Bioactive Light VS Toxic Light

Why Red and NIR are Like Magic Pills for Your Body

by Megan Soffer, Brand & Digital Marketing Manager at TrueLight

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WHAT WE WILL COVER

01. BIOACTIVE LIGHT VS UNHEALTHY LIGHT

Which wavelengths constitute as healthy or harmful lighting? How are they different? And why does it matter anyway?

02. LED LIGHT THERAPY

Explore key mechanisms behind red light therapy that promote better cellular health, anti-aging, reduced inflammation and pain, and more!

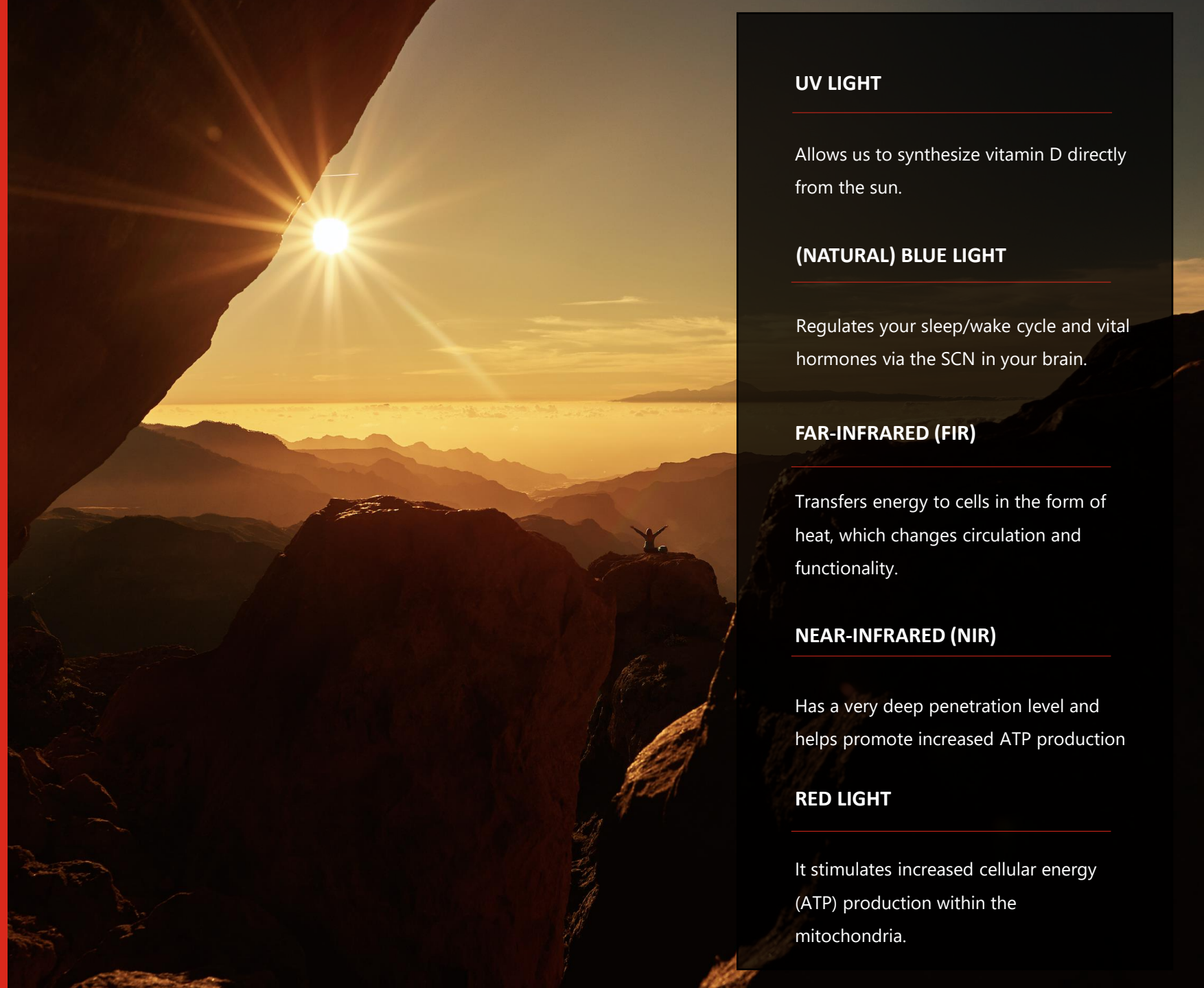
03. RED LIGHT PROMOTES BETTER SLEEP

Also learn why red light is more conducive for sleep, and how you can turn your home into a sleep sanctuary at night.

The human body *needs* light to be healthy. Receiving the right types of light and the right doses at specific times in order to function at its best.

BIOACTIVE LIGHT

Within the sun's spectrum, there are 5 types of "bioactive" light, meaning that they literally affect the function of our cells. These are like nutrients for the body.



UV LIGHT

Allows us to synthesize vitamin D directly from the sun.

(NATURAL) BLUE LIGHT

Regulates your sleep/wake cycle and vital hormones via the SCN in your brain.

FAR-INFRARED (FIR)

Transfers energy to cells in the form of heat, which changes circulation and functionality.

NEAR-INFRARED (NIR)

Has a very deep penetration level and helps promote increased ATP production

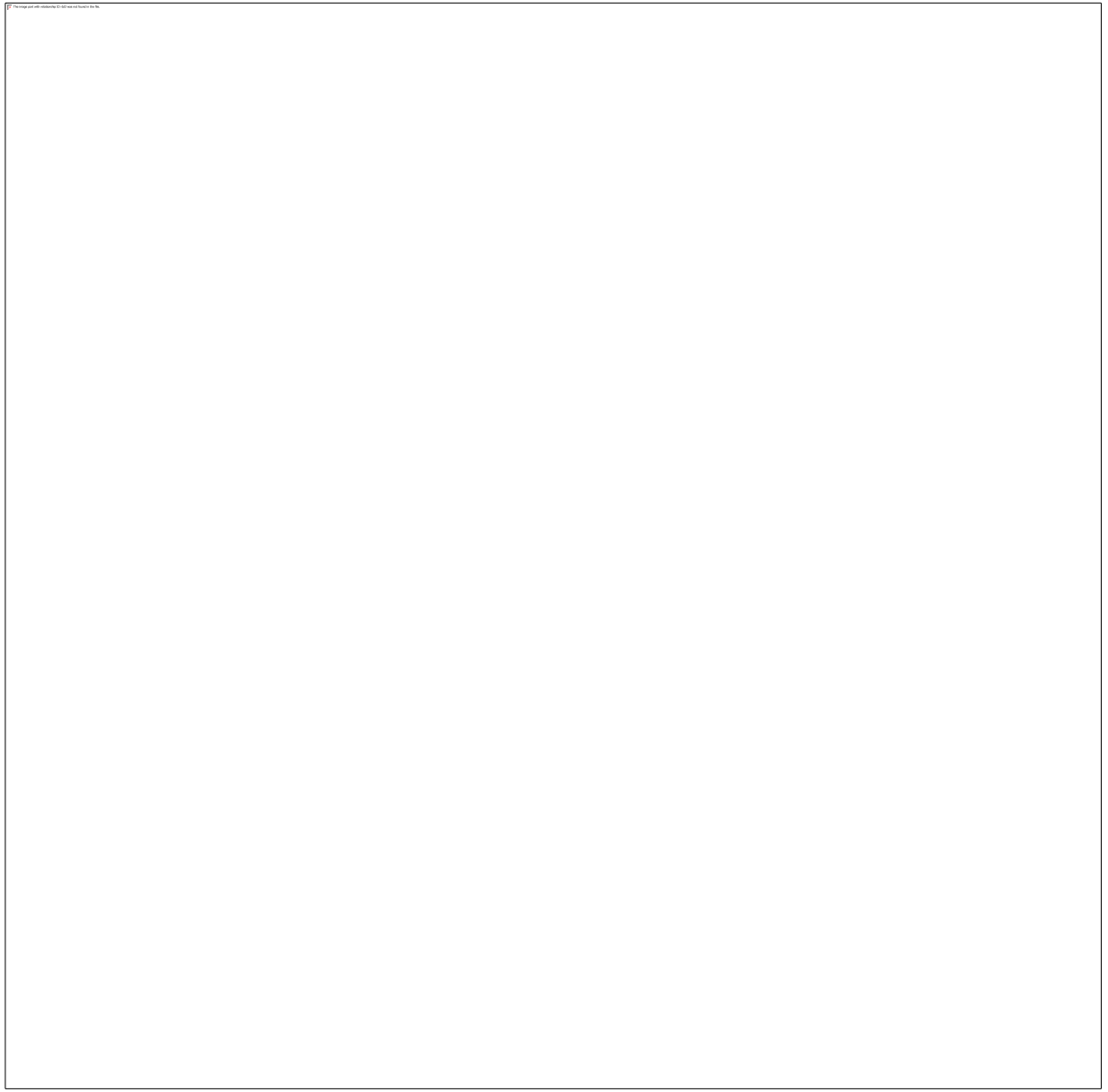
RED LIGHT

It stimulates increased cellular energy (ATP) production within the mitochondria.

