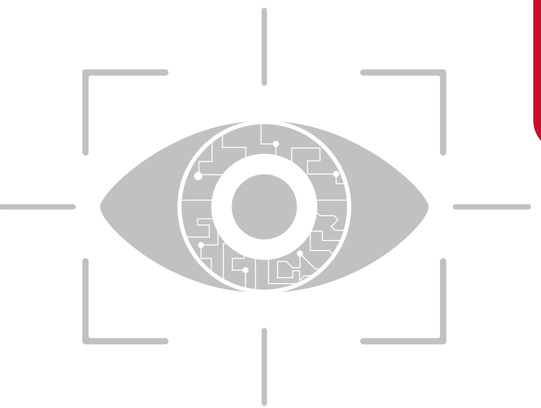
Goekint M, Roelands B, Heyman E, et al. (2011). **Influence of citalopram and environmental temperature on exercise-inducedchanges in BDNF**. Neurosci Lett 494:150–4

HYPERTHERMIC CONDITIONING IS EQUIVALENT TO TRADITIONAL EXERCISE

HELP BRAIN FUNCTION FASTER, INCREASE FOCUS & ATTENTION

INCREASE NOREPINEPHRINE BY 310%

INCREASE PROLACTIN BY AS MUCH AS 1000%



Eur J Appl Physiol Occup Physiol. 1989;58(5):543-50. Haemodynamic and hormonal responses to heat exposure in a Finnish sauna bath. Kukkonen-Harjula K

BENEFITS OF HEAT EXPOSURE

HYPERTHERMIC CONDITIONING

REGULAR HC **REDUCED RISK OF HYPERTENSION, IMPROVED BLOOD PRESSURE AND DECREASED CARDIOVASCULAR RISK**

*Francesco Zaccardi, Tanjaniina Laukkanen, Peter Willeit, Setor K Kunutsor,Jussi Kauhanen, Jari A Laukkanen , **Sauna Bathing and Incident Hypertension: A Prospective Cohort Study**, American Journal of Hypertension, Volume 30, Issue 11, 1 November 2017, Pages 1120–1125.

BENEFITS OF HEAT EXPOSURE

HYPERTHERMIC CONDITIONING

INCREASE **BETA-ENDORPHINS TO HELP DRUG ADDICTION** & PSYCHOLOGICAL DEPENDENCE

INDUCE DYNORPHIN, BETA ENDORPHIN INTERACTION AND A NATURAL MU OPIOID REWARD STATE

J Neurochem. 2003 Jun;85(5):1171-9. Heterologous mu-opioid receptor adaptation by repeated stimulation of kappa-opioid receptor: up-regulation of G protein activation and antinociception. Narita M

Benefits of Non-Thermal Light therapy—or PBM (Photobiomodulation)

The FIVE **BIO-ACTIVE** TYPES OF LIGHT

1

UV LIGHT
What allows us to synthesize vitamin D from the sun.

2

BLUE LIGHT
Sets the circadian rhythm in our brain, which in turn regulates numerous different neurotransmitters and hormones.

3

RED LIGHT
Acts on the mitochondria in our cells to stimulate increased cellular energy (ATP) production.

4

NEAR-INFRARED
Acts on the mitochondria in our cells to stimulate increased cellular energy (ATP) production.

5

FAR-INFRARED
Acts to heat up our cells (this is the part of the sun's spectrum that you feel as heat) which stimulates changes in cell function, as well as circulation changes.

Light therapy—or PBM (Photobiomodulation) physiological benefits

Wavelengths **620-670 nm and 830-850 nm**—have been shown to provide a wide range of cellular benefits:

IMPROVED SKIN HEALTH

ENHANCED MUSCLE RECOVERY

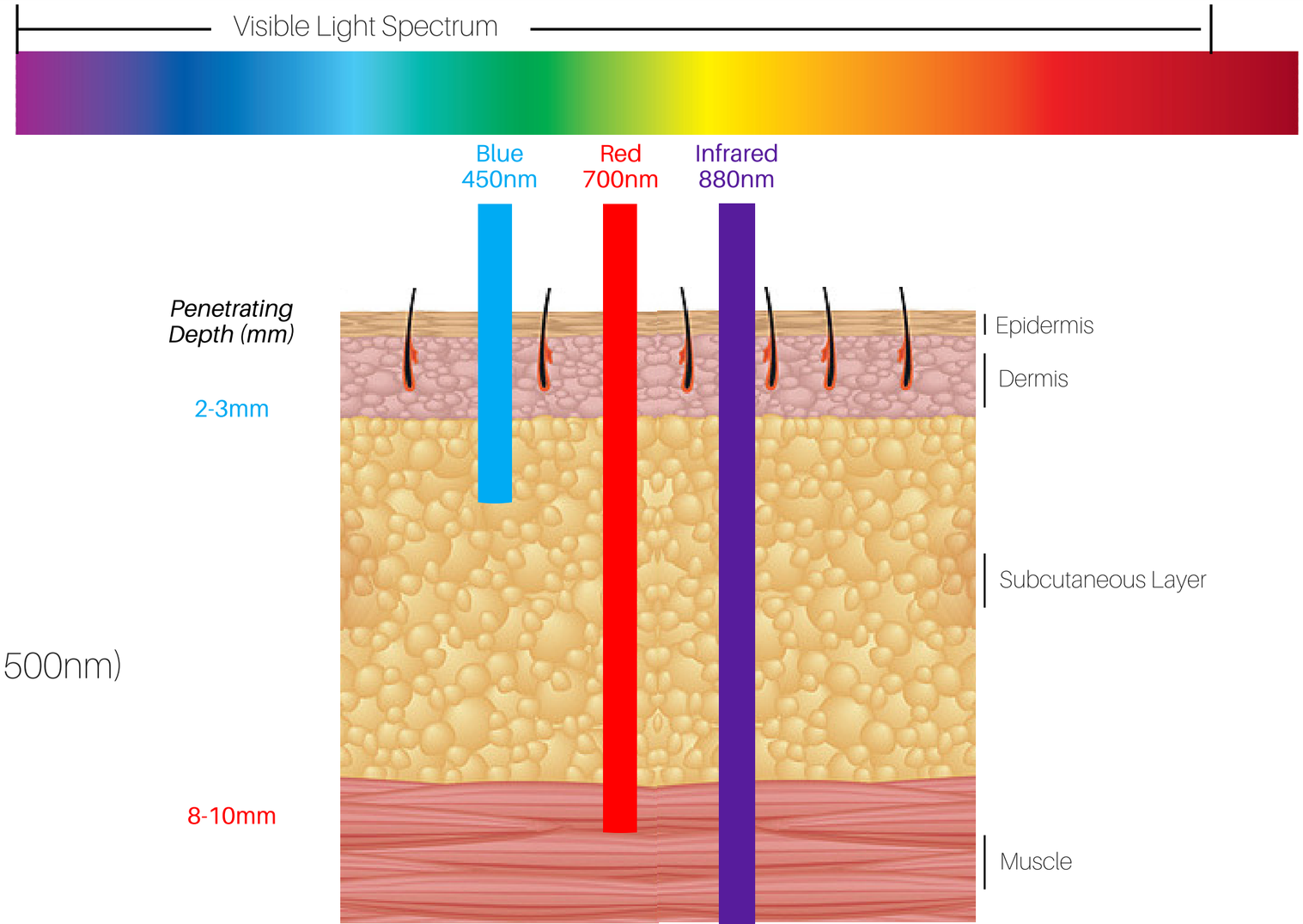
REDUCED JOINT PAIN

WEIGHT LOSS

DEPTH OF PENETRATION & ABSORPTION OF LIGHT ENERGY PHOTONS IN HUMAN TISSUE:

-Visible Color Light Photons
(Non-thermal, 400nm-72-nm)

-Invisible Near-Infrared
(Nearly Non-thermal, 730nm-1500nm)



PHOTOBIOMODULATION

Photobiomodulation is defined as the utilization **electromagnetic energy to trigger photochemical changes** within cellular structures that are receptive to photons.

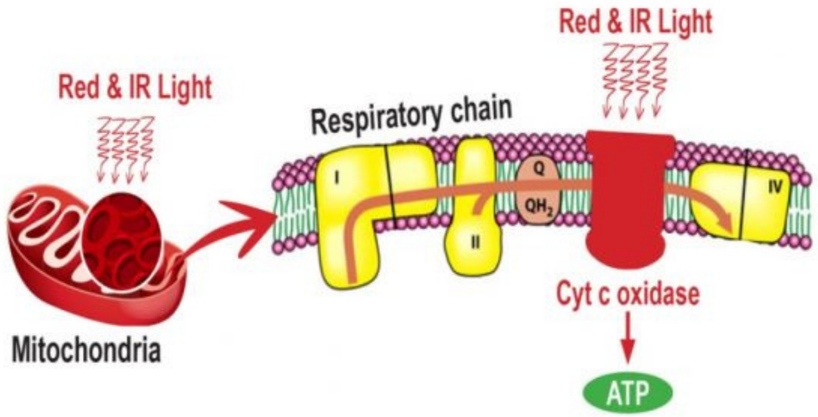
Mitochondria is particularly receptive to this process. At the cellular level, **visible red and near infrared light (NIR) energy are absorbed by mitochondria**, which perform the function of producing **cellular energy called “ATP”**. The key to this entire process is a **mitochondrial enzyme called cytochrome oxidase c**, a chromophore, which accepts photonic energy of specific wavelengths when functioning below par.

