



Circadian Rhythms, Lighting, & Your Health

What you need to know in order
to sleep, feel, and live better.

by Megan Soffer, Brand & Digital
Marketing Manager at TrueDark

WHAT WE WILL COVER

01. WHAT ARE CIRCADIAN RHYTHMS?

Take a deep dive on the science behind circadian clocks and how they influence our cells, hormones, sleep, and more.

02. WHAT IS “JUNK LIGHT”?

Explore why overexposure to conventional lighting is arguably worse than consuming junk food, and how it can put you at a greater risk of experiencing many different health concerns.

03. HOW TO GET YOUR LIGHT RIGHT

Learn helpful tips for keeping your circadian rhythm on track so that you can feel and function your best.



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.

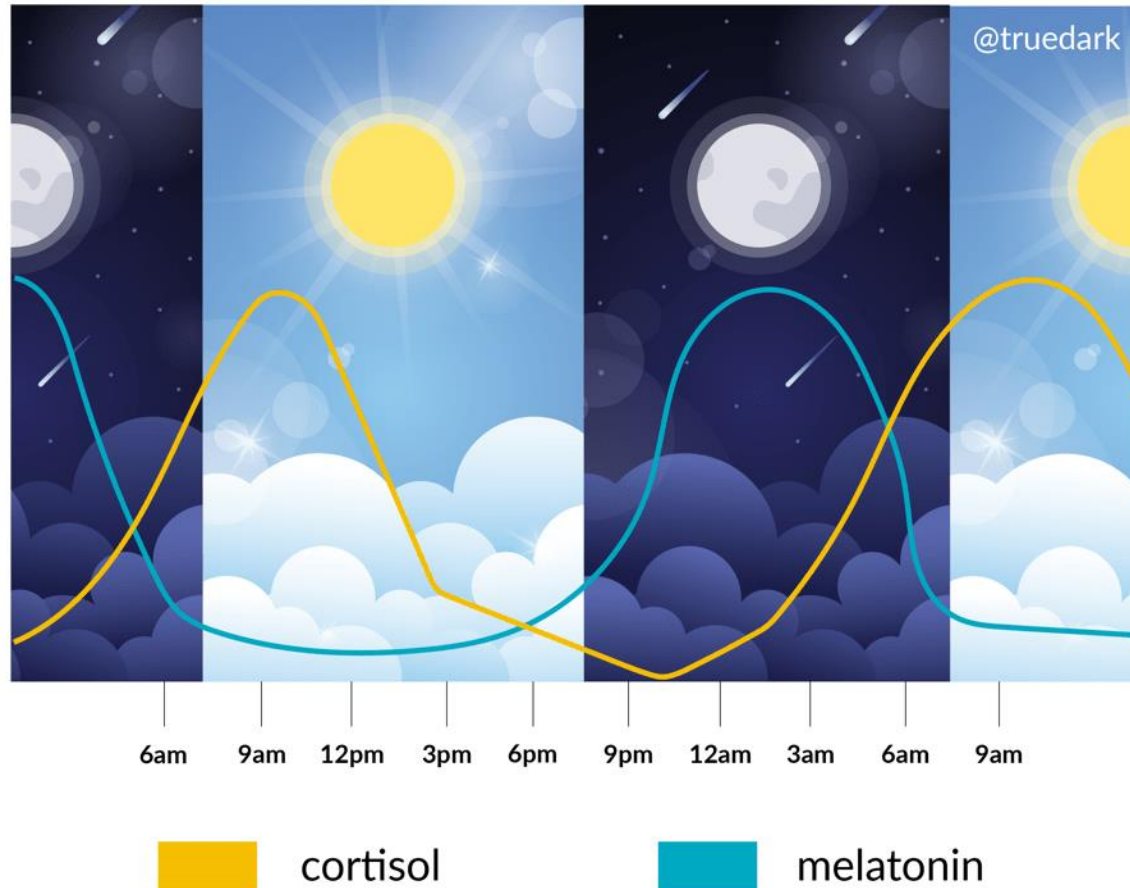


SLEEP

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

CIRCADIAN RHYTHM

Daily Cortisol and Melatonin Levels



Thanks to three scientists (that won the 2017 Nobel Prize in Medicine) we now have a better understanding of the molecular mechanisms that influence circadian rhythms. In studying fruit flies, the scientists discovered a gene-encoded protein that oscillates between high levels at night and low levels during the daytime, in synchrony with a 24-hour cycle. Their findings support the notion that circadian rhythms primarily respond to light and darkness, and that they help the body's master clock adapt human physiology to the different phases of the day.

This natural cycle of light to dark and back directly influences the genes that speed up, slow down, or reset your circadian rhythms. Your body not only anticipates this oscillation, but it also adapts to it so that you can feel and function your best.

HAPPY HORMONES

The Reward Chemical

Plays a big role in your ability to feel pleasure, and helps you execute tasks

Dopamine

The Mood Stabilizer

Regulates mood, sleep, appetite, digestion, and memory

Serotonin

Endorphins

The Pain Killer

It helps reduce feelings of pain and promotes relaxation.

Oxytocin

The Love Hormone

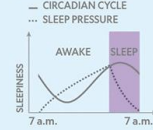
Released in response to physical connection (like hugs). This plays a huge role in interpersonal relationships.

MASTER CLOCK

HOW LIGHT AFFECTS US

How perky we're feeling at any moment depends on the interaction of two processes: "Sleep pressure," which is thought to be created by sleep-promoting substances that accumulate in the brain during waking hours, and our circadian rhythm, the internal clock that keeps brain and body in sync with the sun. The clock can be set backward or forward by light. We're particularly sensitive to blue (short-wavelength) light, the kind that brightens midday sunlight and our computer screens, but can disrupt our cycle—especially at night, when we need the dark to cue us to sleep.