ULTRAVIOLET LIGHT

Ultraviolet light is a form of radiation which is not visible to the human eye.

It's in an invisible part of the "electromagnetic spectrum". Radiated energy, or radiation, is given off by many objects: a light bulb, a crackling fire, and stars are some examples of objects which emit UV radiation.



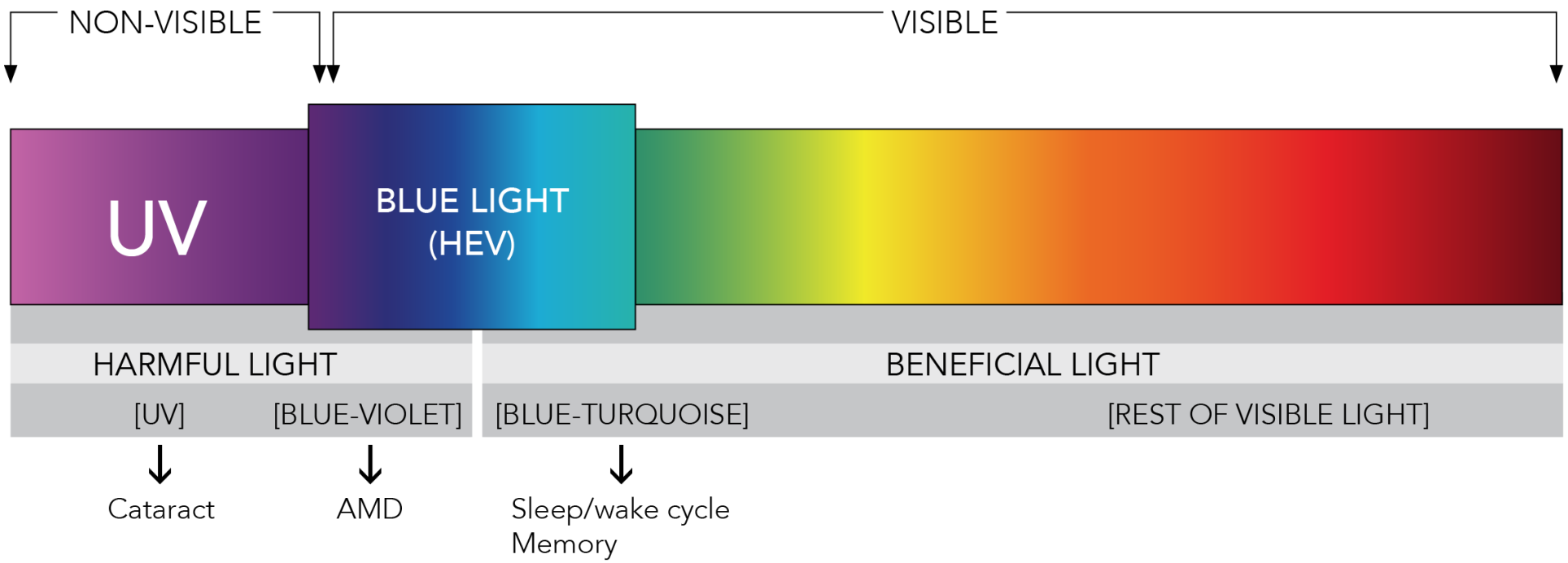
BLUE LIGHT &
CIRCADIAN RHYTHMS

Exposure to [blue] light directly influences your biorhythms, like when you wake up, eat, feel most energized, and when you go to sleep.

The SCN within the hypothalamus is the central player for generating circadian rhythms in rest and activity, core body temperature, neuroendocrine function, autonomic function, memory and psychomotor performance, and a vast array of other behavioral and physiological processes.

HEALTHY BLUE LIGHT

Blue light in the sky-blue region (near 490nm) is where humans have peak sensitivity for circadian responses.



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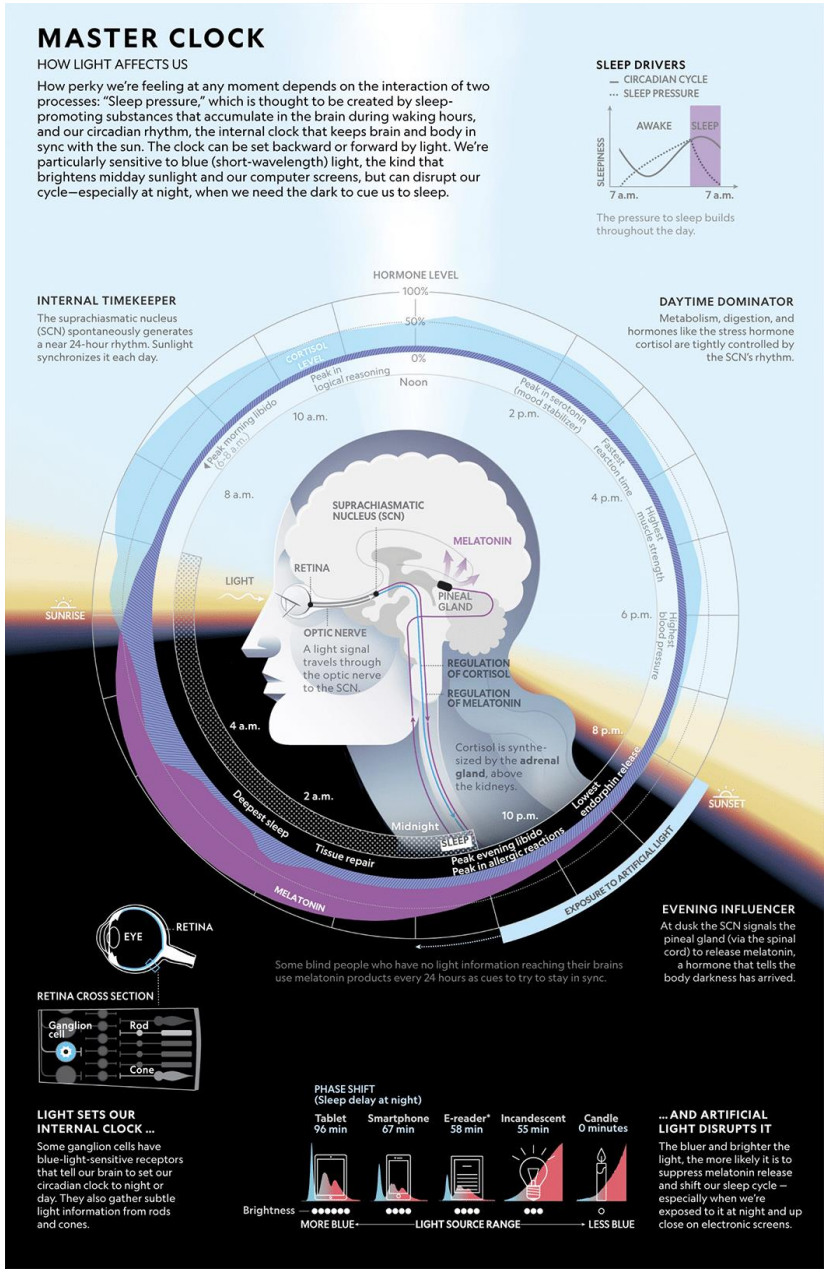

Visual by National Geographic

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The SCN within the hypothalamus is the central player for generating circadian rhythms in rest and activity, core body temperature, neuroendocrine function, autonomic function, memory and psychomotor performance, and a vast array of other behavioral and physiological processes. When blue light enters our eyes, this photo input sends feeds back to the SCN in the brain, which is our body's master clock that regulates our 24-hour biological rhythms.

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CIRCADIAN RHYTHMS

Endogenous oscillators that control mental, physical, and behavioral changes that follow an approximate 24-hour cycle.

Nearly every tissue and organ in the body contains biological clocks that are comprised of proteins which respond primarily to light and temperature. These clocks affect most living things, including animals, plants, and microbes.

HORMONES

Melatonin, cortisol, leptin, and ghrelin levels are highly correlated with circadian rhythmicity.

APPETITE

Aligning your mealtime with your circadian rhythm can help maximize weight loss, improve endurance, reduce the risk of type 2 diabetes, and lower blood pressure.

EXERCISE

Endurance exercise stimulates the expression of core clock genes. Circadian rhythms also directly influence metabolism, muscle strength, and mitochondrial functions.

SLEEP

Producing melatonin at night is vital in order to get consistent, quality sleep at night. Circadian disruption prevents melatonin production and delays sleep.

