



# MELATONIN: KEY TO OPTIMAL HEALTH

# MELATONIN AT A GLANCE

Melatonin is a hormone produced in the pineal gland, retina, GI tract, and white blood cells that is associated with sleep. In addition, there are melatonin receptors expressed all over the body, for example, in the intestines, fat tissue, kidneys, liver, lungs, adrenals, and other organs. The amount of melatonin the body produces decreases as one ages and depends on the activity of an enzyme called serotonin-N-acetyltransferase (NAT). The body's production of NAT, on the other hand, depends on its storage of vitamin B6.

Melatonin is also found in many foods, such as tart cherries, bananas and pistachios.






## HERE'S A TWIST

### TWO TYPES OF MELATONIN?

*“There are two types of melatonin in your body: the melatonin produced in your pineal gland, which traverses into your blood, and subcellular melatonin produced inside your mitochondria.” [Source](#)*

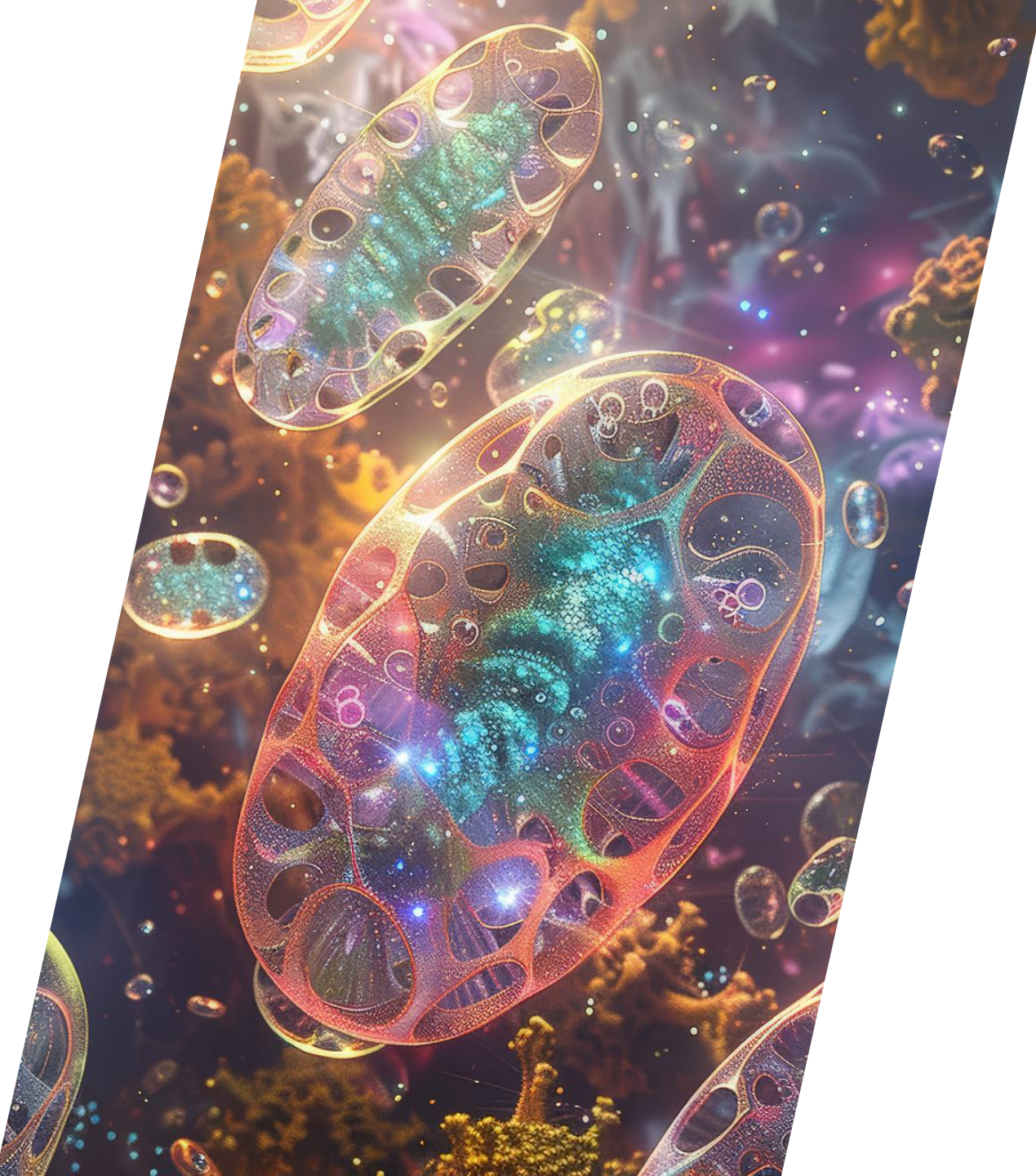


# MELATONIN – MUCH MORE THAN WE THOUGHT!



*“Melatonin is an ancient molecule that is evident in high concentrations in various tissues throughout the body. It can be separated into two pools; one of which is synthesized by the pineal and can be found in blood, and the second by various tissues and is present in these tissues. Pineal melatonin levels display a circadian rhythm while tissue melatonin does not. For decades now, melatonin has been implicated in promoting and maintaining sleep. More recently, evidence indicates that it also plays an important role in neuroprotection.”*

