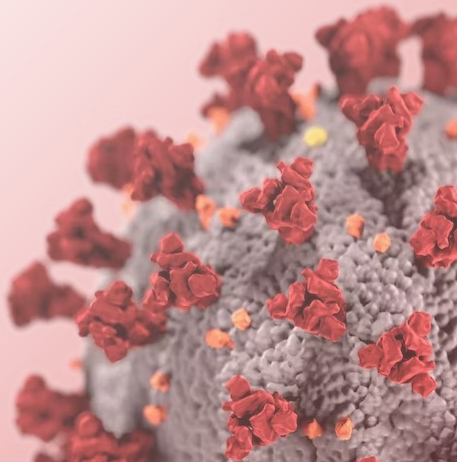
FLCCC ALLIANCE EDUCATIONAL CONFERENCE

EMERGING APPROACHES TO TREATING SPIKE PROTEIN-INDUCED DISEASES

April 28-29, 2023 • Fort Worth, Texas

Sunlight, Photobiomodulation, and Sauna

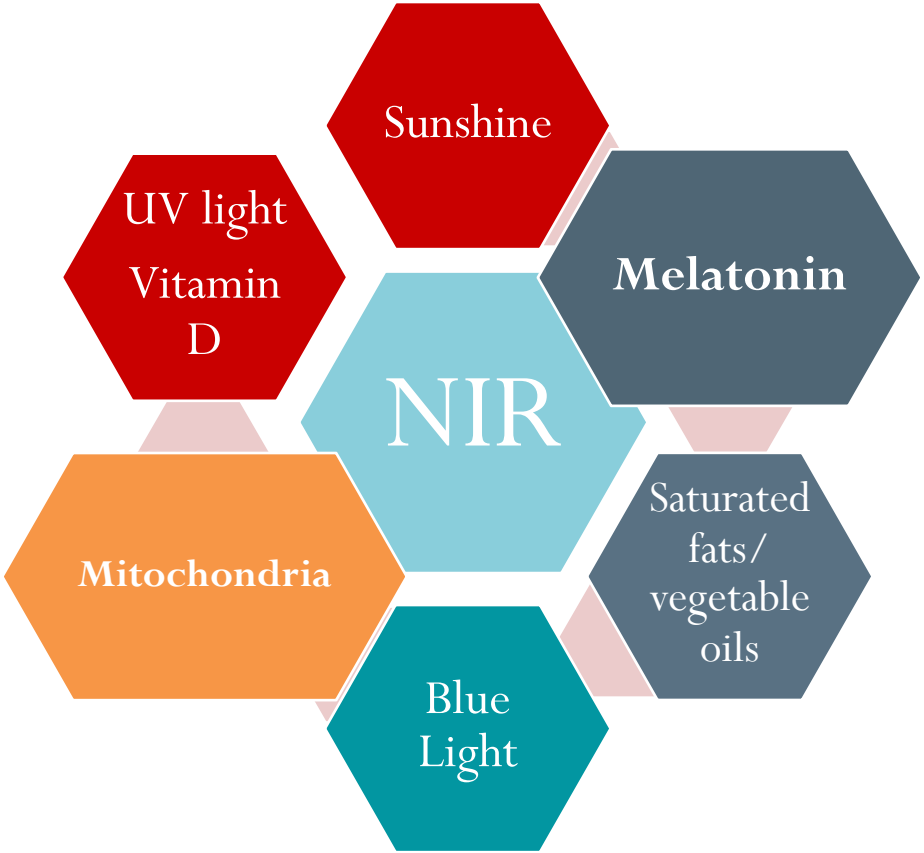


Presented By:

Paul Marik, MD

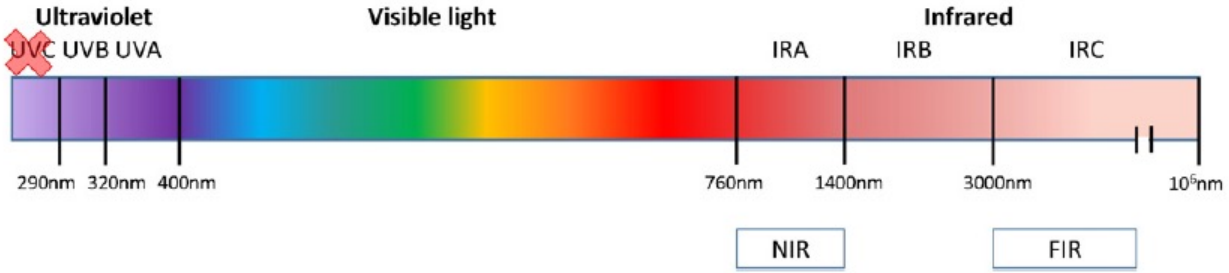
CONFLICT OF INTEREST

Overview: It's Complicated



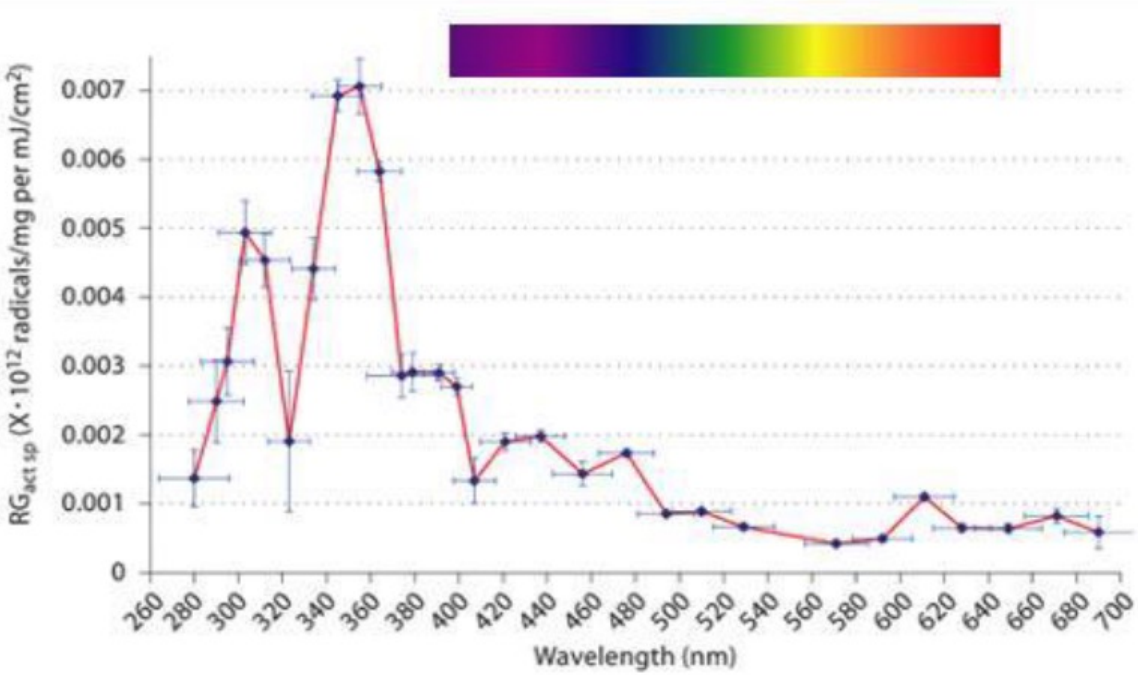
FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

Solar Spectrum



FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

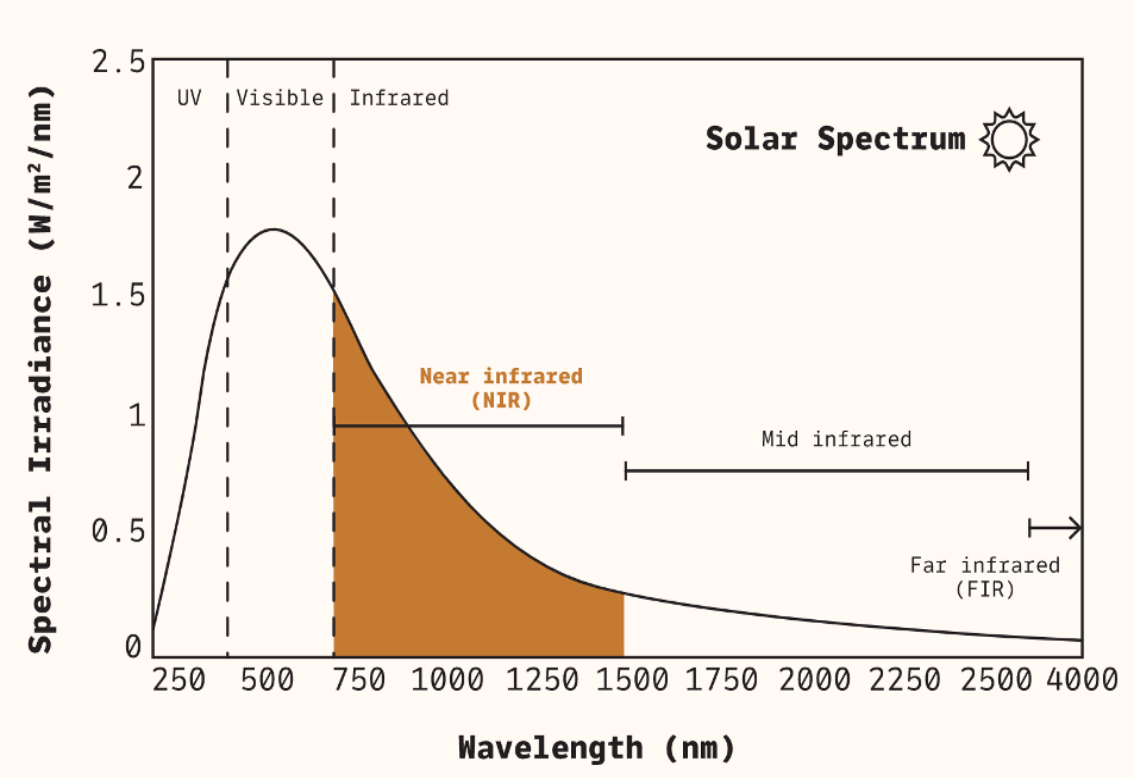
Free Radical Generation Rate As a Function of Wavelength