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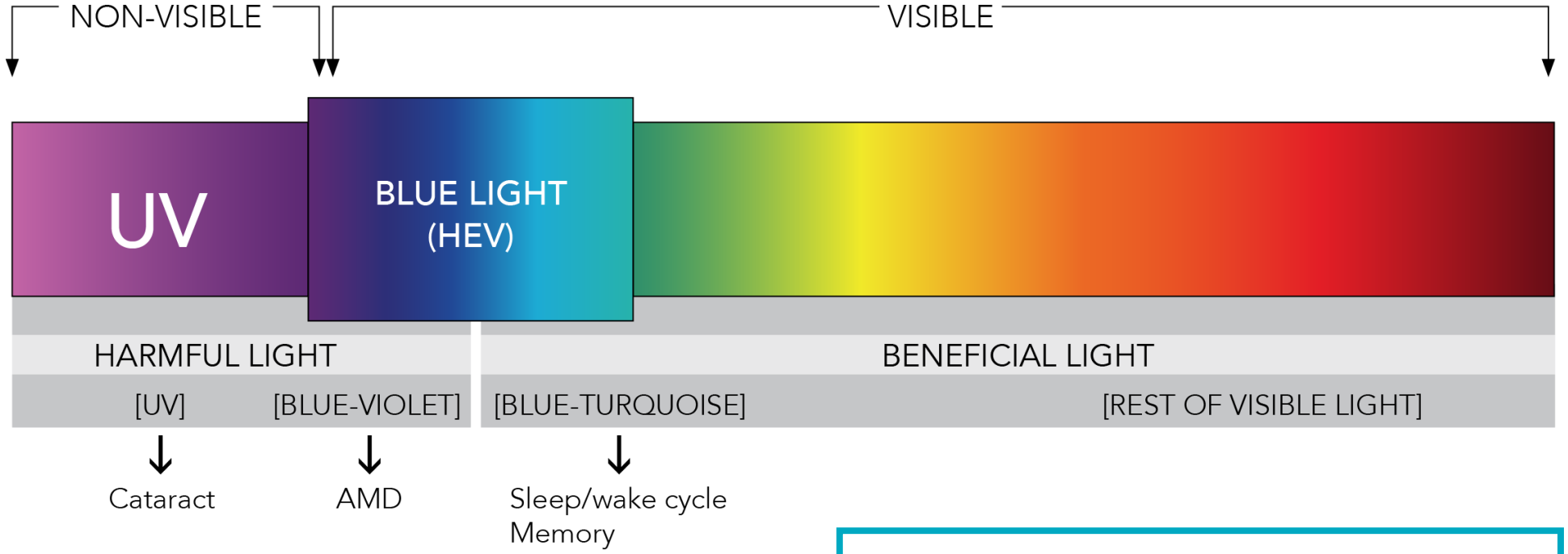
TOXIC
BLUE LIGHT

Also known as “junk light”, this refers to specific wavelengths of visible light that artificial light sources — such as LEDs and compact fluorescents (CFLs) — emit. These light sources lack many of the sun’s frequencies that our bodies and brains need, and yet, they amplify the amount of junk light they emit beyond what humans have evolved to handle.



Toxic blue is in the 400-450nm range

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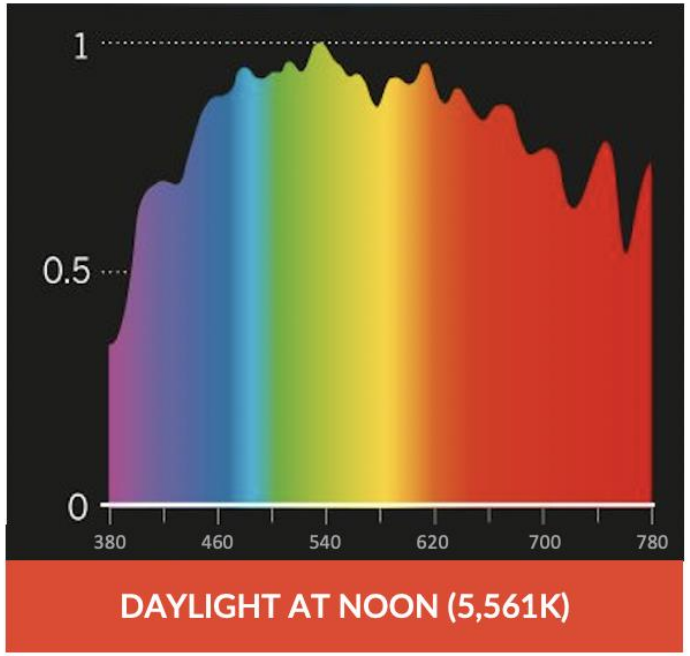
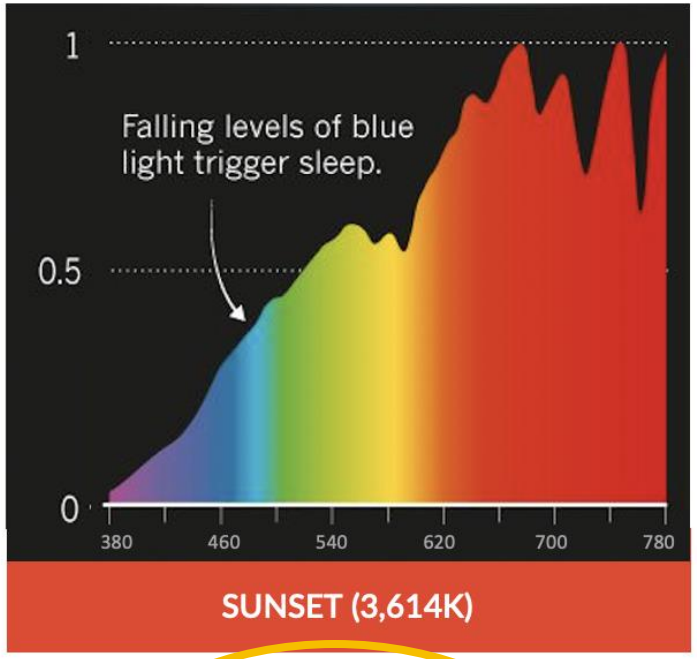
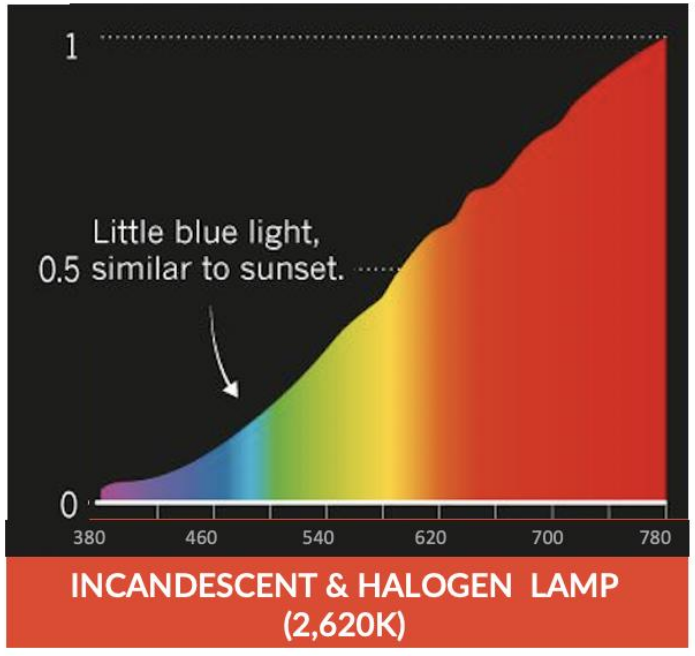


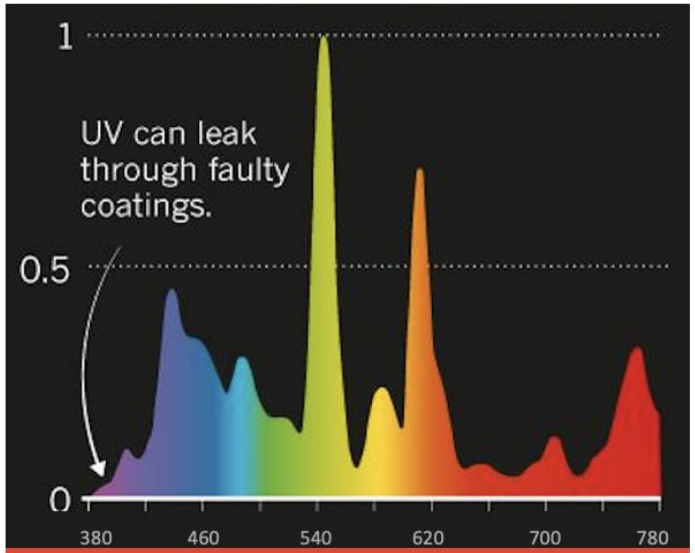
DAYLIGHT AT NOON (5,561K)