SLEEP DRIVERS



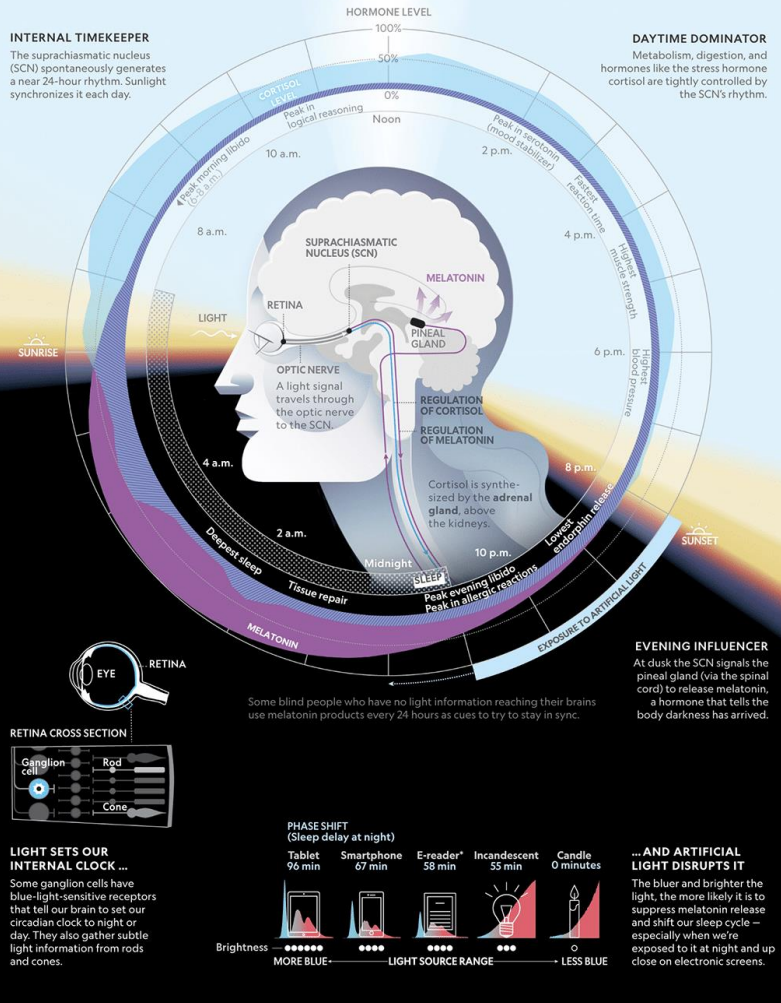
The pressure to sleep builds throughout the day.

INTERNAL TIMEKEEPER

The suprachiasmatic nucleus (SCN) spontaneously generates a near 24-hour rhythm. Sunlight synchronizes it each day.

DAYTIME DOMINATOR

Metabolism, digestion, and hormones like the stress hormone cortisol are tightly controlled by the SCN's rhythm.



THE MASTER CLOCK CONTROLS EVERYTHING

The suprachiasmatic nucleus (SCN) is essentially the brain's master clock that regulates circadian rhythms in the body.

This structure 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.

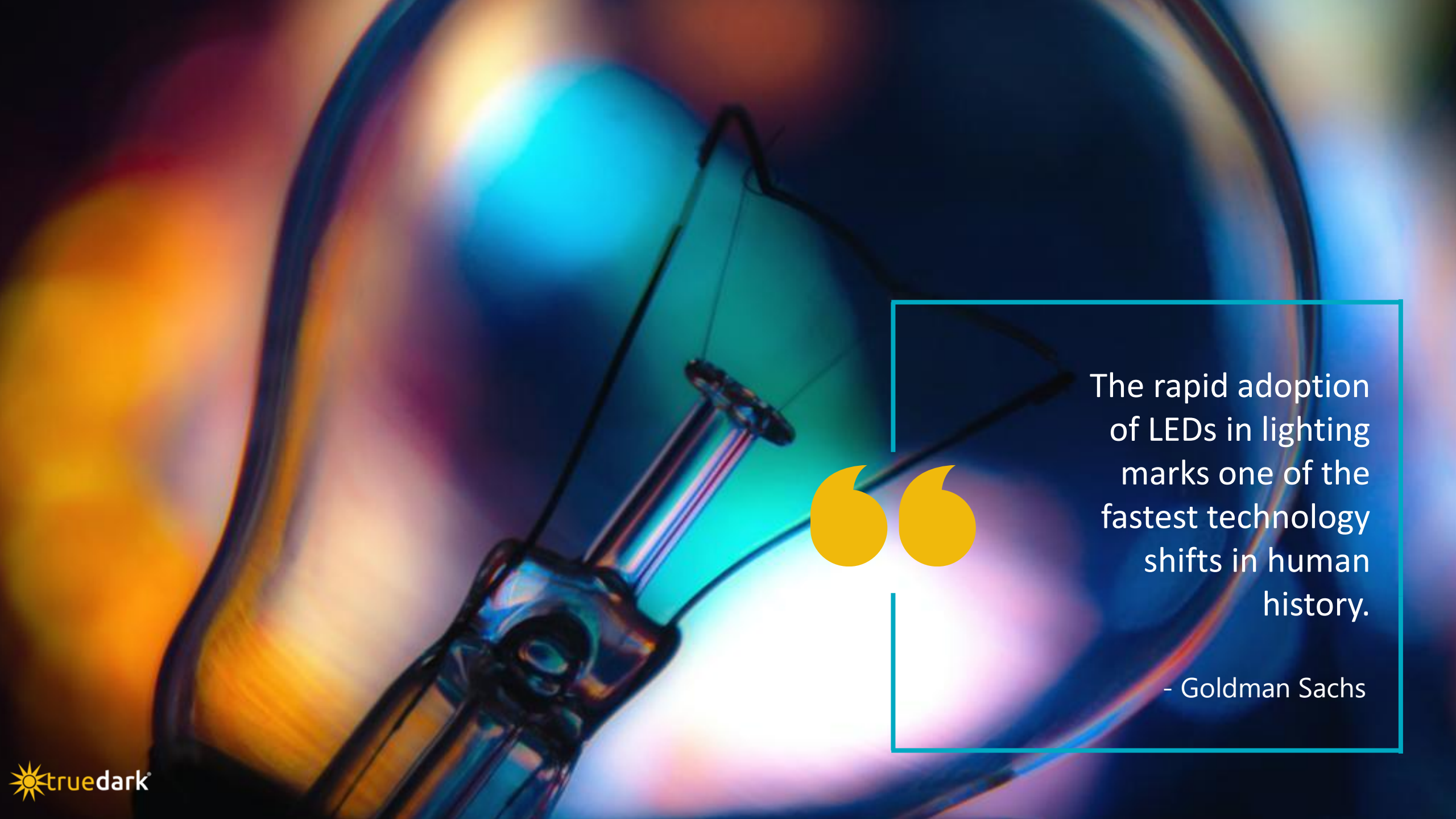


ARE WE CONFUSING OUR CLOCKS?



LIGHTING EVOLUTION





The rapid adoption of LEDs in lighting marks one of the fastest technology shifts in human history.

- Goldman Sachs



TRADITIONAL INCANDESCENT

These lamps produce visible light by heating a tiny coil or filament of tungsten wire that glows when it is heated by an electrical current. These bulbs do not have a long life span.



HALOGEN INCANDESCENT

Also known as a tungsten halogen, this bulb works similarly to a traditional incandescent, but it uses halogen gas. It also requires more heat to light up.