UVB UVA

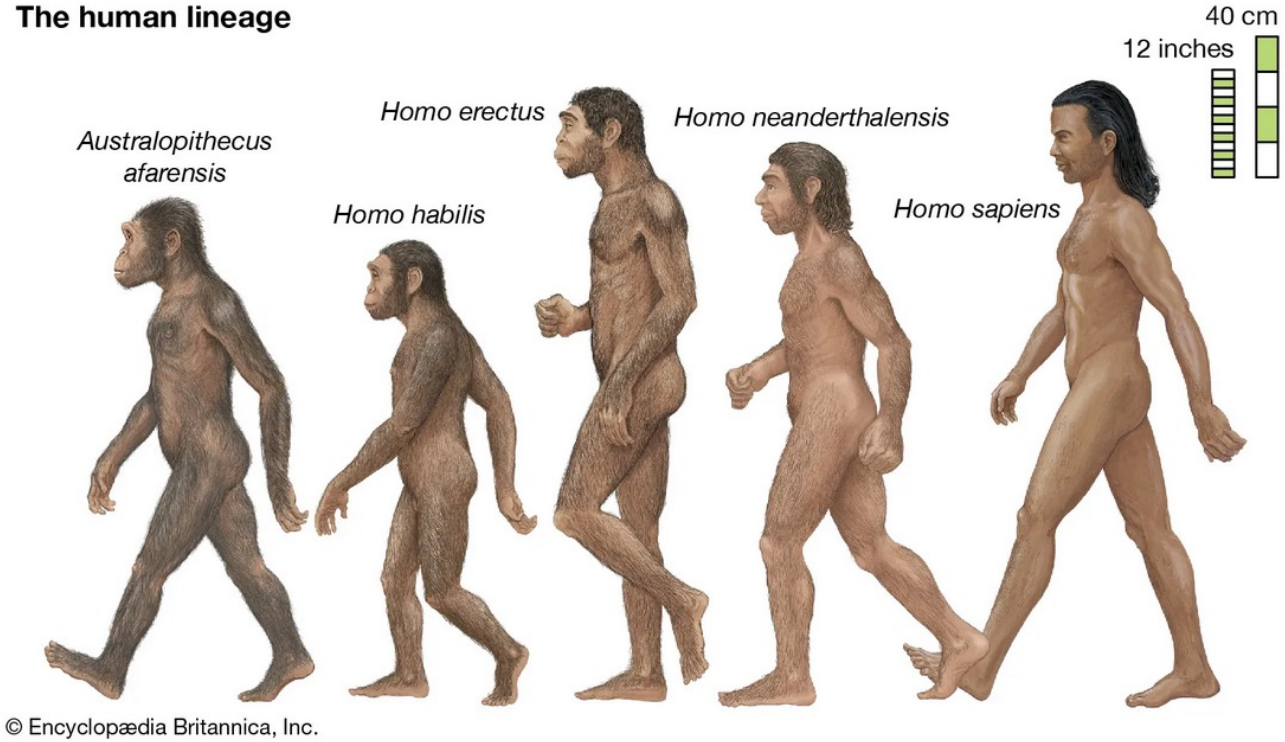
FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Solar spectrum



FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

Human Evolution over Millions of Years



FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

Characteristics of Paleolithic-Neolithic Man

- Usually, one meal a day
- Carnivorous diet - SATURATED FAT
- Exposure to sunlight and fires: Infrared Light (switches on mitochondrial melatonin production)
- Daytime exposure to the blue sky (switches off Pineal Gland Melatonin production)

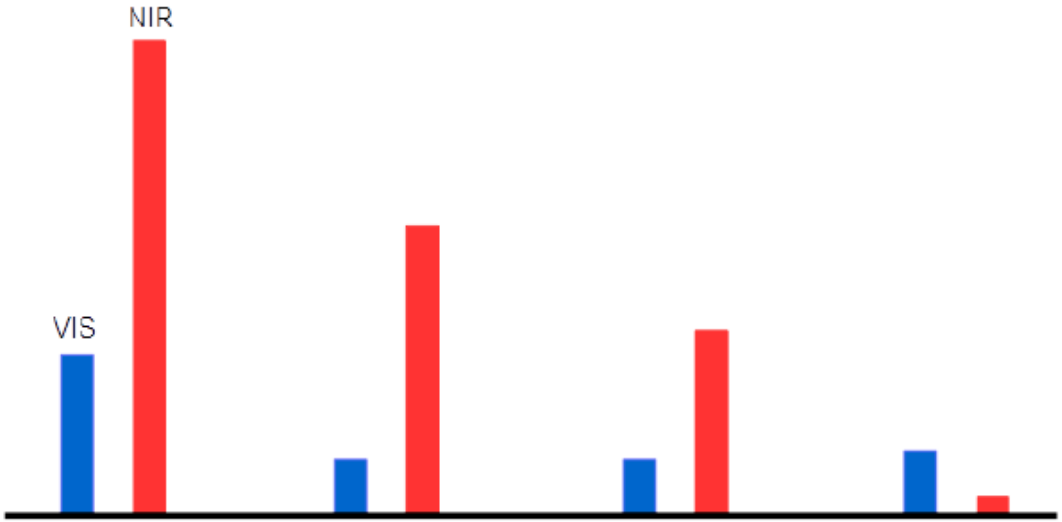
FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Characteristics of Paleolithic-Neolithic Man

Neanderthal family cooking animal meat over bonfire

FLCCC ALLIANCE EDUCATIONAL CONFERENCE

NIR Human Exposure Is Decreasing Over The Last Century



FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

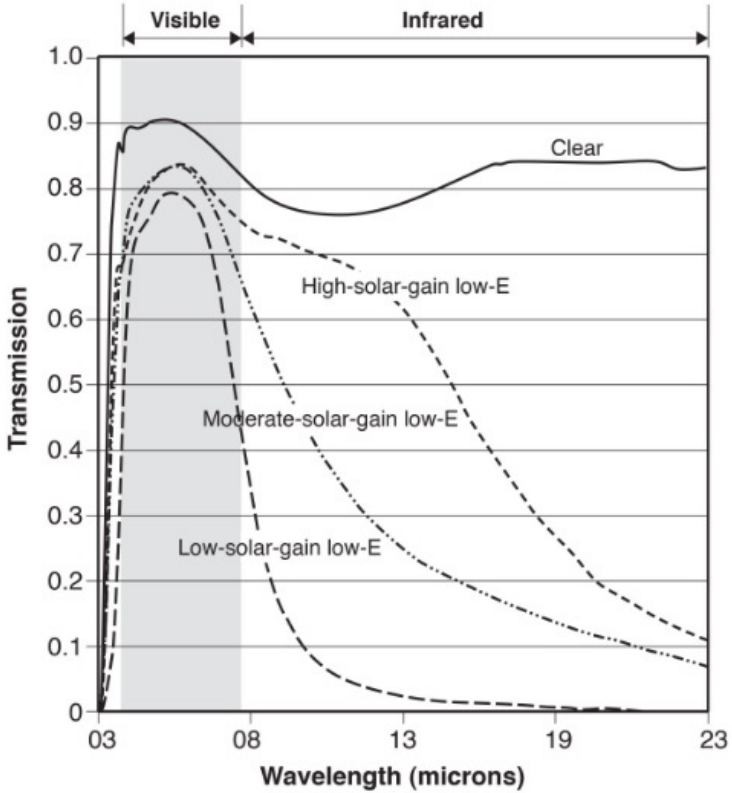
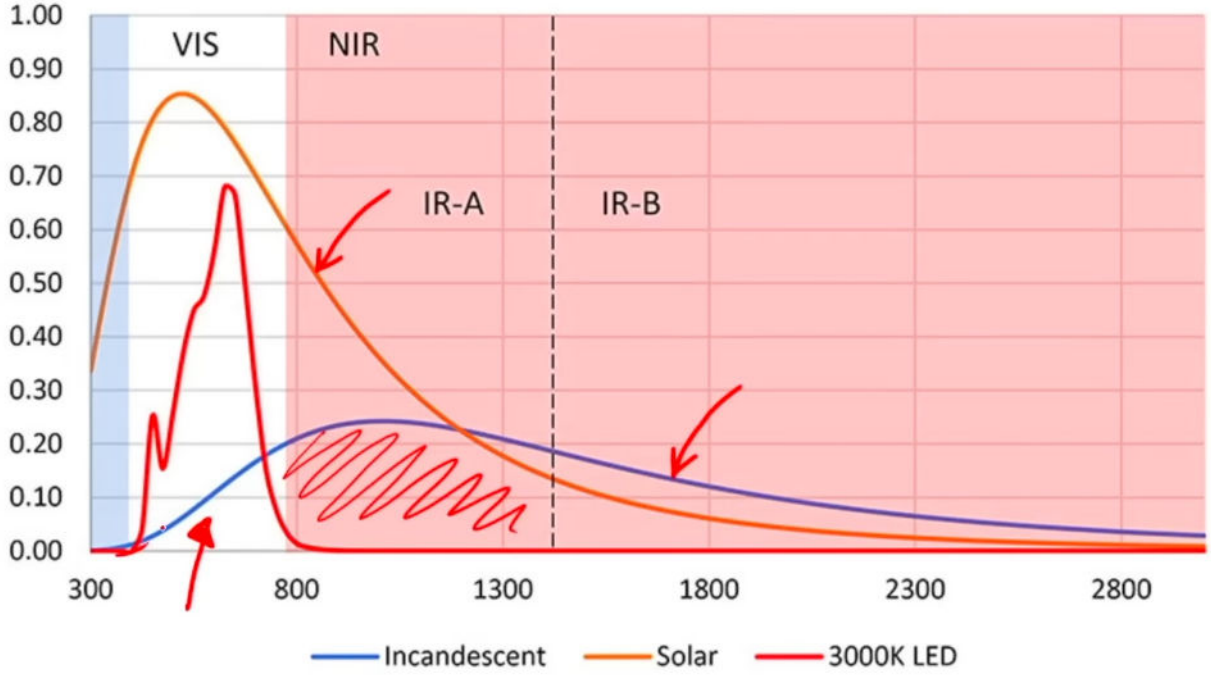