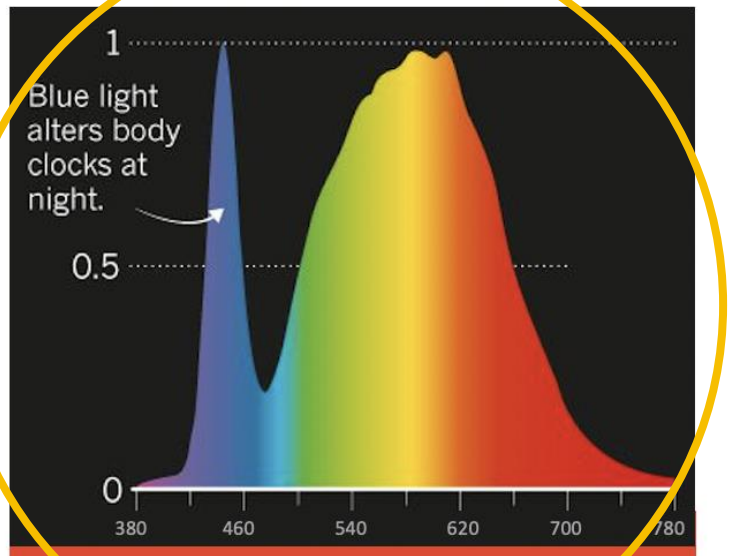
SUNSET (3,614K)



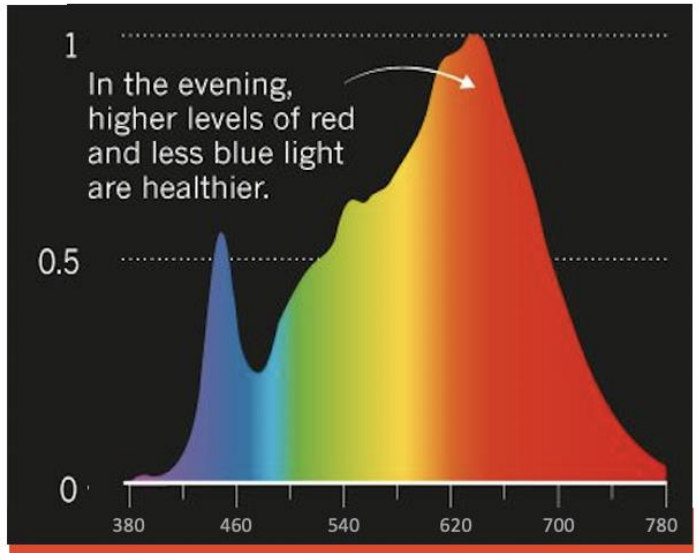
INCANDESCENT & HALOGEN LAMP (2,620K)



COMPACT FLUORESCENT LAMP (6,000K)



COOL WHITE LED LAMP (4,000K)



WARM WHITE LED LAMP (3,000K)

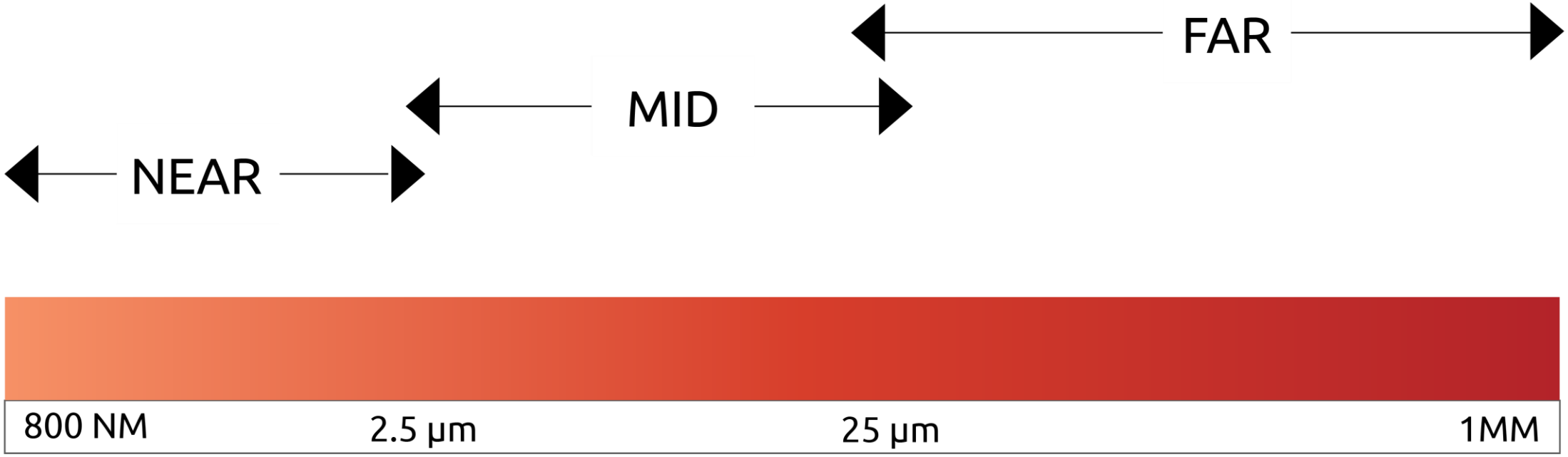
Graphs by Nature

It’s toxic. If you shine blue light on retinal, the retinal kills photoreceptor cells as the signaling molecule on the membrane dissolves. Photo-receptor cells do not regenerate in the eye. When they’re dead, they’re dead for good.

- Kasun Ratnayake, PhD
at the University of Toledo

INFRARED SPECTRUM

Infrared therapy enhances and improves circulation throughout the body to help promote better healing. It also helps ease pain, relieve inflammation, and protect against oxidative stress.



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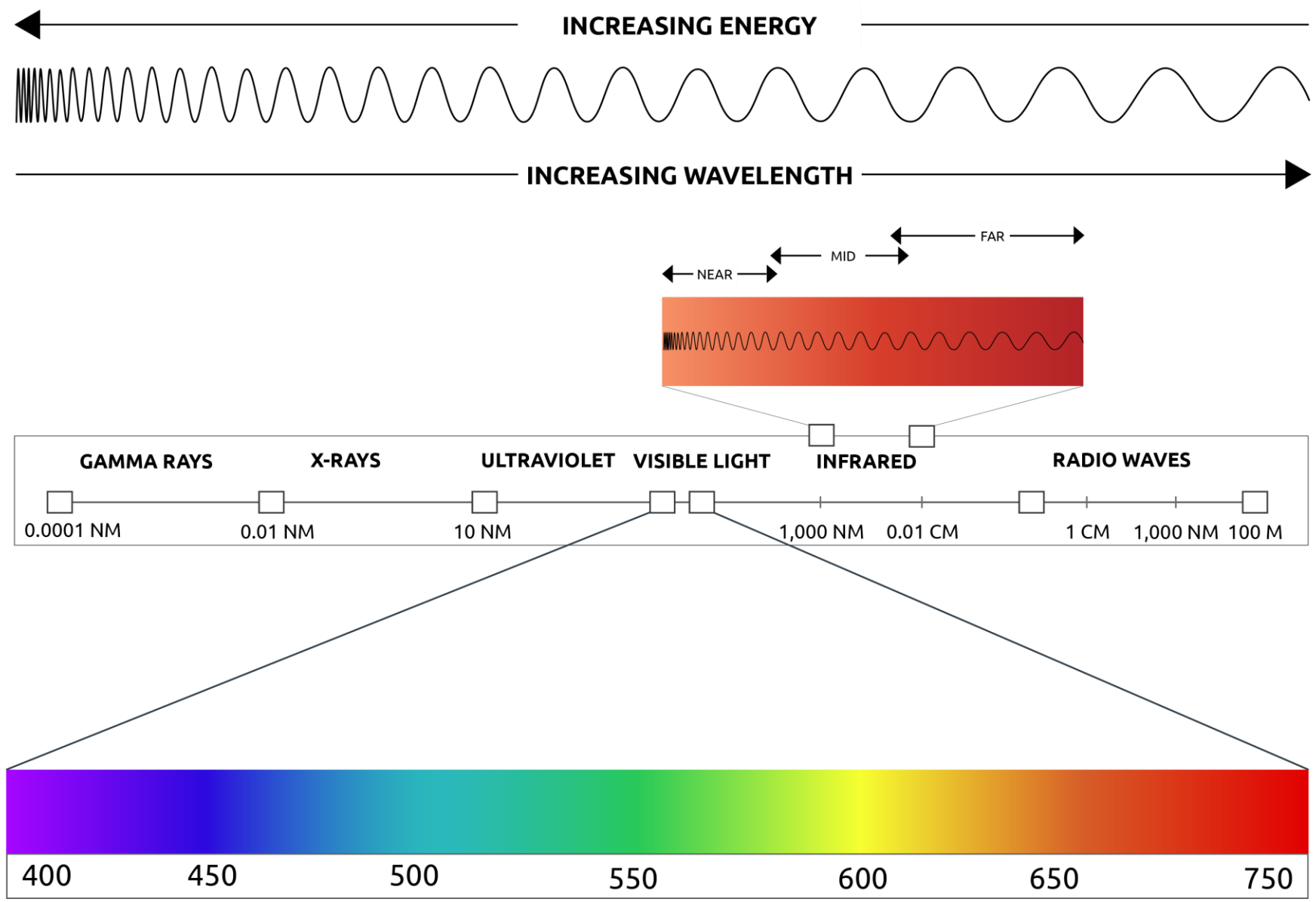
INCREASING ENERGY
INCREASING WAVELENGTH
FAR
MID
NEAR
GAMMA RAYS
X-RAYS
ULTRAVIOLET
VISIBLE LIGHT
INFRARED
RADIO WAVES
0.0001 NM
0.01 NM
10 NM
1,000 NM
0.01 CM
1 CM
1,000 NM
100 M
400
450
500
550
600
650
750