COMPACT FLOURESCENT (CFL)

In CFLs, an electric current is driven through a tube containing argon and mercury vapor to help create light. CFLs use about 70% less energy than incandescent bulbs.



LIGHT-EMITTING DIODE (LED)

LEDs are considered more cost-effective. They don't waste energy by relying on excess heat. This makes them safer and is why they don't need the large, fragile glass bulbs full of toxic gasses.



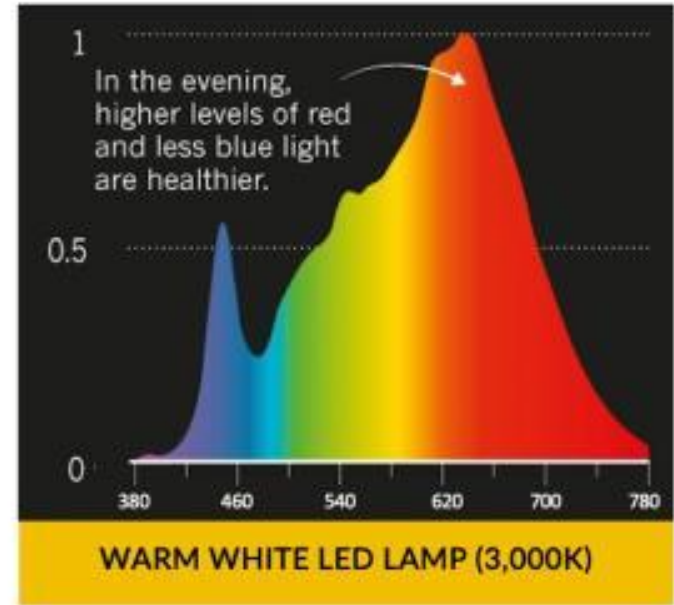
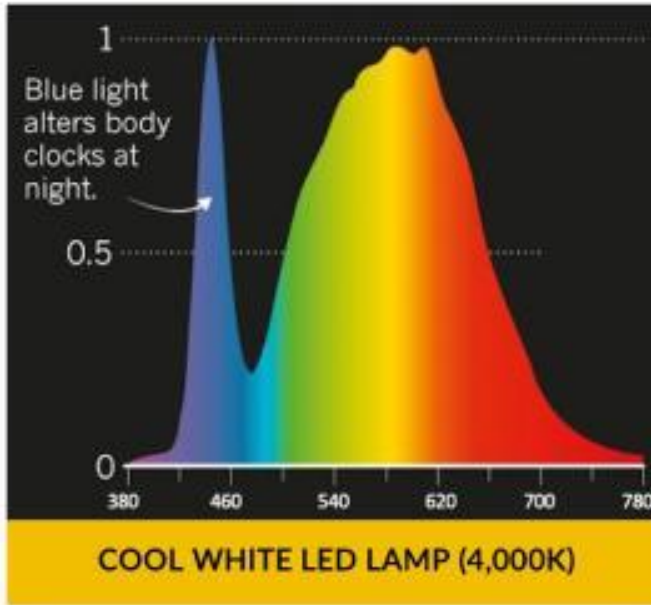
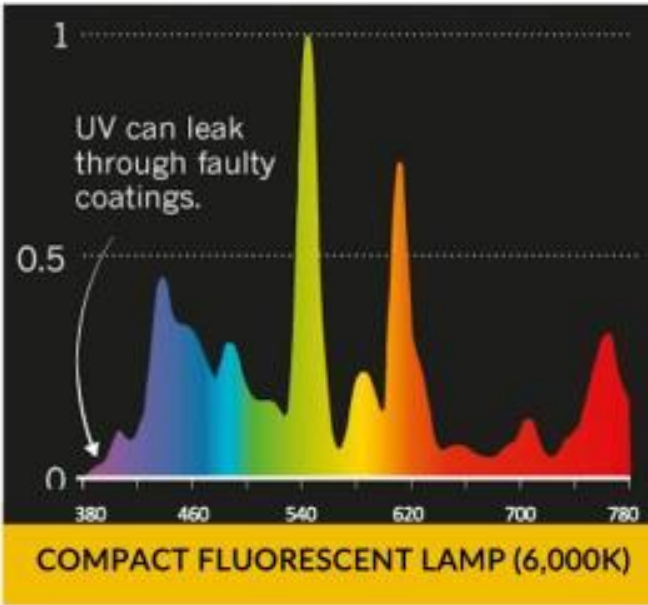
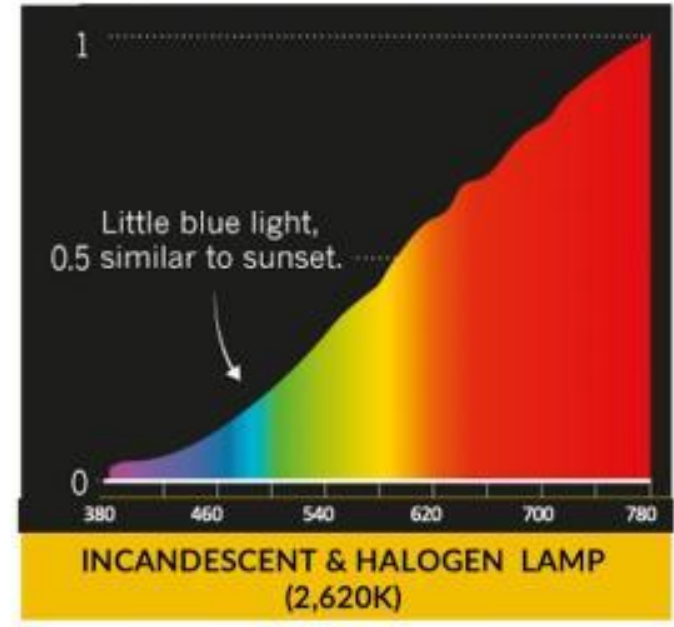
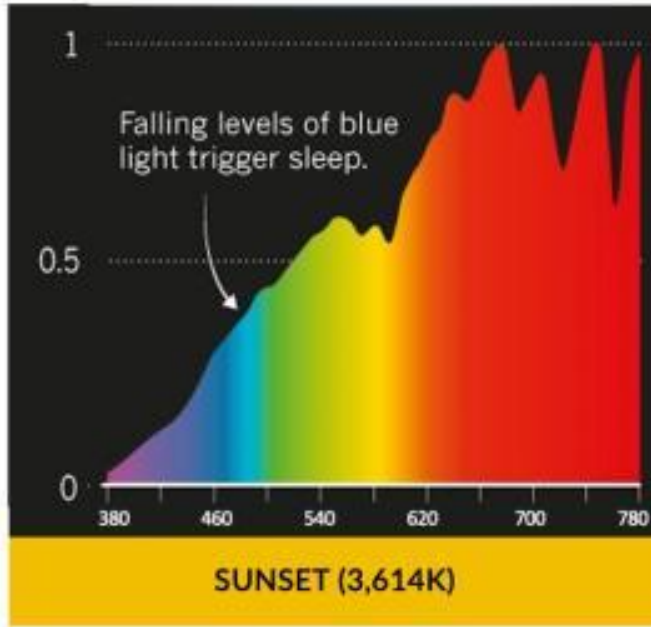
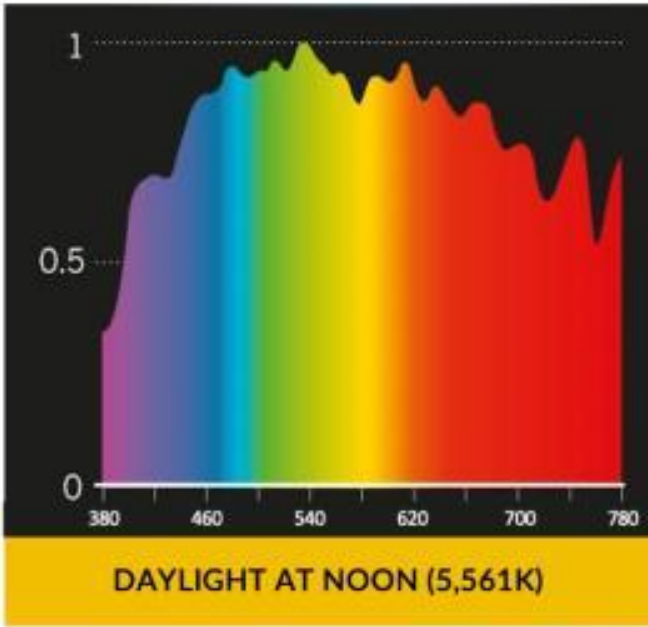
WHAT IS JUNK LIGHT?