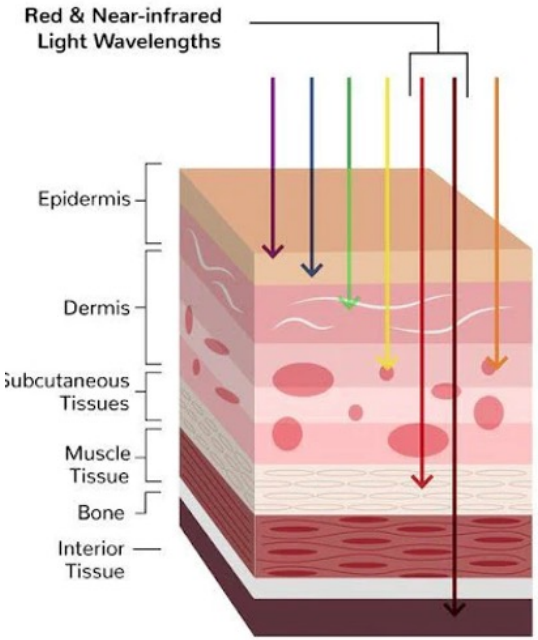
Figure 9. Spectral transmittance curves for glazings with low-e coatings

E coating filter UV B and NIR; Allow UV A to pass

LED lights emit no NIR light at all



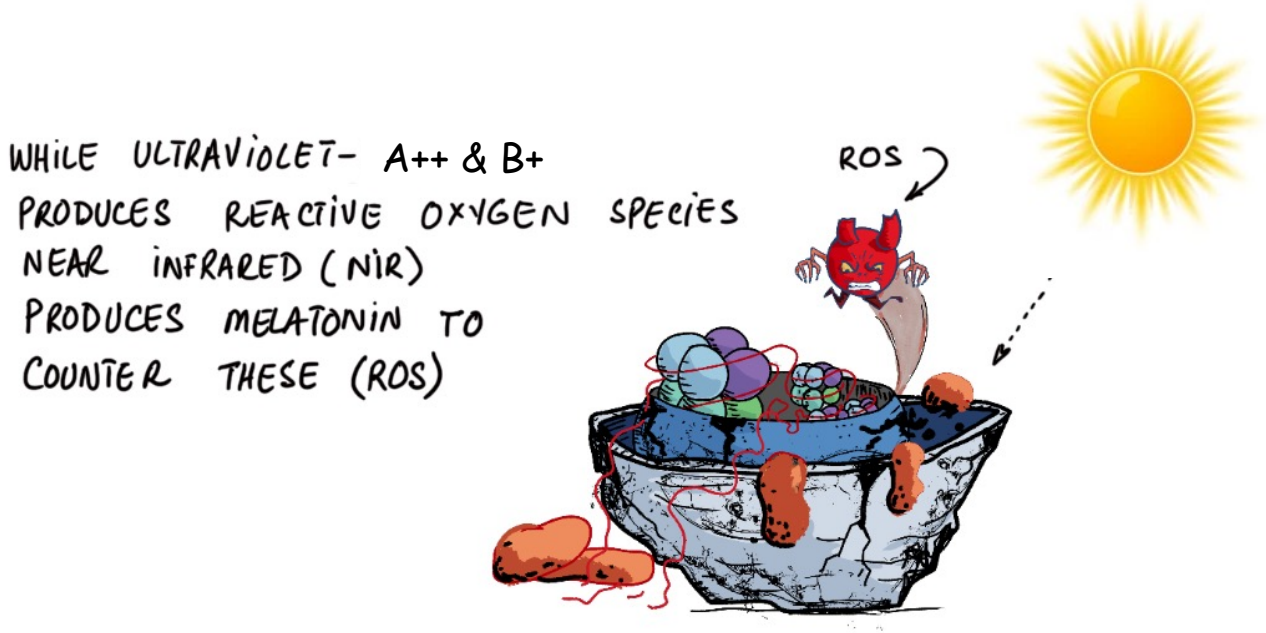
Penetration of different wavelengths



NIR-A has the deepest penetration into tissue of all wavelengths of sunlight, up to 23 cm (9 inches)

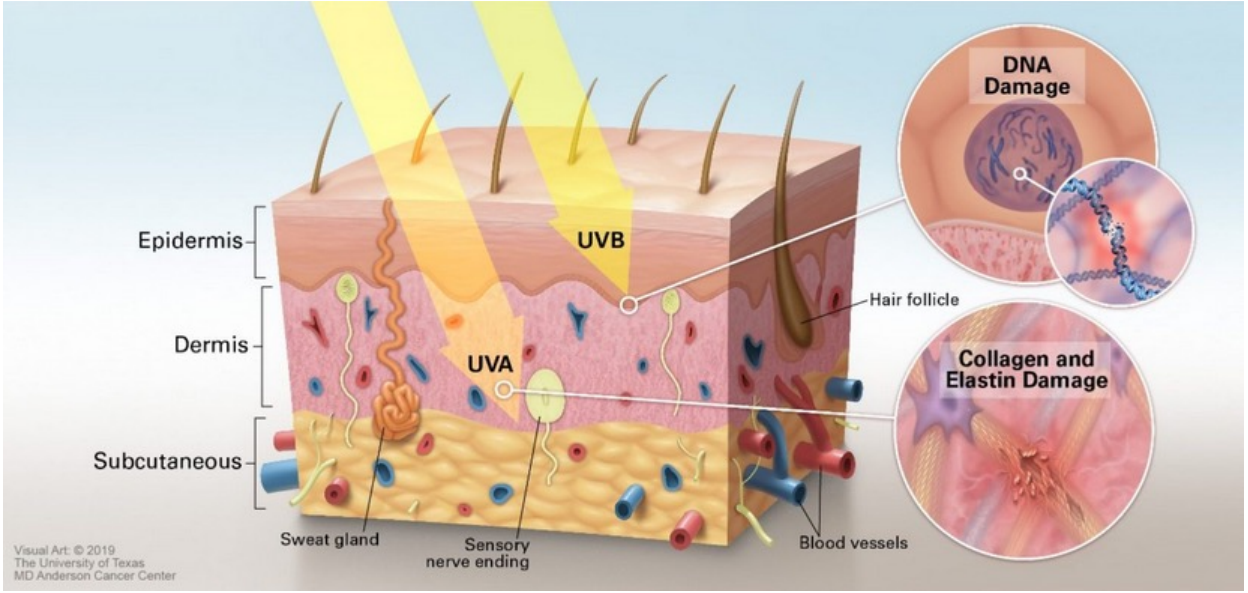
FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Effect of UV and NIR on ROS



NIR/UV optical watt ratios are approximately 3-to-1 at sunrise, reaching 1-to-1 at noon, and returning to 3-to-1 at sunset

FLCCC ALLIANCE EDUCATIONAL CONFERENCE



UVB rays, the primary sunburn ray, are largely blocked by glass; but more than 50 percent of UVA rays, the main cause of premature skin aging, can penetrate glass. Both UVA and UVB rays contribute to the development of skin cancer.

Change in Risk of Skin Cancer over time

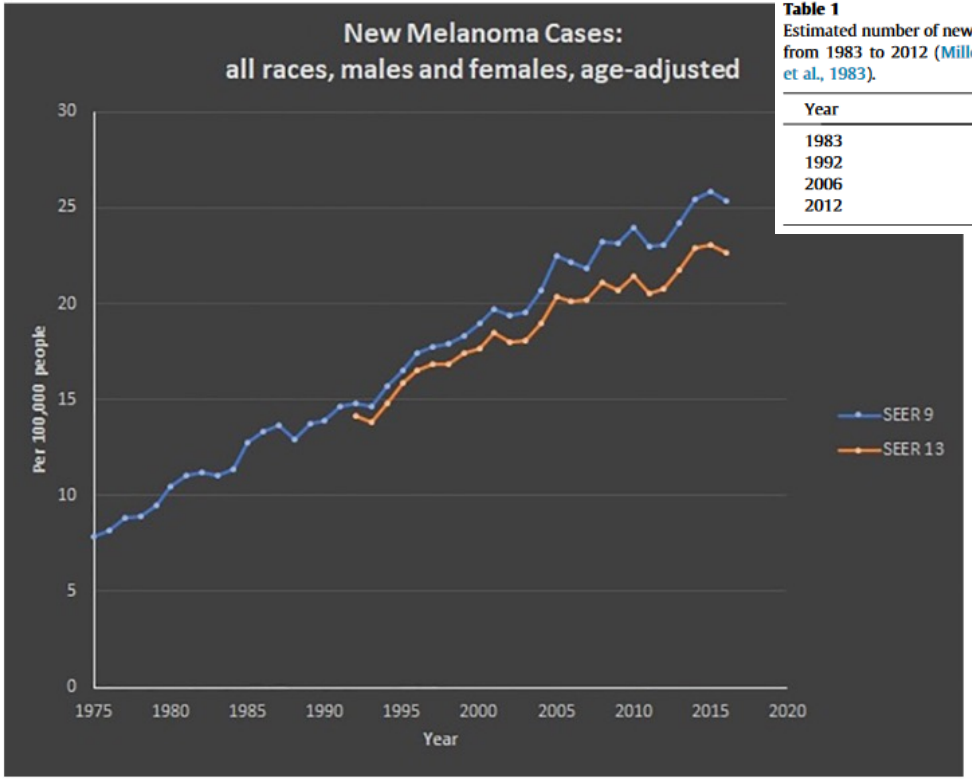
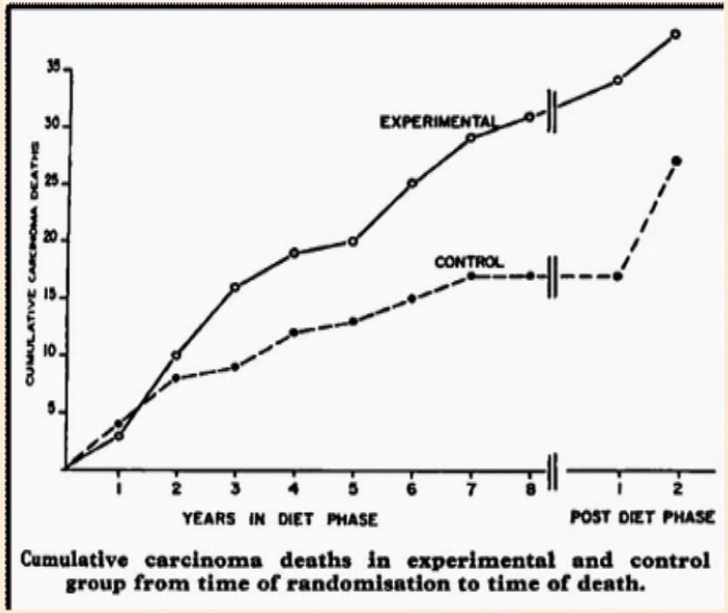


Table 1
Estimated number of new cases of nonmelanoma skin carcinoma in the United States from 1983 to 2012 (Miller and Weinstock, 1994; Rogers et al., 2010, 2015; Scotto et al., 1983).