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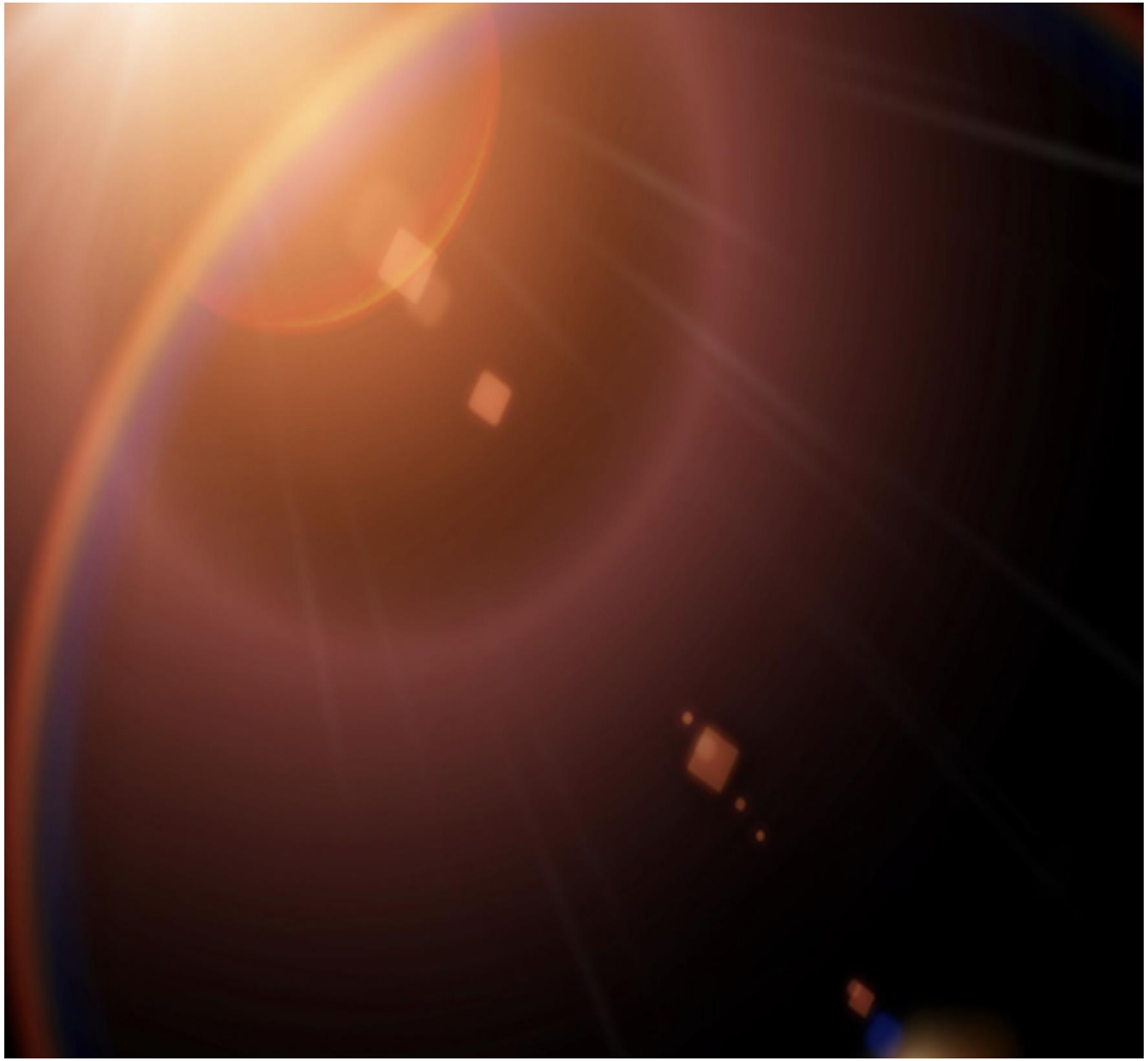
FAR
INFRARED

The human eye cannot see it, but humans can detect it as heat.

Far Infrared (FIR) wavelengths heat up our cells, which causes our body temperature to rise, and stimulates changes in cellular function.



FIR

Benefits

Though the sun emits FIR, people can now mimic similar benefits that they would otherwise get from sunlight via infrared therapy.

When FIR reaches the body, it raises your core body temperature and produces a deep, detoxifying sweat at the cellular level, where most toxins reside.

DETOXIFCATION

FIR promotes the elimination of fats, chemicals and toxins from the blood – such as poisons, heavy metals, and lactic acid.

LOWER BLOOD PRESSURE

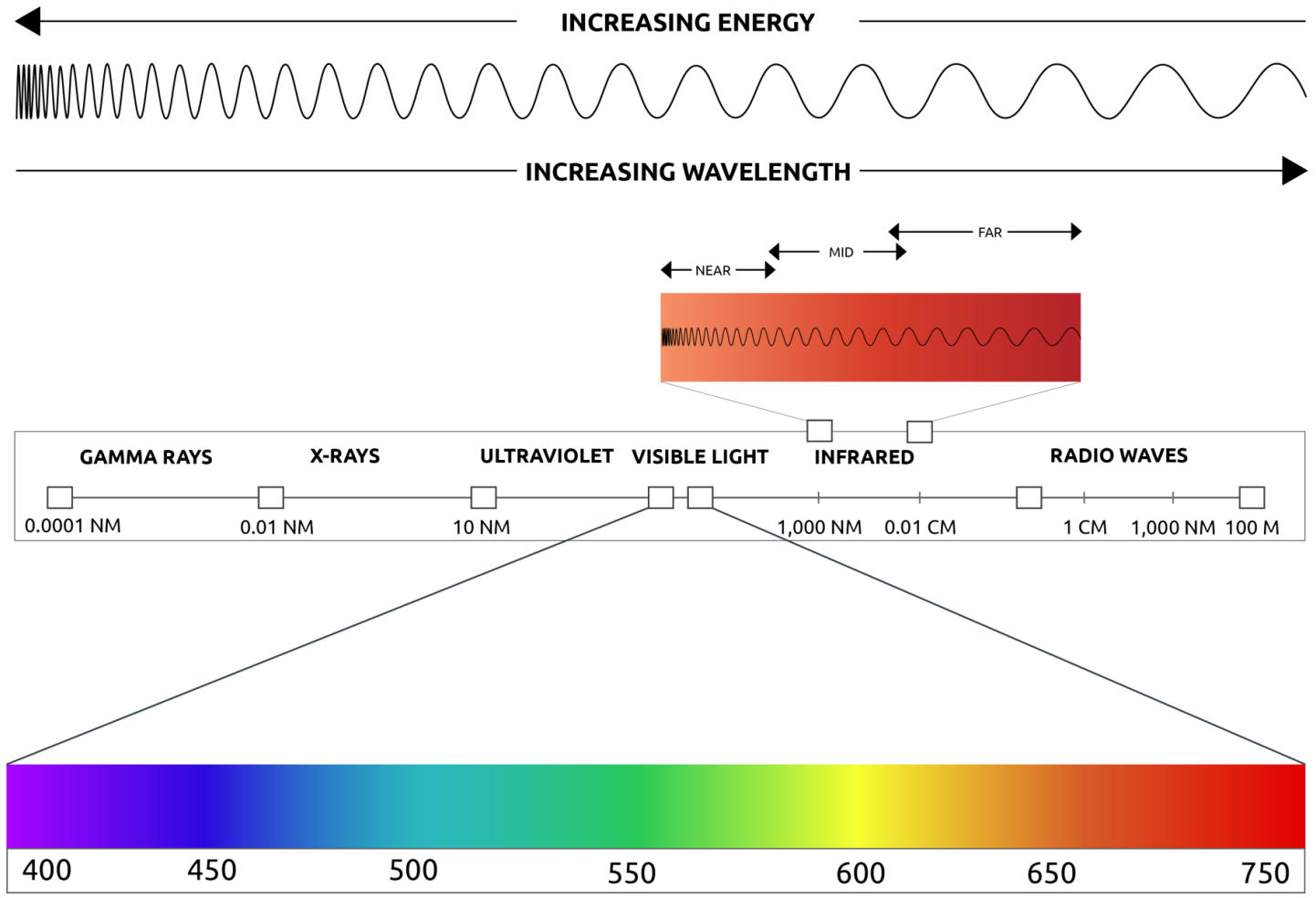
FIR dilates blood vessels and reduces the volume of their inner lining. This helps boost circulation needed for healthy blood pressure..