“Junk light” 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.

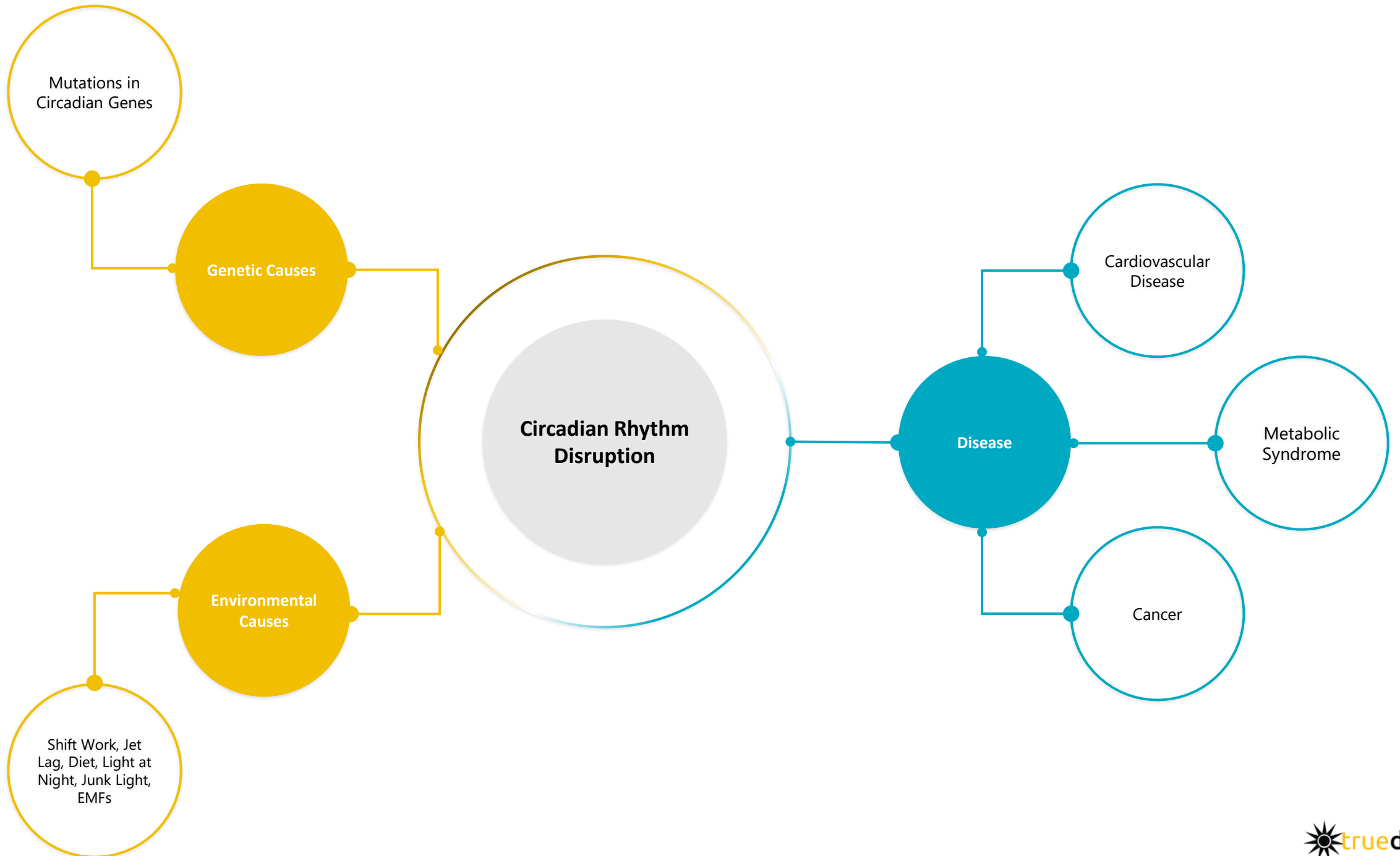
GREEN LIGHT | 492-577nm

BLUE LIGHT | 455-492nm

VIOLET LIGHT | 400-455nm







HEALTH IMPACTS



"Just about everything that takes place physiologically is really staged along the circadian cycle. What's now emerging is the idea that [preserving] the circadian cycle is quite important in health maintenance, and if it gets broken, there's a penalty to be paid in health and perhaps in aging."

- Leonard Guarente, Director of [The Paul F. Glenn Center for Biology of Aging Research at MIT](#)

INSOMNIA

Excessive amounts of blue light in the evening suppresses melatonin production and leaves you feeling "wired and tired".

MOOD DISORDERS

Sleep and mood are closely connected; chronic insomnia may increase the risk of developing anxiety or depression.