Year	New cases of nonmelanoma skin carcinoma
1983	400,000–500,000
1992	900,000–1, 200,000
2006	3,500,000
2012	5,300,000

FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

"Side effects" of vegetable oils



Cumulative carcinoma deaths in experimental and control group from time of randomisation to time of death.

Veterans home in L.A.

850 elderly men

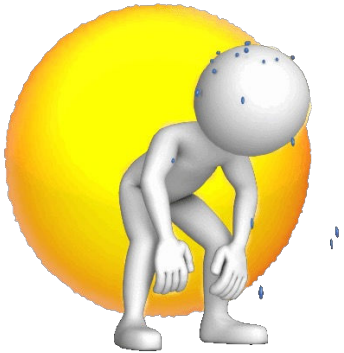
Intervention: diets where soy, corn, safflower, cottonseed oil replaced animal fats

6 year trial

Men successfully lowered cholesterol by 13%

Polyunsaturated vegetable oils are unstable, increase oxidative injury and change composition of cell membranes

The Curative Power of the Sun



THE OPEN AIR TREATMENT OF INFLUENZA.

WILLIAM A. BROOKS,
Surgeon-General, Massachusetts State Guard.

"A few medicines were used to relieve the patients' symptoms and aid their recovery, but these were considered less important than were regular meals, warmth, and plenty of fresh air and sunlight."

Am J Public Health 1918; 746 - 750

THE OPEN AIR TREATMENT OF INFLUENZA.

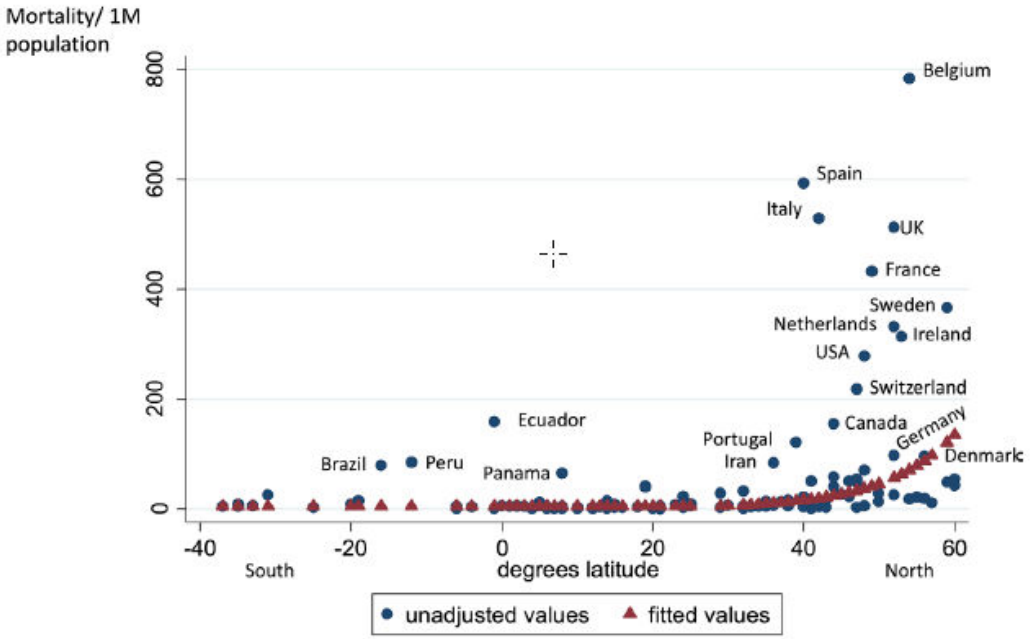
WILLIAM A. BROOKS,
Surgeon-General, Massachusetts State Guard.

The open-air treatment adopted at the camp reduced the fatality of hospital cases from 40% to about 13%.

Brooks wrote that "the efficacy of open-air treatment has been absolutely proven, and one has only to try it to discover its value."

Am J Public Health 1918; 746 - 750

COVID-19 Mortality Increases With Northerly Latitude After Adjustment For Age Suggesting a Link With UVB and Vitamin D

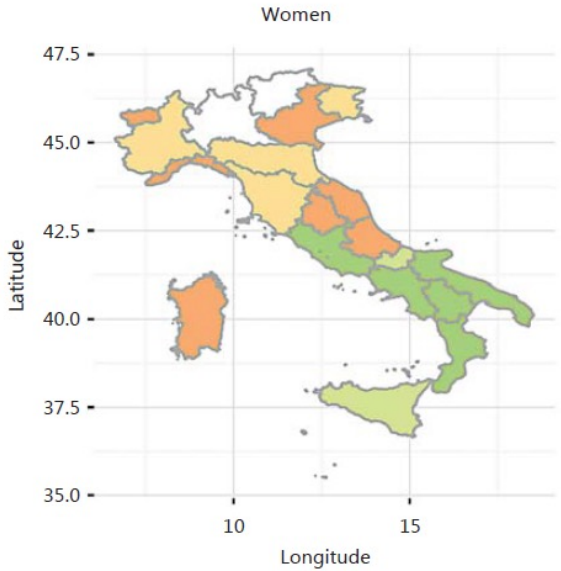


Rhodes J et al. BMJ Nutr. Prev. Health 2020;3:118

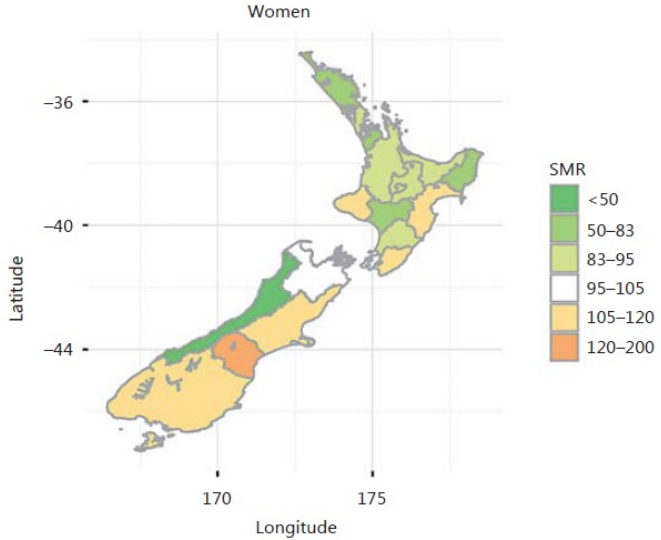
Dement Geriatr Cogn Disord 2016;42:31–41

Geographical Variation in Dementia Mortality in Italy, New Zealand, and Chile: The Impact of Latitude, Vitamin D, and Air Pollution

Italy



New Zealand



Original Article | Journal of INTERNAL MEDICINE

Avoidance of sun exposure is a risk factor for all-cause mortality: results from the Melanoma in Southern Sweden cohort

Methods. We assessed the avoidance of sun exposure as a risk factor for all-cause mortality for 29,518 Swedish women in a prospective 20-year follow-up of the Melanoma in Southern Sweden (MISS) cohort.
Results. We found that all-cause mortality was inversely related to sun exposure habits. The mortality rate amongst avoiders of sun exposure was approximately twofold higher compared with the highest sun exposure group.

Lindqviist PG, et al J Internal Med 2014; 276:77

Photobiomodulation

What is Photobiomodulation?

Photobiomodulation (PBM), or low-level laser/light therapy is a non-invasive light-driven intervention that involves the use of red and near-infrared (NIR) light to stimulate healing processes, reduce pain, protect the aging brain and decrease inflammation in several tissues,
including nervous tissue.

Hamblin MR. AIMS Biophys 2017;4:337

FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

PubMed.gov

((((photobiomodulation) OR (red light therapy)) OR (infrared light)) OR (low le

Search

> 60 000 Citations

Photobiomodulation for Alzheimer's Disease: Has the Light Dawned?

Significant Improvements in Cognitive Performance Post-Transcranial, Red/Near-Infrared Light-Emitting Diode Treatments in Chronic, Mild Traumatic Brain Injury: Open-Protocol Study

Transcranial Near Infrared Light Stimulations Improve Cognition in Patients with Dementia

Photobiomodulation therapy (PBMT) on acute pain and inflammation in patients who underwent total hip arthroplasty—a randomized, triple-blind, placebo-controlled clinical trial

Effects of low-power light therapy on wound healing: LASER x LED*

Photobiomodulation therapy before futsal matches improves the staying time of athletes in the court and accelerates post-exercise recovery

Biological Properties of Red/NIR Light

- Increases mitochondrial ATP production
- Increases mitochondrial melatonin production
- Increases HSP
- Activates cell stress response
- Increases autophagy
- Increase microvascular blood flow – NO release
- Anti-inflammatory
- Improved sleep
- Decreased appetite: Ghrelin and leptin
- Wound healing, stimulates angiogenesis and collagen synthesis
- Increases human growth factor
- NO SIDE EFFECTS – SAFE
  - cleared by FDA as insignificant risk device

FLCCC ALLIANCE EDUCATIONAL CONFERENCE

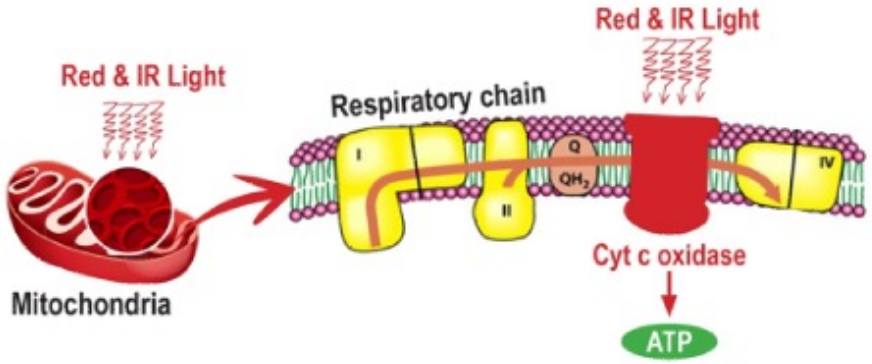
Photobiomodulation of PROVEN benefit

- Acute inflammatory diseases e.g., COVID-19
- Chronic inflammatory diseases e.g., osteoarthritis
- Improved wound healing, recovery and pain post-surgery
- Improved wound healing / tissue repair
- Improved cognition in Alzheimers/neurodegenerative diseases
- Improved cognition in traumatic brain injury
- Improved performance in athletes

FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

Red and Near Infrared Light

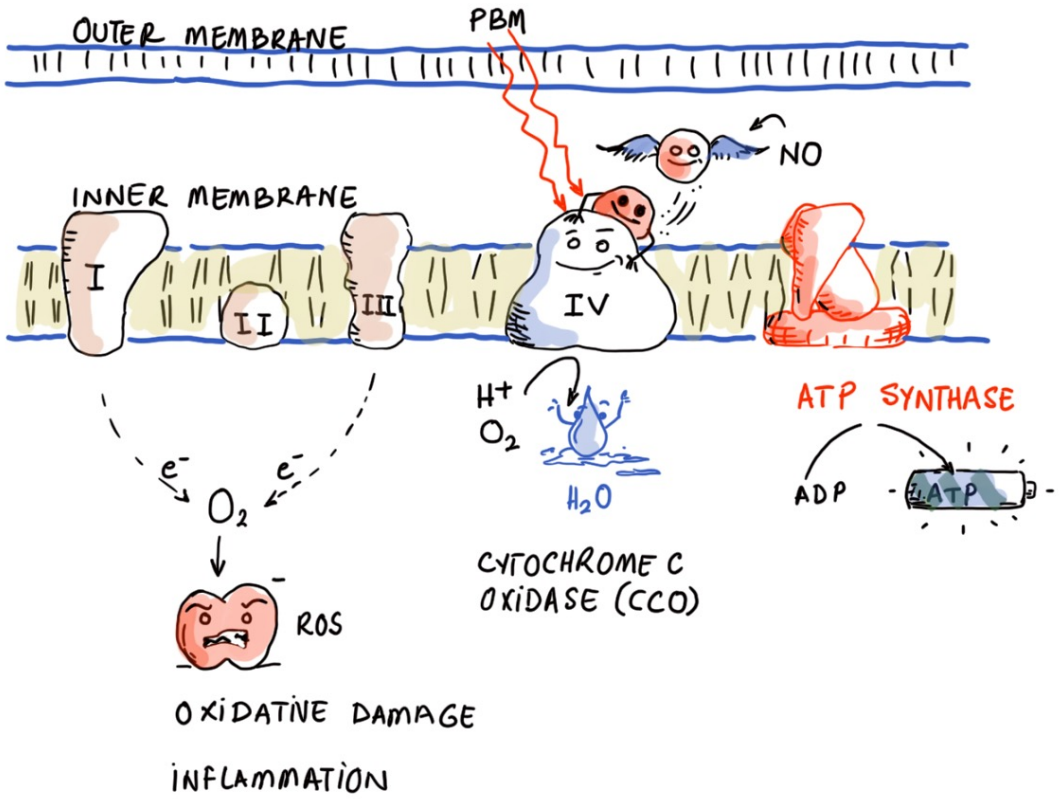
The cytochrome-c oxidase (CCO) mitochondrial membrane protein has absorption bands for 600nm-950nm wavelengths. Red is 600-700, Near Infrared (NIR-A) is in the 700nm-950nm band. So, both red and near infrared stimulate mitochondrial response.



50% of the absorption of NIR light by biological tissue attributed to CCO

FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Electron Transport Chain



FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Melatonin Research (Melatonin Res.) http://www.melatonin-research.net

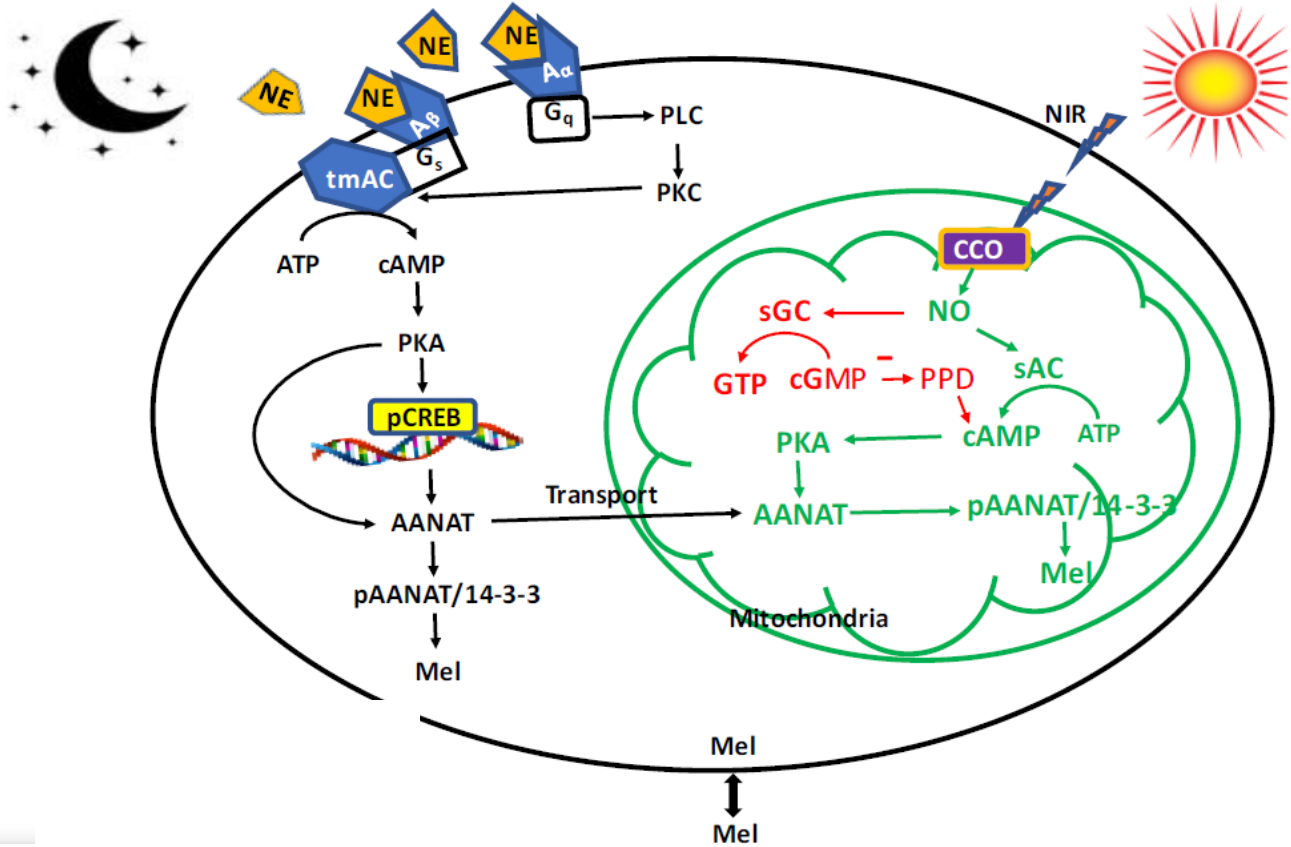
Melatonin and the Optics of the Human Body

Scott Zimmerman*[1] and Russel J. Reiter[2]

Mitochondria produce melatonin in many cells in quantities which are orders of magnitude higher than that produced in the pineal gland. Mitochondrial melatonin is produced in response to the NIR photons. Sunlight therefore stimulates this antioxidant reservoir of the cell. While circulatory melatonin may be the "***Hormone of Darkness***", subcellular melatonin may be the "***Hormone of Daylight***".

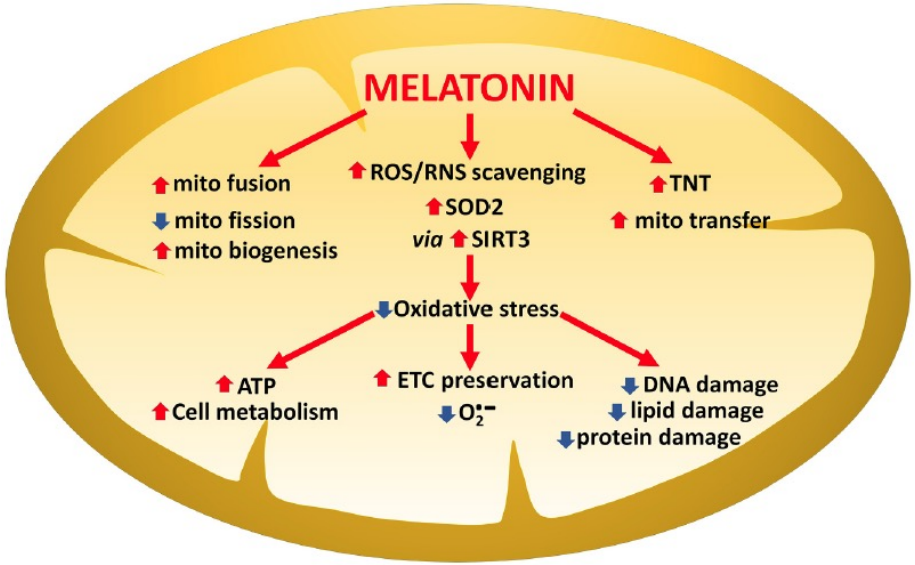
These assumptions are no longer valid in modern societies where most of our time is spent exposed to visible only lighting and displays, which emit zero NIR photons.