RELAXATION

FIR rays provide a gentle, soothing and therapeutic heat that promotes relaxation and improved sleep.

WEIGHT LOSS

FIR increases heart rate, cardiac output and metabolic rate, which burns more calories and leads to greater weight loss.

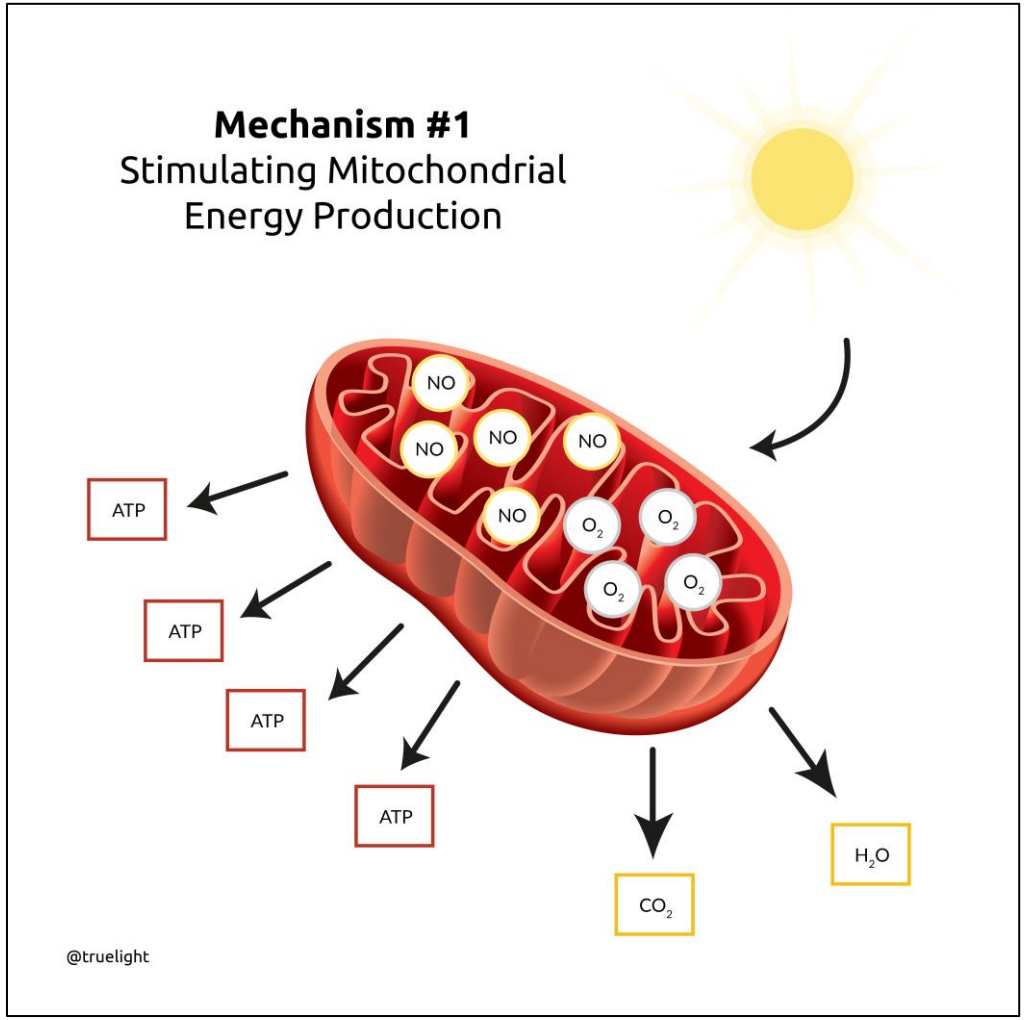


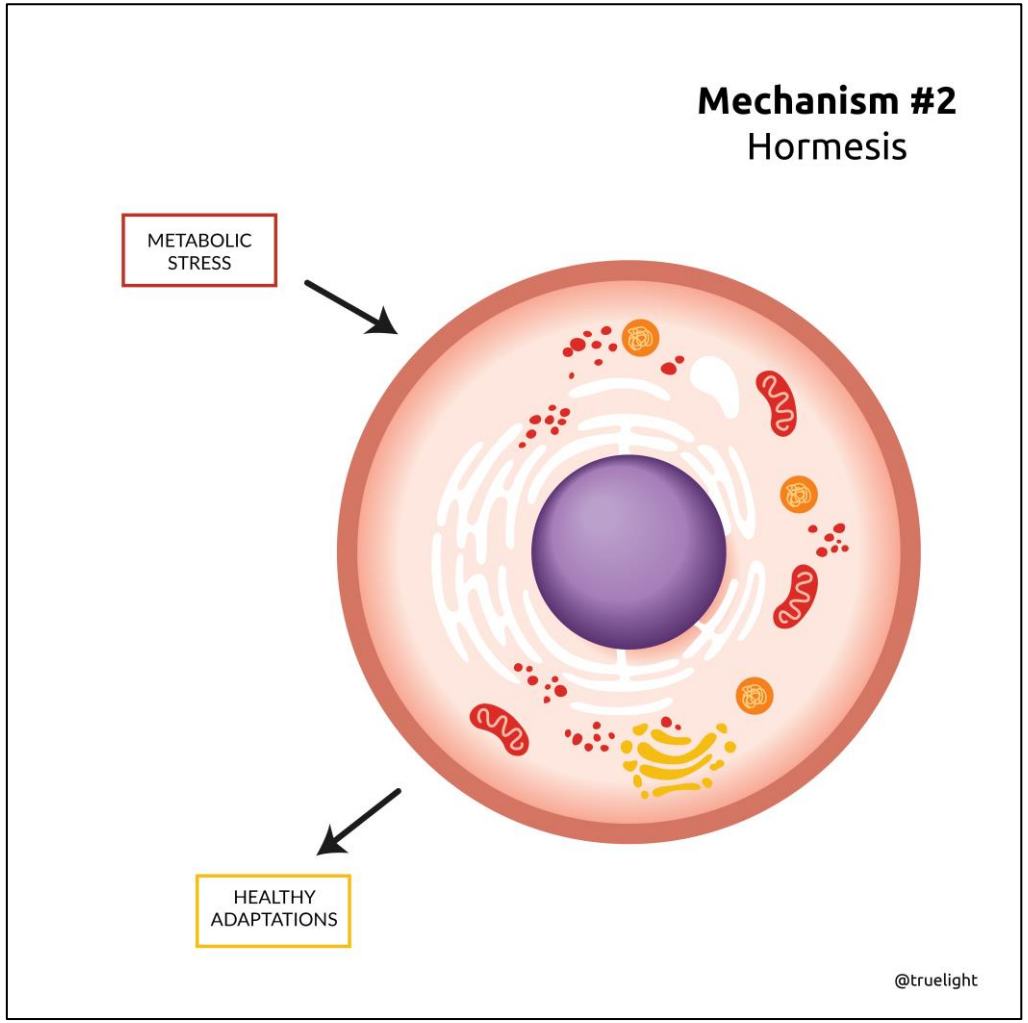
NIR AND RED LIGHT

While NIR is invisible, and Red Light is visible, they have very similar mechanisms and potential health benefits.

NIR (750nm – 2,500nm) has a very deep penetration level, reaching all the way down to our cells, where the light activates the mitochondria to produce more ATP (energy). Red Light sits on the “long end” of the visible spectrum with wavelengths of 630nm-700nm. This light is best suited for healing the skin’s surface.