WEAKENED IMMUNE SYSTEM

Constant exposure to light can trigger inflammation, muscle loss, and early signs of osteoporosis.

THE FOUR KILLERS

Insufficient sleep puts you at a greater risk of experiencing heart disease, diabetes, Alzheimer's, and even cancer.






Exposing yourself to artificial junk light rather than natural sunlight or incandescent light , which contains less blue light than other artificial sources, is kind of like the difference between eating a normal meal and eating a bowl of sugar containing the same number of calories. Artificial blue light is the high-fructose corn syrup of lighting. And when you consider the fact that the average American spends 93% of his or her life under artificial lights – most often fluorescent or LED – it’s no surprise that the incidence of all Four Killers is on the rise.

- Dave Asprey, Founder of Bulletproof and NYT Best-Seller



A woman with curly hair is shown in profile, looking down thoughtfully. She is in a bedroom at night, with a lamp glowing in the background. The scene is dimly lit, creating a calm and contemplative atmosphere.

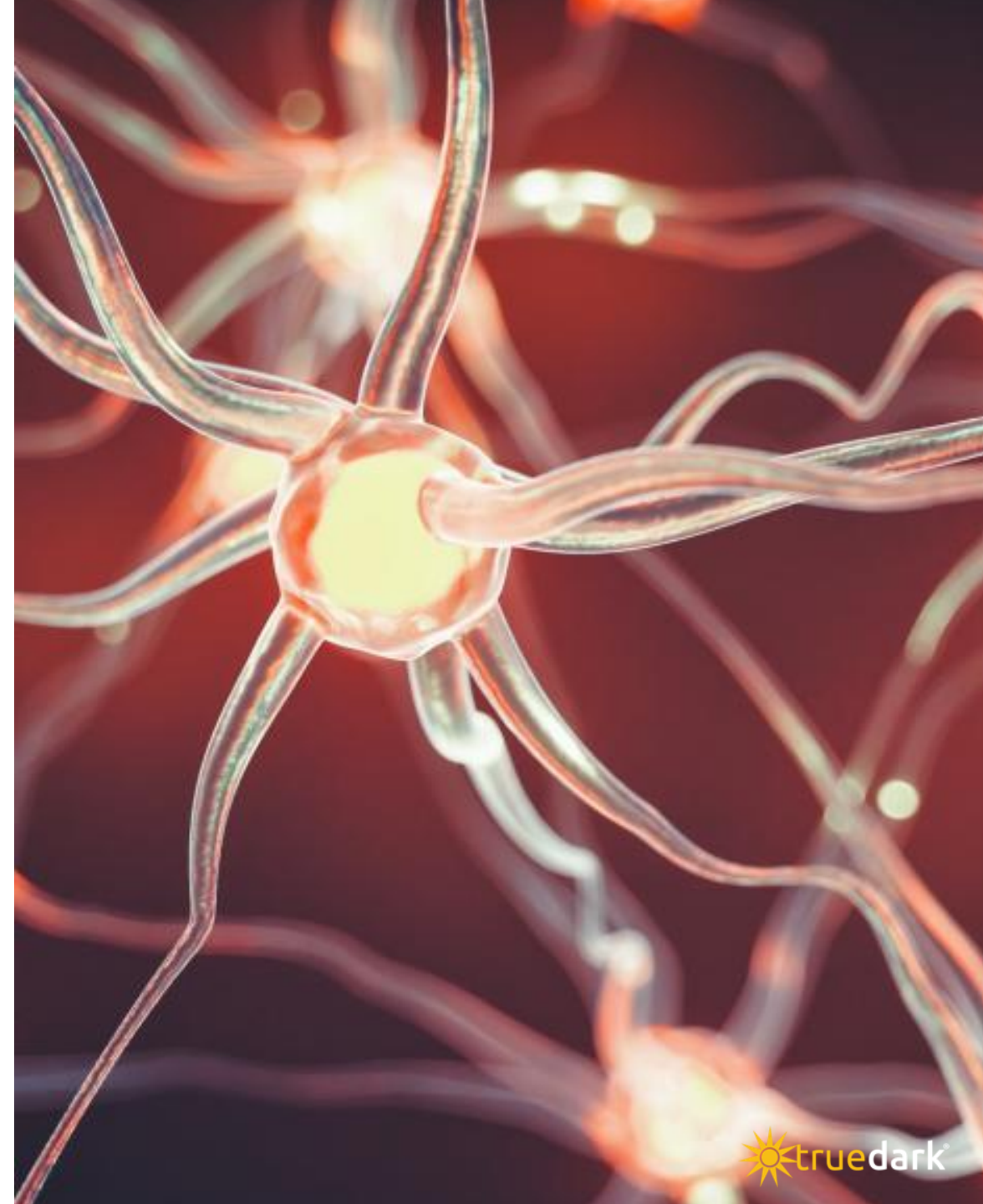
After just one night of getting only four or five hours of sleep, your natural killer cells—the ones that attack the cancer cells that appear in your body every day—drop by 70%.

- Matthew Walker,
Neuroscientist

ONE NIGHT

of poor sleep leads to an increase in beta-amyloid, a protein in the brain associated with impaired brain function and Alzheimer's disease.