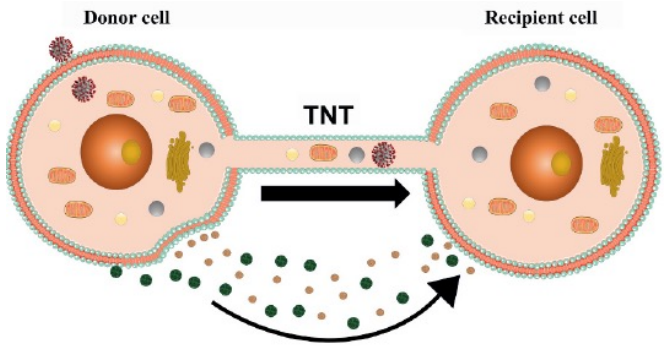
Melatonin



FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Melatonin and Mitochondria



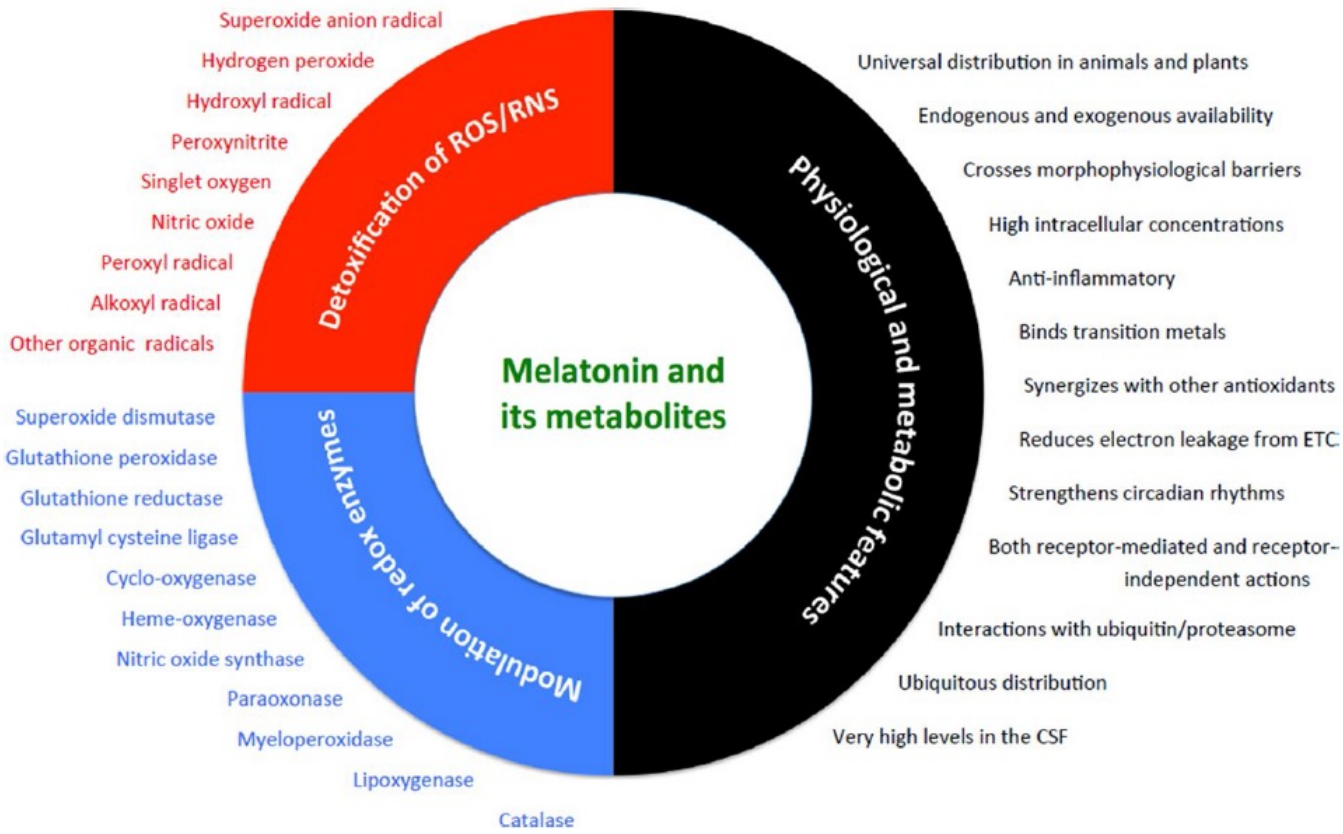


Tunneling nanotubes (TNT)

Mitochondria: A major site of melatonin synthesis

Cells Require Near Infrared Light for Optimal Mitochondrial Function

FLCCC ALLIANCE
EDUCATIONAL CONFERENCE



One molecule of melatonin may scavenge up to 10 oxygen reactive species (ROS)/or nitrogen reactive species. Has no pro-oxidative activity. It is an amphiphilic (both lipid and water soluble) molecule.

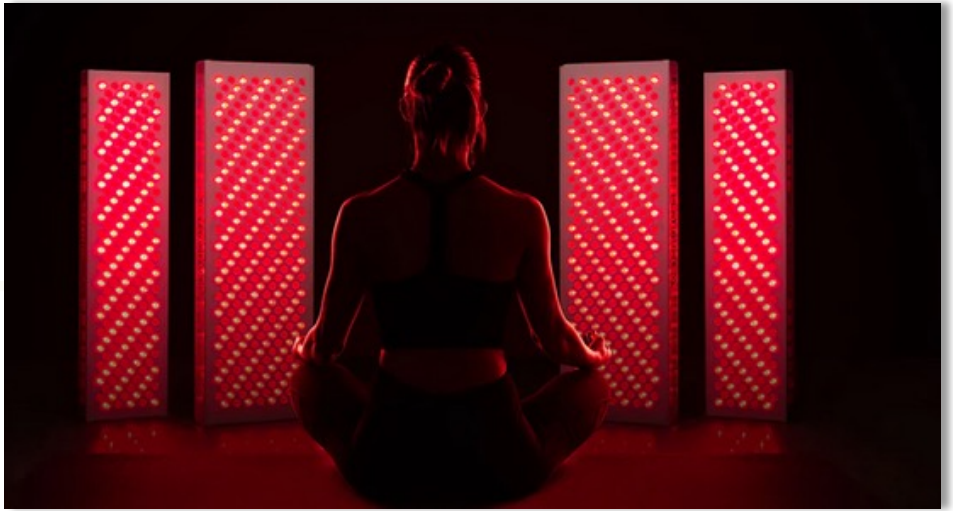
REVIEW Open Access

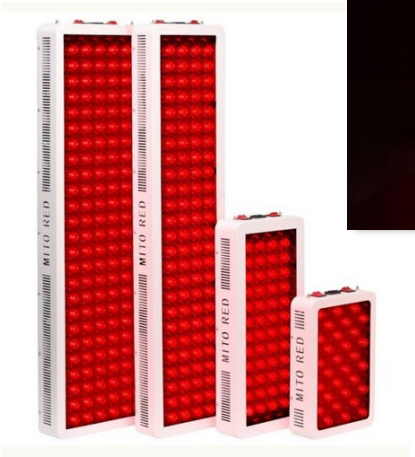
Mitochondria as a target for neuroprotection: role of methylene blue and photobiomodulation

Luodan Yang[1], Hannah Youngblood[2], Chongyun Wu[1] and Quanguang Zhang[1*]

Translational Neurodegeneration 2020;9;19

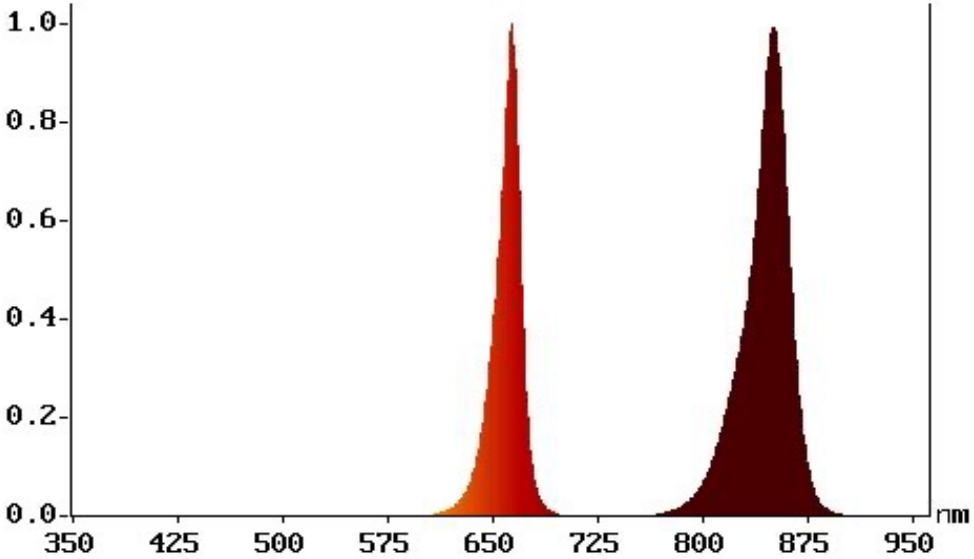
LED Panels – Red and Near IR Light





FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

LED Light Therapy Distribution

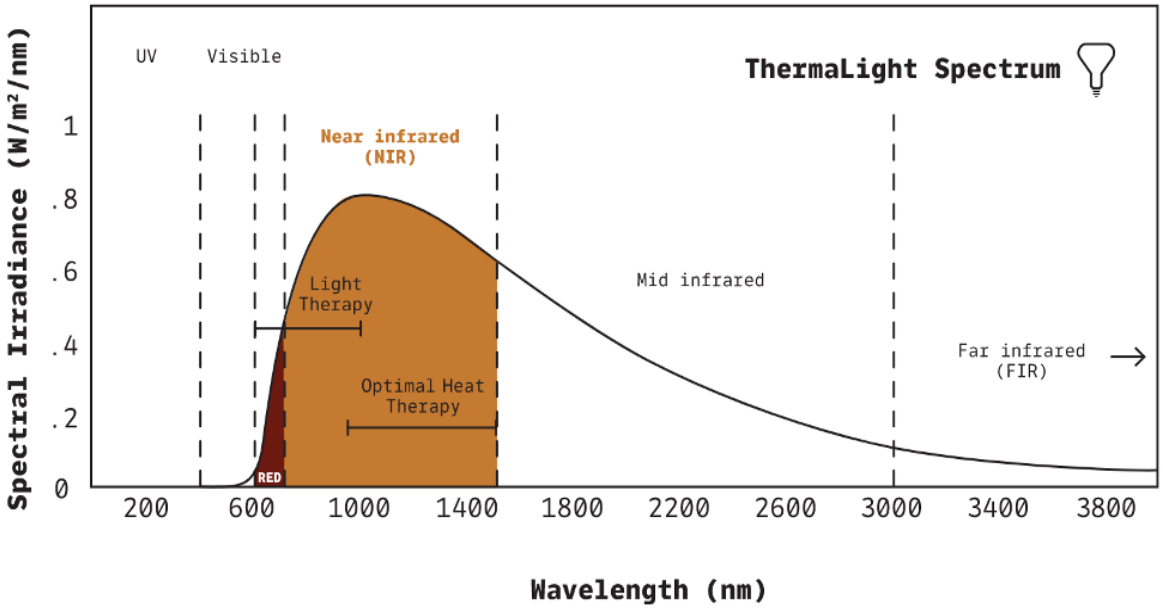


FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

ThermaLight

FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

ThermaLight Spectrum



Sunlight without the UV radiation

FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Sunlight vs ThermaLight Spectrum