KEY MECHANISMS





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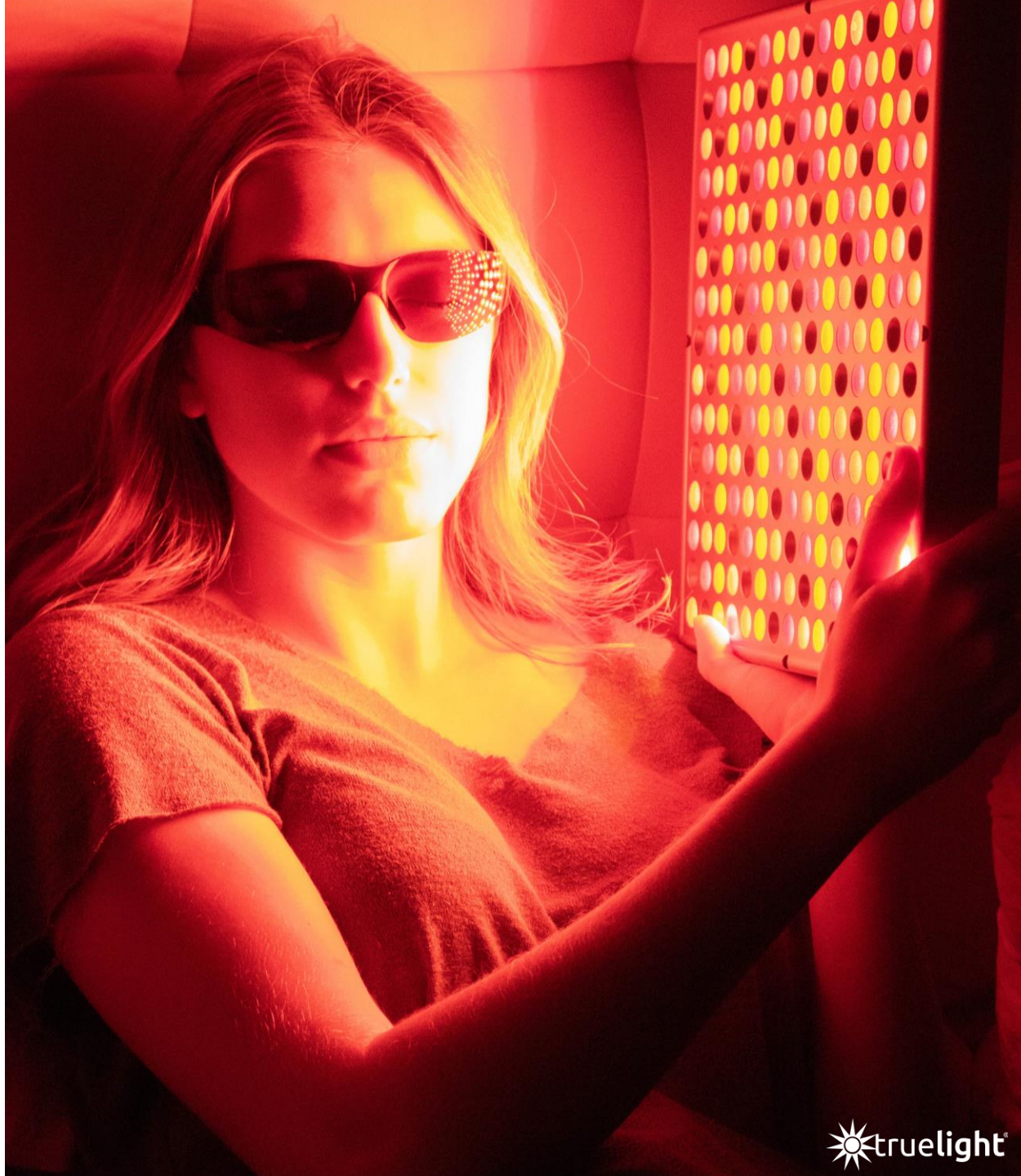
LED light therapy, also known as photobiomodulation (PBM) or low-level laser therapy (LLLT), is a painless, drug-free, non-invasive treatment for healing the body from the surface of the skin all the way down to the bone.

LED LIGHT THERAPY

LED light therapy is, in essence, like photosynthesis for the skin and body – giving your cells the energy they need to help you relax, recover, and rejuvenate. Researchers working with NASA have found that LED light therapy activates color-sensitive chemicals in body tissues, stimulating the process in a cell's mitochondria.



BETTER [CELLULAR] HEALTH & PERFORMANCE

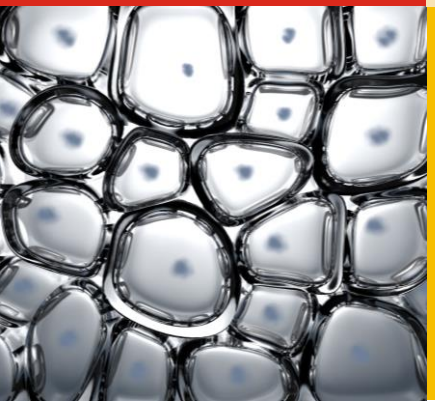
More cellular energy production allows the body as a whole to function better

IMPROVED CIRCULATION

Mitochondria convert photonic energy to help increase local blood circulation

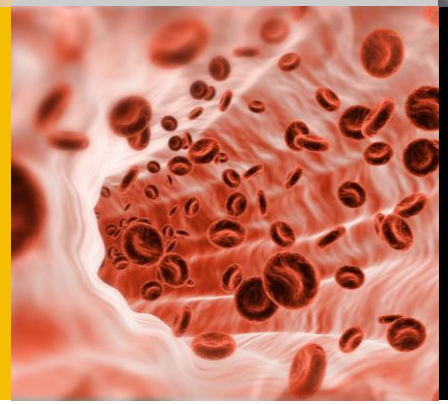
LESS PAIN AND INFLAMMATION

These effects are both local, where light is applied, and systemic, in other tissues and organs in the body



ANTI-AGING, BETTER SKIN

Promotes radiant skin, reduces fine lines, wrinkles, and scars



FASTER MUSCLE RECOVERY

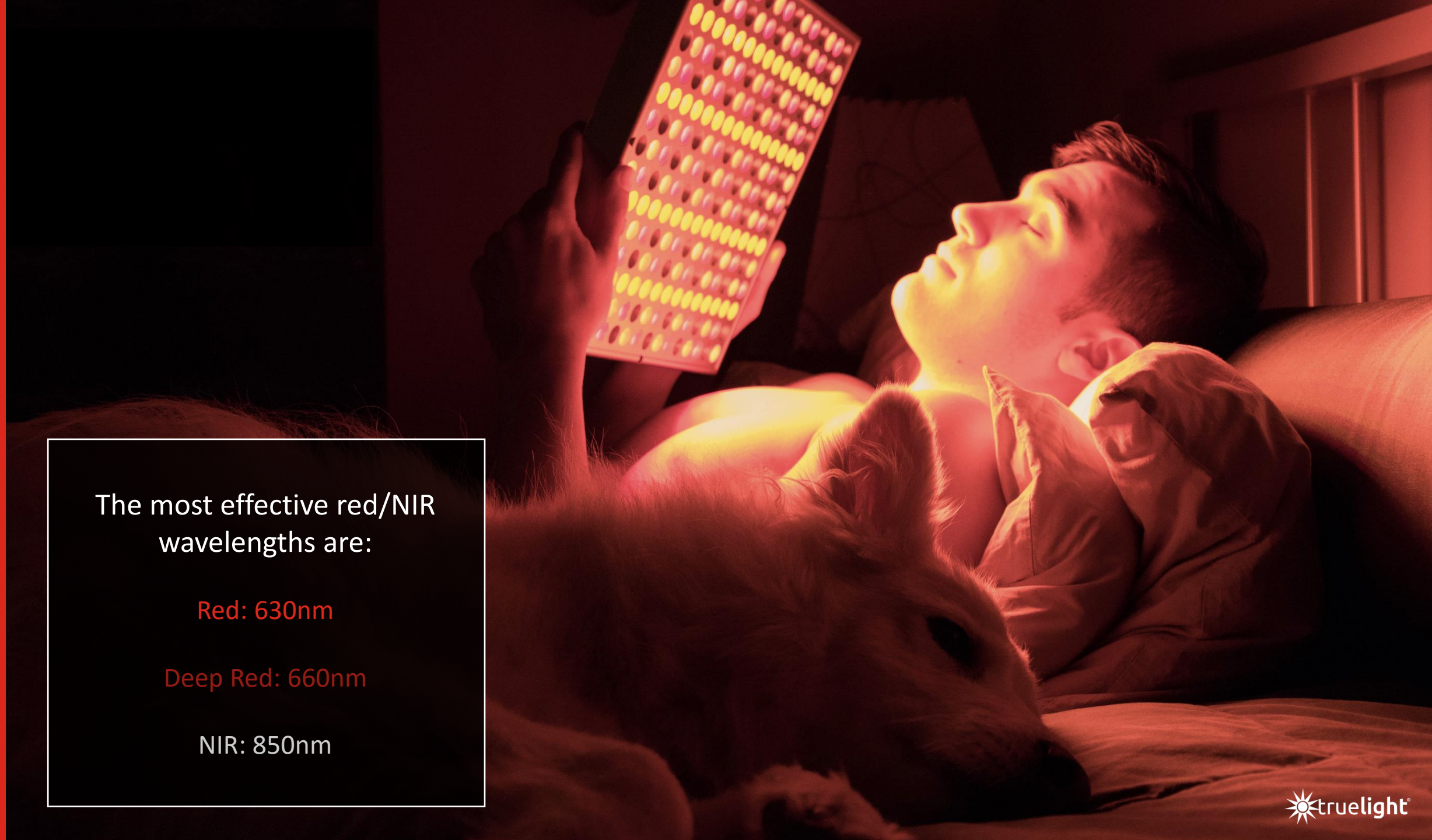
More energy in your cells allows your muscles to repair and recover faster

DEEPER SLEEP

Red light is “warmer”, making it more conducive for better sleep at night

AND SO MANY OTHER POTENTIAL BENEFITS

There are now *over 3,000 peer-reviewed scientific studies* showing that NIR and red light therapy can help you: slow down the process of aging, lose fat, reduce chronic inflammation and pain, increase strength and muscle recovery, speed up wound/injury healing, combat some autoimmune conditions and improve hormonal health, optimize your brain function and mood, and improve your energy levels.