- *National Institutes of Health (NIH)*

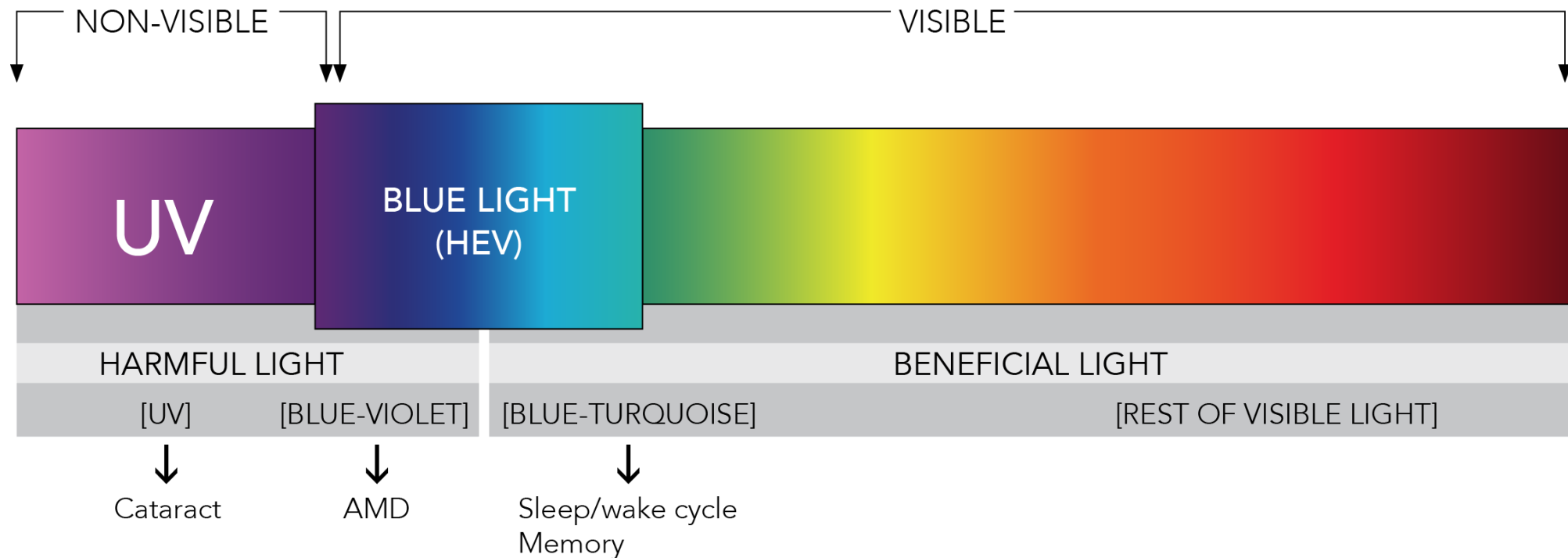




**Junk light is worse than junk
food.
But not all blue light is bad.**

BLUE LIGHT

Blue-violet light is considered more harmful whereas blue turquoise is healthy blue light that your mind and body need in order to feel and function your best.



NATURAL BLUE LIGHT

STIMULATES CIRCADIAN RESPONSES

The sky-blue region near 490nm is considered the key wavelength within the blue light spectrum because that is where the human body's circadian system has peak sensitivity.

BOOSTS ALERTNESS, FOCUS & MOOD

Sunlight helps boost a chemical in your brain called serotonin, and that can give you more energy and help keep you calm, positive, and focused.

CAN HELP IMPROVE COGNITIVE PERFORMANCE

Daytime exposure to blue light has been shown to activate functional brain responses in brainstem areas that help enhance memory performance.



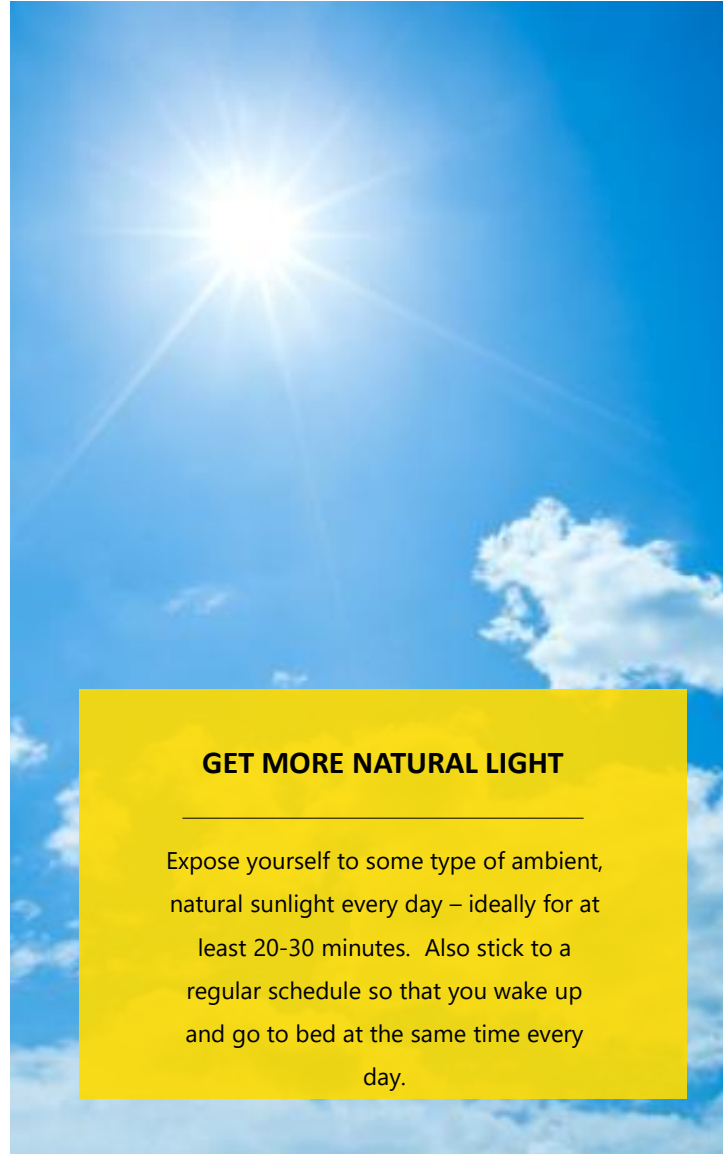


We cannot go back to the Stone Age, we cannot turn off all the lights and just live under day and night, but if we learn about what disrupts circadian rhythms and how we can nurture [these] rhythms, then we can still live in this modern society, [...] be healthy, prevent diseases, and even reverse some diseases.