Light Band	Wavelength Range in Nanometers (nm)**	Sun (T=5500K)	SaunaSpace ThermaLight™ (T=2450K)
Ultraviolet (UV)	10-400	10%	0%
Blue	400-500	12%	0%
Green	500-550	6%	0%
Yellow	550-600	6%	1%
Red	600-700	11%	2%
Near Infrared	**700-1500**	**41%**	**39%**
Mid Infrared (IR-B)	1500-3000	11%	41%
Far Infrared (IR-C)	>3000	2%	17%

Sunlight without the UV radiation

FLCCC ALLIANCE EDUCATIONAL CONFERENCE

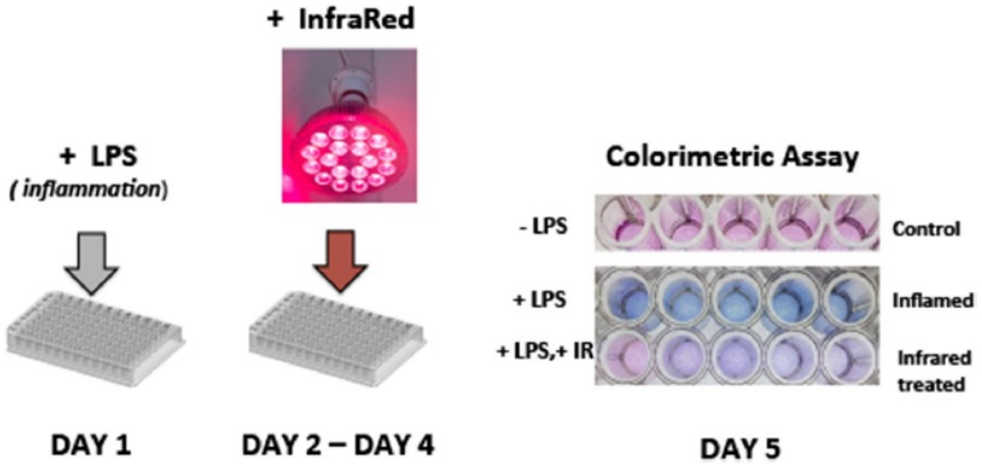
COMMUNICATIVE & INTEGRATIVE BIOLOGY
2021, VOL. 14, NO. 1, 200–212
https://doi.org/10.1080/19420889.2021.1965718

Taylor & Francis
Taylor & Francis Group

SHORT COMMUNICATION

OPEN ACCESS Check for updates

Infrared light therapy relieves TLR-4 dependent hyper-inflammation of the type induced by COVID-19



720 nm infrared illumination at 6 W/m2 for 10 min every 12 h

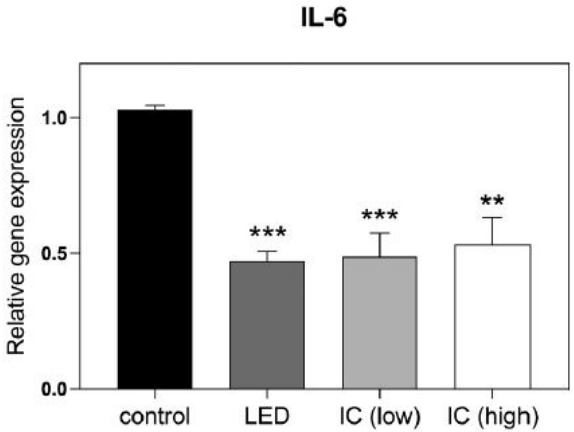
COMMUNICATIVE & INTEGRATIVE BIOLOGY
2021, VOL. 14, NO. 1, 200–212
https://doi.org/10.1080/19420889.2021.1965718

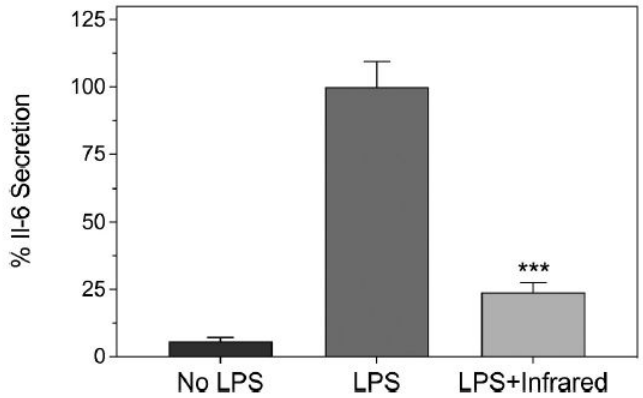
Taylor & Francis
Taylor & Francis Group

SHORT COMMUNICATION

OPEN ACCESS Check for updates

Infrared light therapy relieves TLR-4 dependent hyper-inflammation of the type induced by COVID-19





SHORT COMMUNICATION

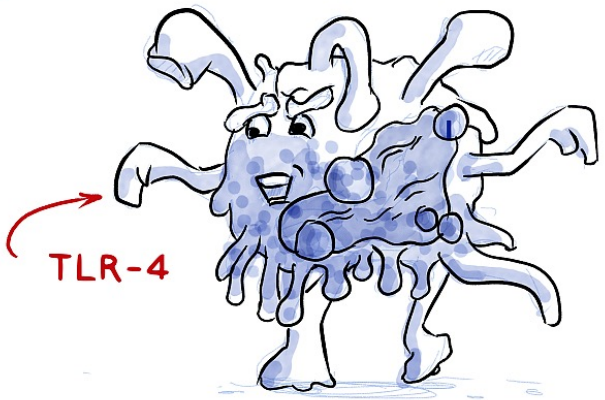
OPEN ACCESS Check for updates

Infrared light therapy relieves TLR-4 dependent hyper-inflammation of the type induced by COVID-19

Near Infrared Light

Works Through TLR-4 Receptors

To Reduce Inflammation



Cardiopulmonary and hematological effects of infrared LED photobiomodulation in the treatment of SARS-COV2

Objective: To compare the photobiomodulation technique using near-infrared LED to conventional respiratory physiotherapy treatment in patients with COVID-19 in reversing acute conditions, reducing hospitalization time, and decreasing the need for oxygen therapy.

Methodology: The cohort was comprised of 30 patients undergoing COVID-19 treatment who were divided and allocated into two equal groups randomly: the LED group (LED), treated with infrared LED at 940 nm and conventional therapy, and the control group (CON), who received conventional treatment with LED irradiation off. Patients received irradiation/sham irradiation once a day for 15 min for 7 days.

Pereira PC, et al. Journal of Photochemistry and Photobiology 2023;238:112619

Cardiopulmonary and hematological effects of infrared LED photobiomodulation in the treatment of SARS-COV2

Pereira PC, et al. Journal of Photochemistry and Photobiology 2023;238:112619

Cardiopulmonary and hematological effects of infrared LED photobiomodulation in the treatment of SARS-COV2

Data at the patients' hospital intake: body mass index (BMI), age, pneumonia severity index (PSI), sex, and comorbidities.

Groups	Mean		SEM		p
Body mass index - BMI (kg/m^2)					
LED	26.1		2.0		0.704^{+}
CON	25.6		0.5		
Age (years)					
LED	66.9		2.3		0.096^{++}
CON	62.3		2.1		
Pneumonia severity index (PSI)					
LED	97.1 (IV)		1.5		0.003^{+}
CON	85.3 (III)		3.2		
Sex (M/W)	Men		Women		p
LED	8		7		1.000^{+++}
CON	7		8		
Comorbidities (number of patients)	HBP	CKD	DM	HF	p^{IV}
LED	12	1	5	0	0.542
CON	9	0	5	1	

Pereira PC, et al. Journal of Photochemistry and Photobiology 2023;238:112619

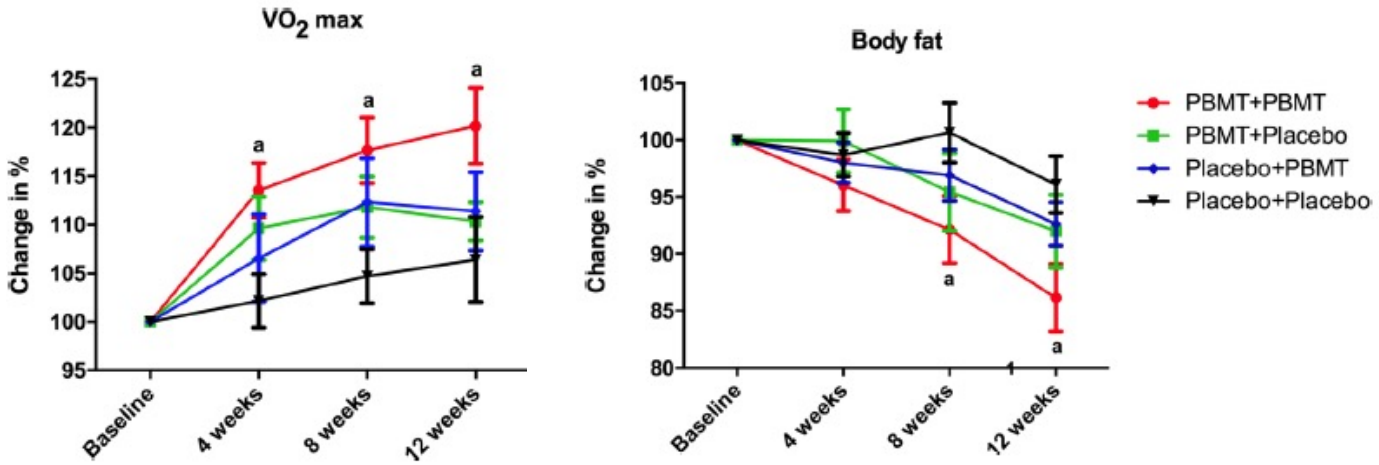
Cardiopulmonary and hematological effects of infrared LED photobiomodulation in the treatment of SARS-COV2

Cardiopulmonary, hematologic, and body temperature outcomes, Mean (SEM), inter-group statistical analysis between groups, and Cohen's parameter.