MITOCHONDRIA:
the “engine” of the cell.

Specific wavelengths of light have some amazing effects on the **mitochondria** in our cells, which are sometimes called **the “engine” of the cell.**

All living things need to make **ADENOSINE TRIPHOSPHATE, or ATP for cellular energy**

STIMULATING MITOCHONDRIAL ENERGY PRODUCTION



The **mitochondria are the batteries** that fuel all the processes of our organs.

When it comes to red/NIR, the photoacceptor **cytochrome c oxidase** in our mitochondria is of particular importance.

Cytochrome c oxidase is part of the respiratory chain in our mitochondria that is responsible for producing **ATP** (cellular energy).

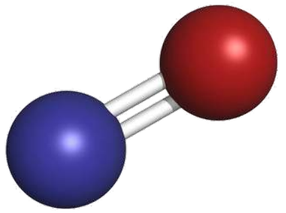
In addition, the process creates mild oxidants **(ROS-*Reactive Oxygen Series*)**, which leads to gene transcription and then to cellular repair and healing.

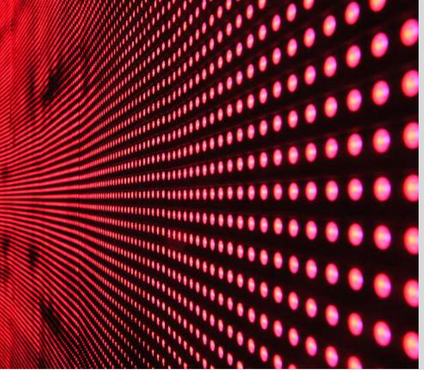
When red and near-infrared light photons hit the photoacceptor **cytochrome c oxidase,** it **helps the mitochondria use oxygen more efficiently to produce ATP.**

PBM RELEASES NITRIC OXIDE

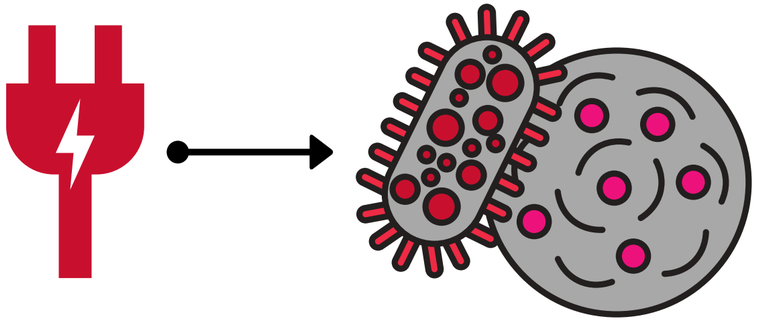
Photobiomodulation **reverses the whole degenerative process by:**

1) Releasing the **nitric oxide** (molecule that our body produces to help its **50 trillion cells communicate with each other**).
2) Giving the cell the exact wavelengths of light which the **cell converts to ATP**, and
3) Stopping the process of creating **free radicals.**

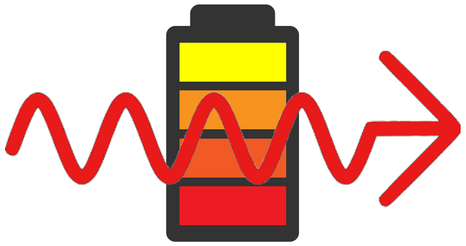


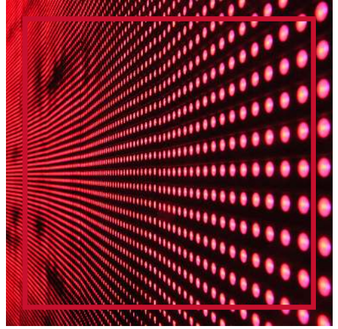


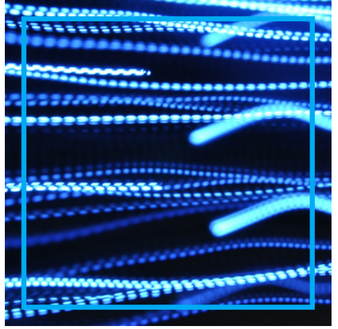
RED LIGHT WAVELENGTHS BOOST CELLULAR FUNCTION & ENERGY



A simple way to think of this process is that the **photons** in these wavelengths essentially **charge your “cellular batteries.”**