- Satchin Panda, Author of *The Circadian Code* & Professor at SALK Institute

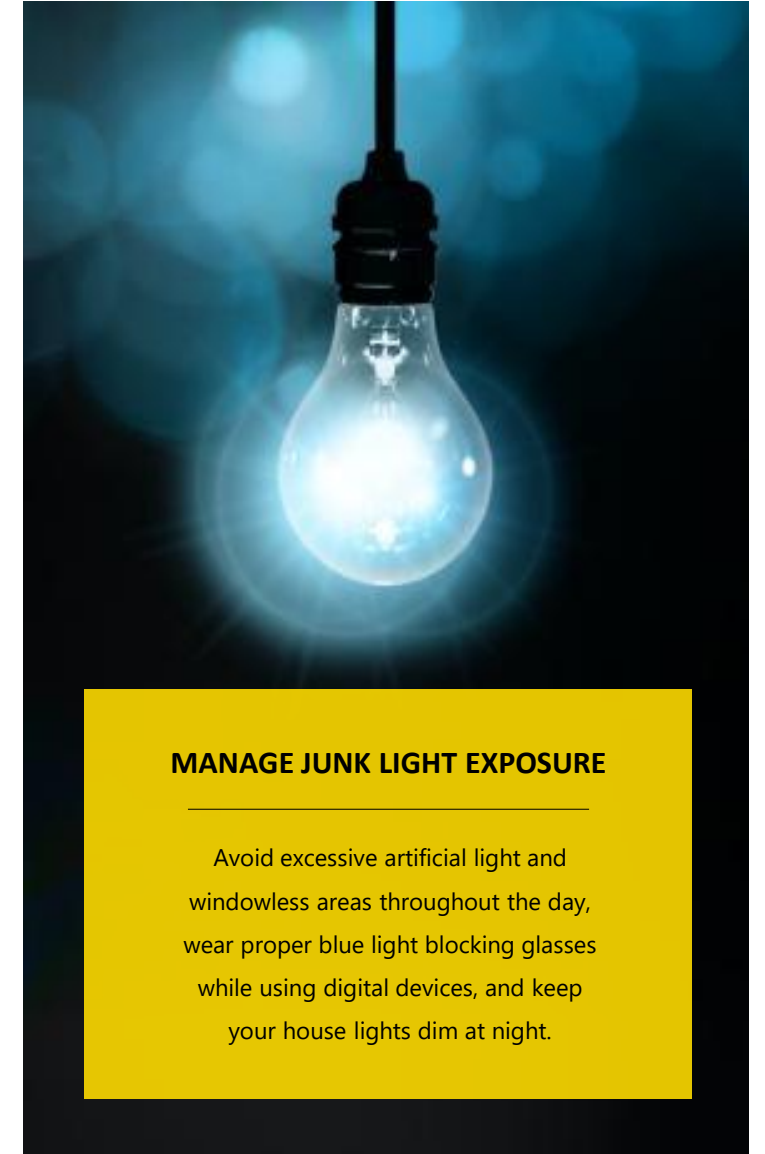
GET YOUR LIGHT RIGHT

For optimal health, a 2-pronged approach is ideal for keeping your circadian rhythm in sync, as nature intended.



GET MORE NATURAL LIGHT

Expose yourself to some type of ambient, natural sunlight every day – ideally for at least 20-30 minutes. Also stick to a regular schedule so that you wake up and go to bed at the same time every day.



MANAGE JUNK LIGHT EXPOSURE

Avoid excessive artificial light and windowless areas throughout the day, wear proper blue light blocking glasses while using digital devices, and keep your house lights dim at night.

BLUE BLOCKERS

Not all lenses are the same; certain lens colors and technologies are designed for specific purposes.

Different lens colors block out different amounts of different wavelengths.



DAYTIME LENSES

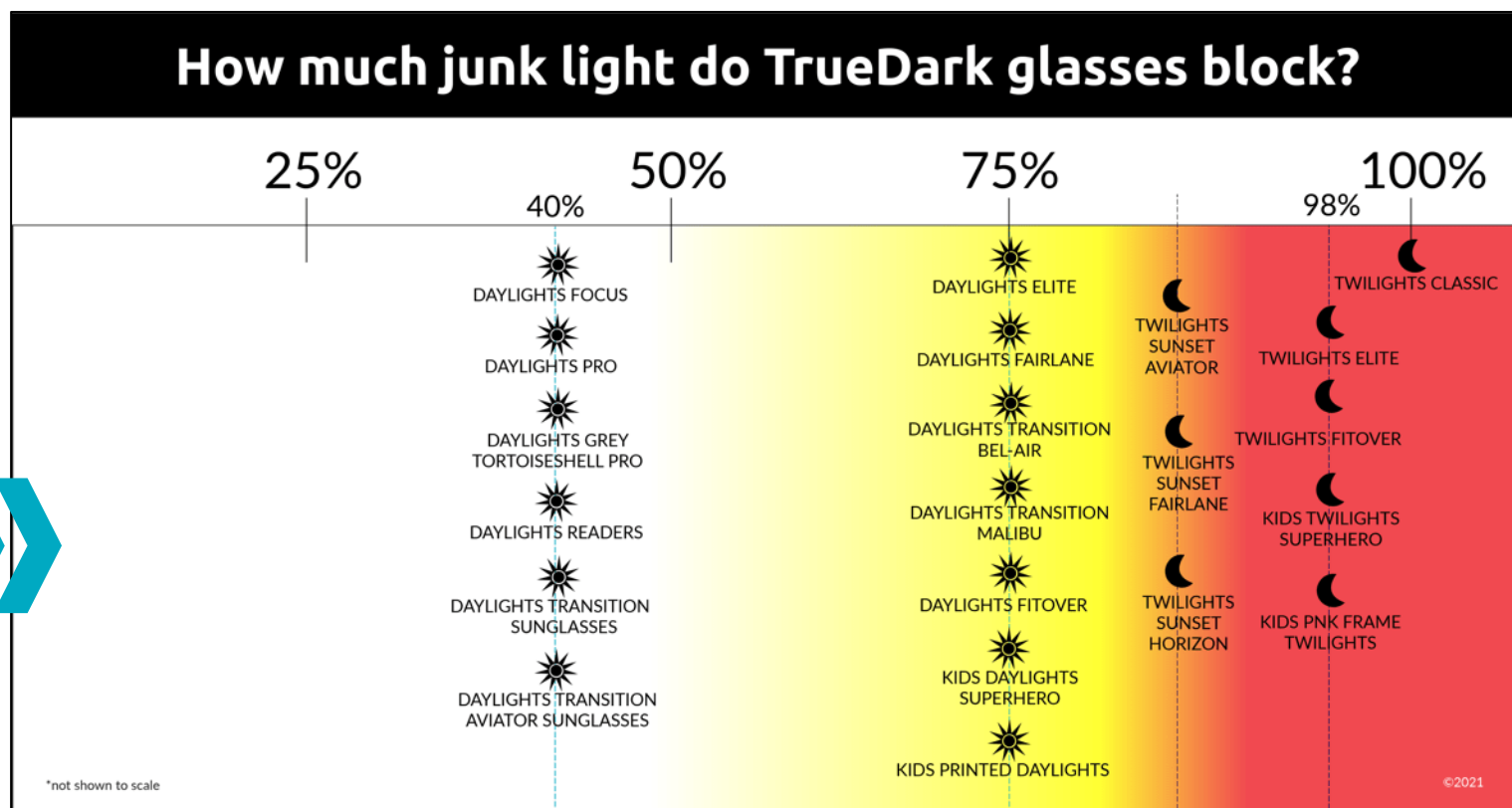
Refers to clear or yellow lenses ONLY. The key here is to prevent overexposure to blue light exposure, not block it out completely.

TRANSITION LENSES

These lenses have 2-in-1 technology that transition when exposed to natural sunlight. Block artificial blue light inside and UV rays outside.

NIGHTTIME LENSES

Refers to darker (red) lenses that block blue, green & violet light. These are ideal to wear 30-90 mins before bedtime, or while traveling across time zones.