	ΔLED	Δ CON	p	d
Cardiopulmonary analysis				
Oxygen flow intake (L/min)	−3.1 (0.2)	−4.1 (0.4)	0.025*	0.9
Partial Oxygen Saturation (%)	9.4 (0.5)	2.6 (0.7)	< 0 0.0001***	3.1
Tidal Volume (mL)	74.4 (9.0)	22.1 (3.3)	< 0.0001***	2.0
Maximum Inspiratory Pressure (cmH_2O)	−24.9 (2.2)	−7.0 (0.8)	< 0.0001***	2.8
Maximal Expiratory Pressure (cmH_2O)	19.1 (3.0)	2.0 (0.9)	< 0.0001***	2.0
Respiratory Frequency (rpm)	−5.1 (0.5)	−2.8 (0.4)	0.0009***	1.4
Heart Rate (bpm)	−19.7 (3.3)	−1.9 (1.5)	0.0001***	1.7
Systolic Blood Pressure (mmHg)	−13.6 (2.3)	−5.3 (1.8)	0.007**	1.1
Lymphocytes (mm^{-3})	850 (240)	−10 (130)	0.004**	1.2
Monocytes (mm^{-3})	70 (53)	−20 (23)	0.14^{ns}	–
LOS Hosp	8 ± 0.2	11.7 ± 1.4	0.02	

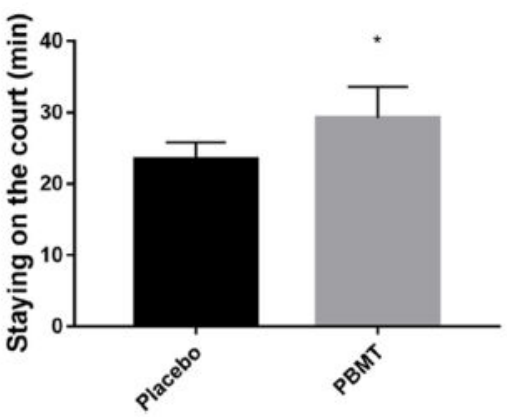
Pereira PC, et al. Journal of Photochemistry and Photobiology 2023;238:112619

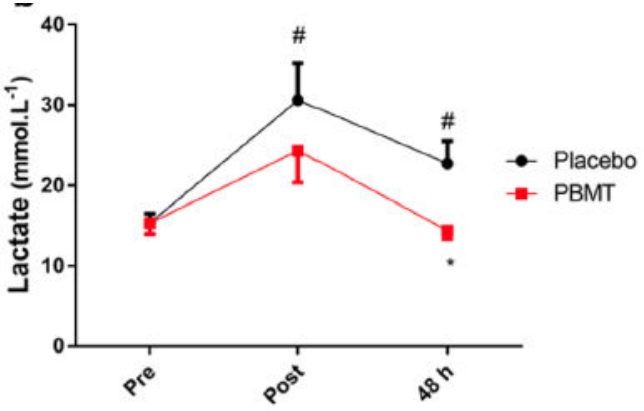
When is the best moment to apply photobiomodulation therapy (PBMT) when associated to a treadmill endurance-training program? A randomized, triple-blinded, placebo-controlled clinical trial



Miranda EF, et al. Lasers in Med Sci 2017

Photobiomodulation therapy before futsal matches improves the staying time of athletes in the court and accelerates post-exercise recovery

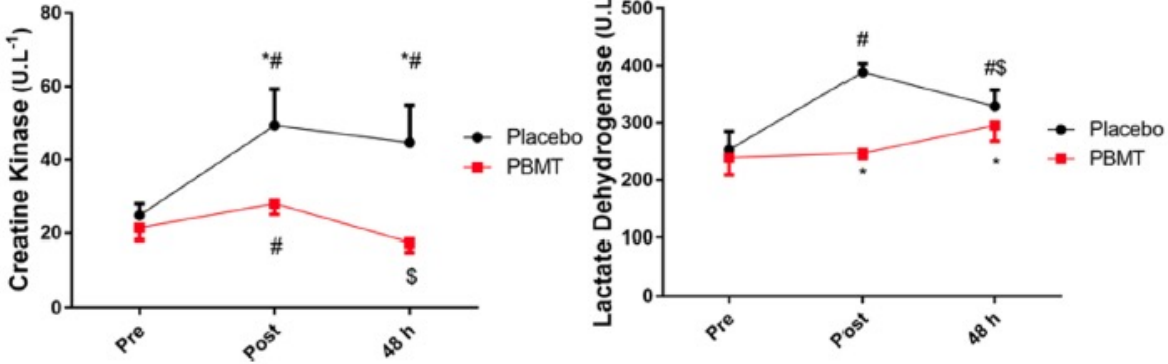




Futsal: 5-a-side indoor football

De Marchi T, et al. Lasers in Med Sci 2018

Photobiomodulation therapy before futsal matches improves the staying time of athletes in the court and accelerates post-exercise recovery



Futsal: 5-a-side indoor football

De Marchi T, et al. Lasers in Med Sci 2018

In the “always winter” of 2023, walk in the light of the Sun

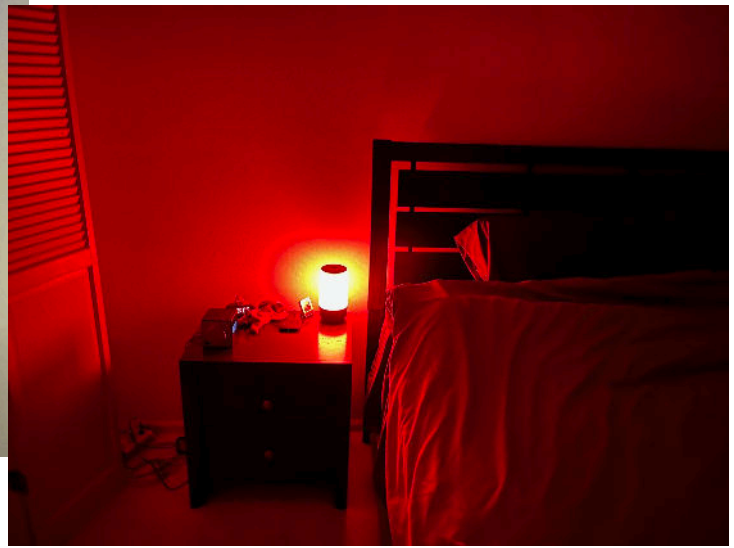
Early morning or mid-afternoon

FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Controlling your “Light Environment”

Morning

Night



FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

The Health Benefits of Sauna

Types of Sauna

1.Traditional saunas are heated through electric or wood burning heat. They can be dry or wet. Wet saunas introduce steam through steam generators or by throwing water on hot rocks. Traditional saunas are very, very hot, and put most people's heat endurance to the test.

2.Far infrared saunas use heating elements that mainly emit light in the far-infrared range. This type of far-infrared light does offer some light therapy, but it doesn't penetrate the body as well as near-infrared light does. Additionally, far-infrared saunas typically emit **harmful levels of EMFs**, though some manufacturers are working to reduce the EMFs in their product.

3.Near infrared lamp saunas combine heat therapy and light therapy. The light from near-infrared saunas can penetrate the body up to 9 inches. Additionally, NIR saunas generally emit very low levels of EMFs. Because of the spectrum of light, NIR saunas allow the air to stay cooler while still heating the body.

FLCCC ALLIANCE EDUCATIONAL CONFERENCE

Traditional Finnish Sauna

FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

Near IR Sauna

FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

Far IR Sauna

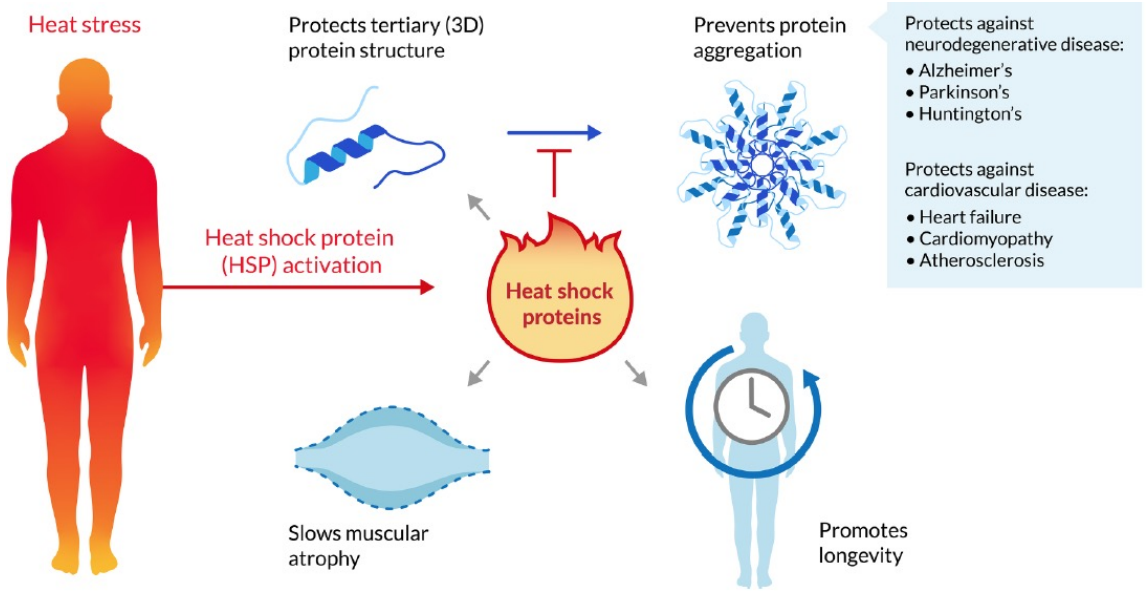
FLCCC ALLIANCE
EDUCATIONAL CONFERENCE

Experimental Gerontology 154 (2021) 111509

Review

Sauna use as a lifestyle practice to extend healthspan

Rhonda P. Patrick [a,*], Teresa L. Johnson [b]



Original Investigation

Association Between Sauna Bathing and Fatal Cardiovascular and All-Cause Mortality Events

Tanjaniina Laukkanen, MSc; Hassan Khan, MD, PhD; Francesco Zaccardi, MD; Jari A. Laukkanen, MD, PhD

Age and Ageing 2017; **46:** 245–249
doi: 10.1093/ageing/afw212
Published electronically 7 December 2016

Sauna bathing is inversely associated with dementia and Alzheimer's disease in middle-aged Finnish men

JAMA Psychiatry | Original Investigation

Whole-Body Hyperthermia for the Treatment of Major Depressive Disorder

A Randomized Clinical Trial

FLCCC
ALLIANCE
EDUCATIONAL
CONFERENCE
Spring 2023

THANK YOU