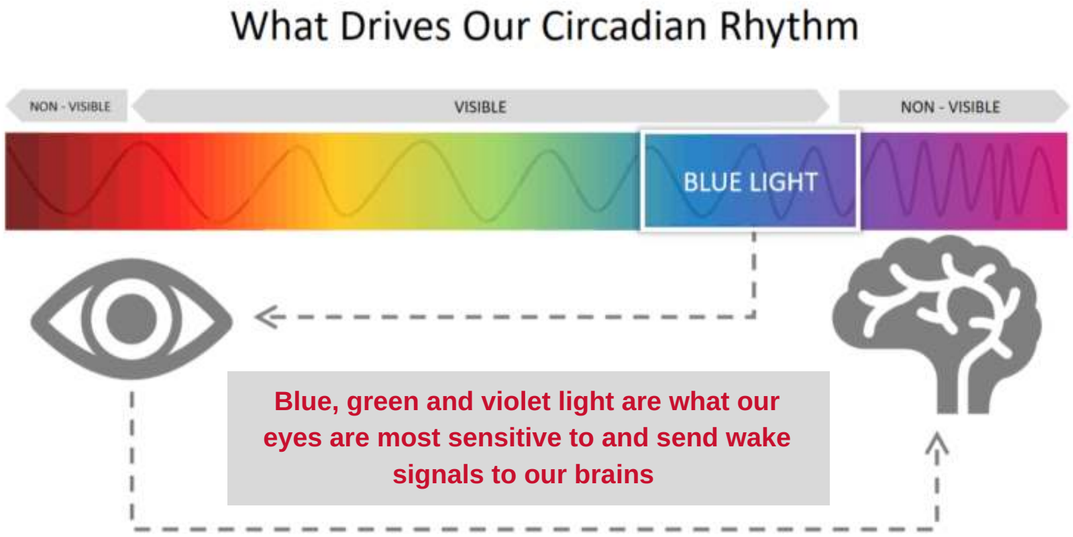






RED LIGHT MODULATES AND BALANCES THE **HARMFUL EFFECTS OF BLUE LIGHT.**

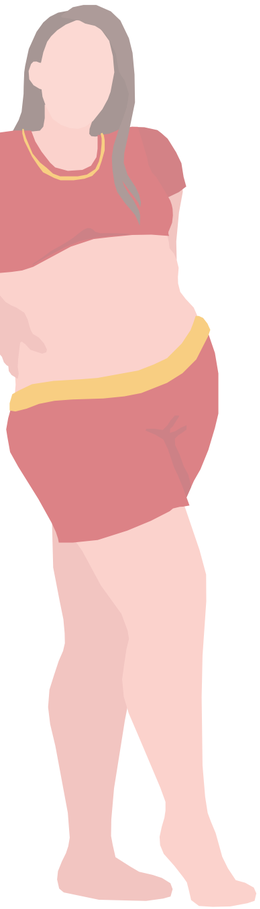
“Monitor screen time” (TVs, computers, cell phones, tablets, etc.) is primarily blue light (410-420nm).



Blue light disrupts and reduces our melatonin neurotransmitters causing circadian problems/sleep problems and increase of chronic health problems.

BENEFITS OF LIGHT THERAPY

RED LIGHT (PBM) RESEARCH



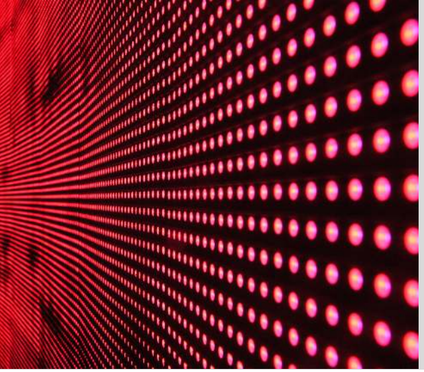
EXPOSURE TO RED LIGHT THERAPY 1 TIME PER WEEK FOR SIX WEEKS PRODUCED A

5.4 INCH REDUCTION OF BODY FAT

...AND 2 WEEKS AFTER STOPPING THE RED LIGHT TREATMENTS, PARTICIPANTS **LOST ON AVERAGE ANOTHER 0.8 INCHES**

A Six-week Low-level Laser Therapy Protocol is Effective for Reducing Waist, Hip, Thigh, and Upper Abdomen Circumference.

J Clin Aesthet Dermatol. 2016 Jun; 9(6): 31–35.Published online 2016 Jun 1.



RED LIGHT RECAP

- Our **CELLS** are receptive to **LIGHT**
- When it comes to the **Mitonchondria**, which actually produces the **energy** and ultimately burns fat within our body, it has a specific enzyme which reacts to that light: **CYTOCHROME C OXIDASE**
- When **CYTOCHROME C OXIDASE** gets hit by a **specific wavelength of RED LIGHT** , it triggers all kinds of different processes generally resulting in a massive **increase of ATP (Energy)**, massive **reduction in Reactive Oxygen Species** (Free Radicals) and increases in **Nitric Oxyde which increases blood flow, more nutrients delivery.**