The most effective red/NIR wavelengths are:

Red: 630nm

Deep Red: 660nm

NIR: 850nm

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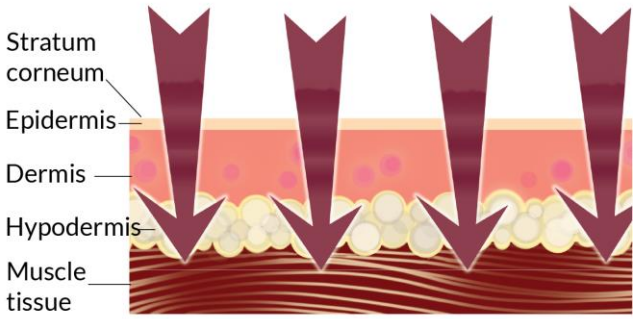
STRENGTHENING LIGHT

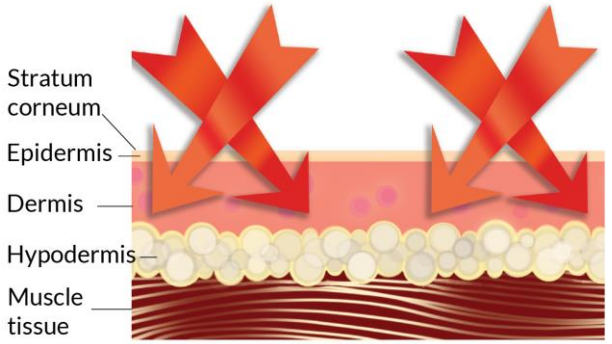


NEAR-INFRARED LIGHT 850NM (invisible)

Potential Benefits:

- Protection against oxidative stress
- Faster growth and repair of new muscles cells and tissues
- Detoxification
- Improved thyroid function

REJUVENATION LIGHT

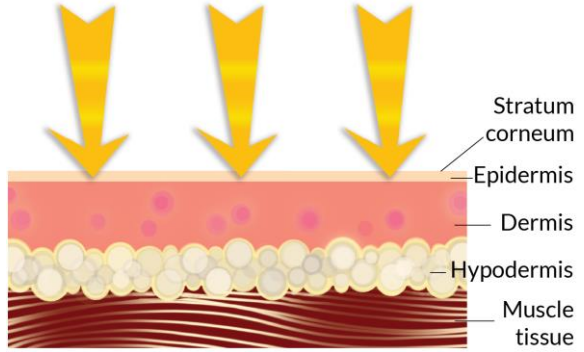


RED LIGHT 660NM AND 630NM

Potential Benefits:

- Reduced scars, wrinkles, and fine lines
- Greater collagen production
- Improved strength & muscle recovery
- Better blood circulation
- Anti-inflammatory effects and pain relief

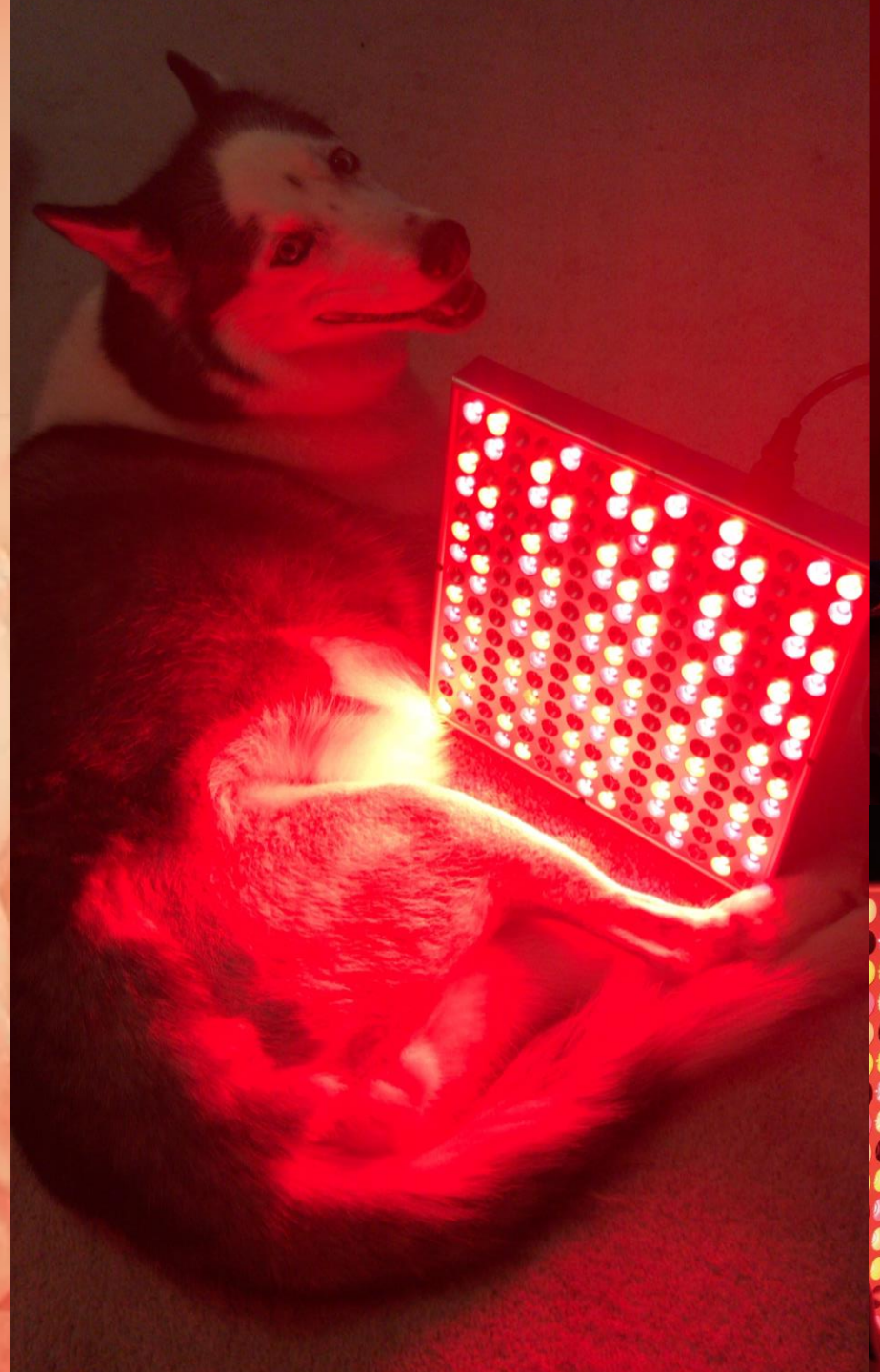
PREPARATION LIGHT



YELLOW / AMBER LIGHT 580NM

Potential Benefits:

- Alleviates skin redness, flushing, and irritation
- Reduces rosacea
- Treats UV radiation damage
- Boosts lymphatic flow
- Increases cellular growth

RECAP & CONCLUSION

01. NOT ALL LIGHT IS CREATED EQUAL

There are "bioactive" wavelengths that help regulate your sleep, mood, focus, important hormones, and more.

02. RED AND NIR LIGHT ARE LIKE MAGIC PILLS

These wavelengths have unique properties that help stimulate increased ATP production for better skin, hormone balance, circulation, muscle recovery, and much more.

03. RELAX, RECOVER & REJUVENATE WITH TRUELIGHT

For better sleep, dimmable and tunable bulbs that emit primarily red light and ZERO blue light are the most effective lighting option for your home.

THANK YOU!

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