TRUEDARK TRANSITION SUNGLASSES





PRESCRIPTION GLASSES

TrueDark now offers the most dynamic collection of custom single vision Rx glasses for today's [over] screen-lit world.

TrueDark's full prescription lineup includes:

- Clear Lenses that block 30% of blue light
- Clear Transition UV 400 Lenses that block 30-40% of blue light indoors and 99% of UVA/UVB outdoors
- Yellow Lenses that block 75% of blue light
- Red Lenses that block 98-100% of blue, green, and violet light
- Gradient Red to Amber Lenses that blocks 99% of blue light and 93%-73% of green light from top to bottom, respectively

ORANGE LENSES

The very first “blue blockers” were big, orange clunky glasses developed by NASA in the 1970s. Since then, many studies have illustrated that orange lenses aren’t as effective as they were once thought to be — because they block too much blue light during the day, and not enough of the full junk light spectrum at night.



CIRCADIAN LIGHTING

Your home is your sanctuary, and now more than ever, you're spending more time inside of it. Make your living environment circadian-friendly.

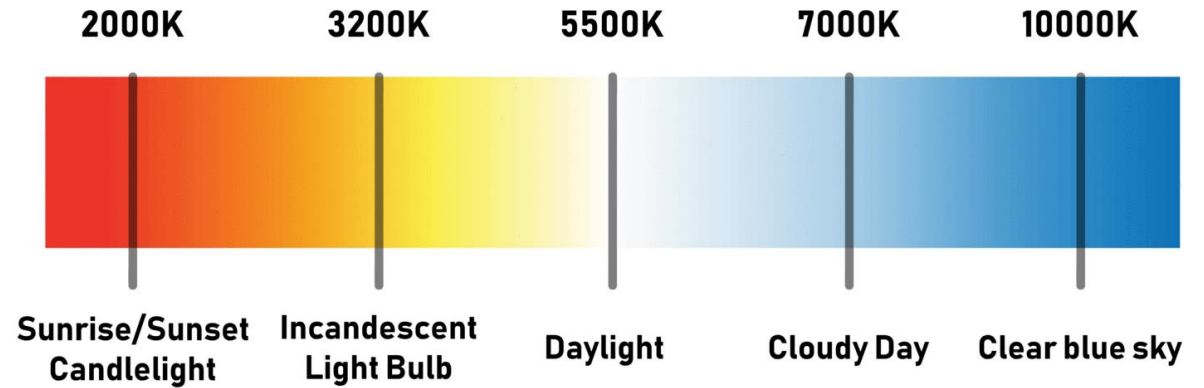
Circadian lighting, also known as human-centric lighting, is intentionally designed to help keep your body's internal clock aligned with the 24-hour diurnal/nocturnal cycle.



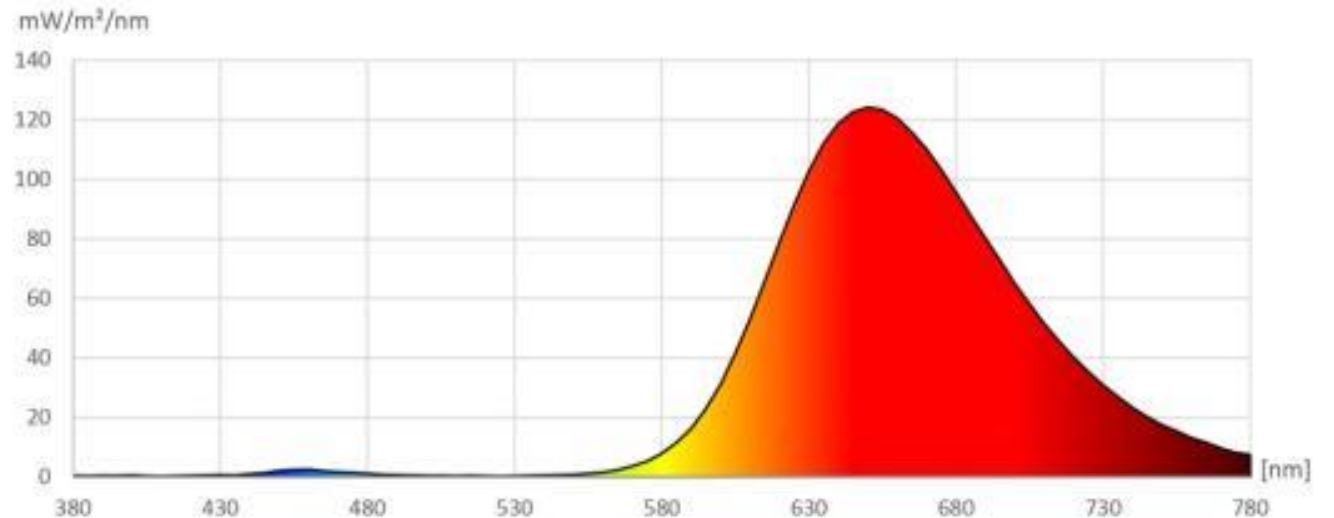
SLEEP LIGHTING

When it comes to sleep, there's no room for compromise.

For nighttime, you want to choose light bulbs that primarily emit red light and essentially emit ZERO blue light. This will help promote natural melatonin production and faster, deeper sleep.



Ideal Light Exposure for Nighttime





PORTABLE NIGHTLIGHT

The TrueLight Luna Red® portable nightlight features motion and dusk-to-dawn sensors which automatically shut off with the presence of light. This product is also ideal for travel.



LIGHT BULB

The new TrueLight Luna Red™ Sunset Sleep Light Bulb, inspired by TrueDark Twilights Sunset eyewear, primarily emits red wavelengths of light and offers dimming capabilities to allow users to customize their space effectively before bedtime.



NIGHTLIGHT + FLASHLIGHT

Tired of flipping light switches and tripping over the dog at night? The TrueLight Luna Red® Nightlight + Flashlight is a motion-sensing device that minimizes brightness and emits red light only to help keep your sleep/wake cycle on track.

RECAP & CONCLUSION

01. LIGHT AND DARK CYCLES

These cycles are essential for keeping your circadian rhythm in sync, regulating vital hormones, and keeping your immune system strong.

02. NATURAL LIGHT VS JUNK LIGHT

Not all blue light is bad, but overexposure to artificial junk light can wreak havoc on your circadian rhythm, mood, performance and more.

03. HOW TO GET YOUR LIGHT RIGHT

Get at least 20-30 mins of natural sunlight each day, and proactively limit your exposure to artificial light with blue light blocking glasses and light bulbs that support circadian health.





SPECIAL OFFER

*Save 25% off
TrueDark products*

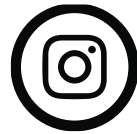
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