[Melatonin: More Than Just the Hormone That Regulates Sleep](#)

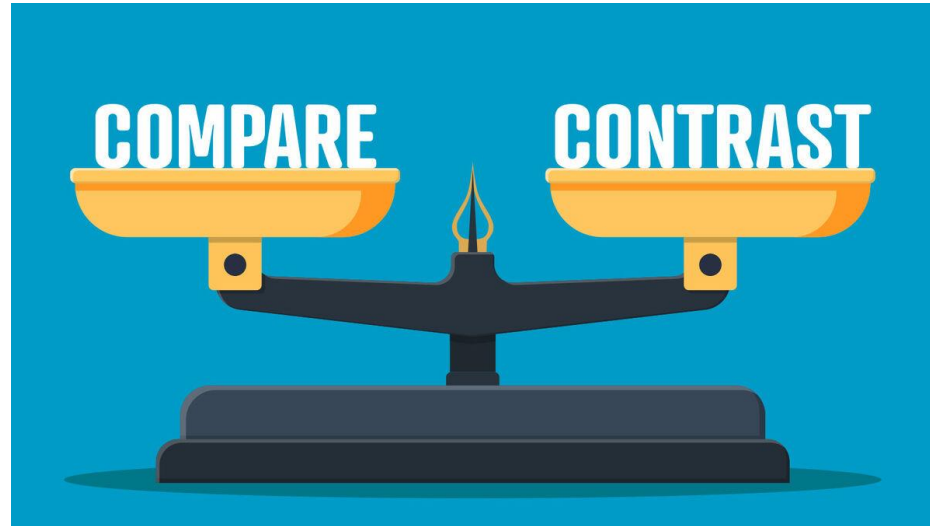


## MELATONIN & THE MITOCHONDRIA

*“So, it's very important to have a good **antioxidant** at the level of the mitochondria and **melatonin** happens to be located and is, in fact, synthesized in the mitochondria. Melatonin scavenges radicals that are generated, but it also stimulates something called sirtuin-3, which activates or deacetylates super oxide dismutase (SOD), which is a very **important antioxidative enzyme.**”*



*“Melatonin production in the pineal gland is highly rhythmic, depending on the light-dark cycle. This is not true for melatonin in mitochondria. It's not cyclic. It's not impacted by the light dark environment. It may be affected by certain wavelengths of energy, but it's not affected by the light dark environment.”*



*So, blood levels are derived from the pineal gland, and this rhythm is very important for setting circadian rhythms. In other words, the function of that melatonin is quite different from the function of the mitochondrial produced melatonin. It sets the rhythm. Of course, there's always some scavenging by that melatonin as well, but the real scavenging is involved with mitochondrial-produced melatonin.”*

# PINEAL GLAND VS. MITOCHONDRIAL MELATONIN

## PINEAL GLAND MELATONIN

- CIRCULATES IN THE BLOODSTREAM
- HIGHLY RHYTHMIC, DEPENDENT ON THE LIGHT-DARK CYCLE
- SETS THE CIRCADIAN RHYTHM – SLEEP/WAKE CYCLE IN THE BODY
- SOME FREE RADICAL SCAVENGING (ANTIOXIDANT ACTIVITY) BUT NOT CLOSE TO THAT PERFORMED BY MITOCHONDRIAL MELATONIN

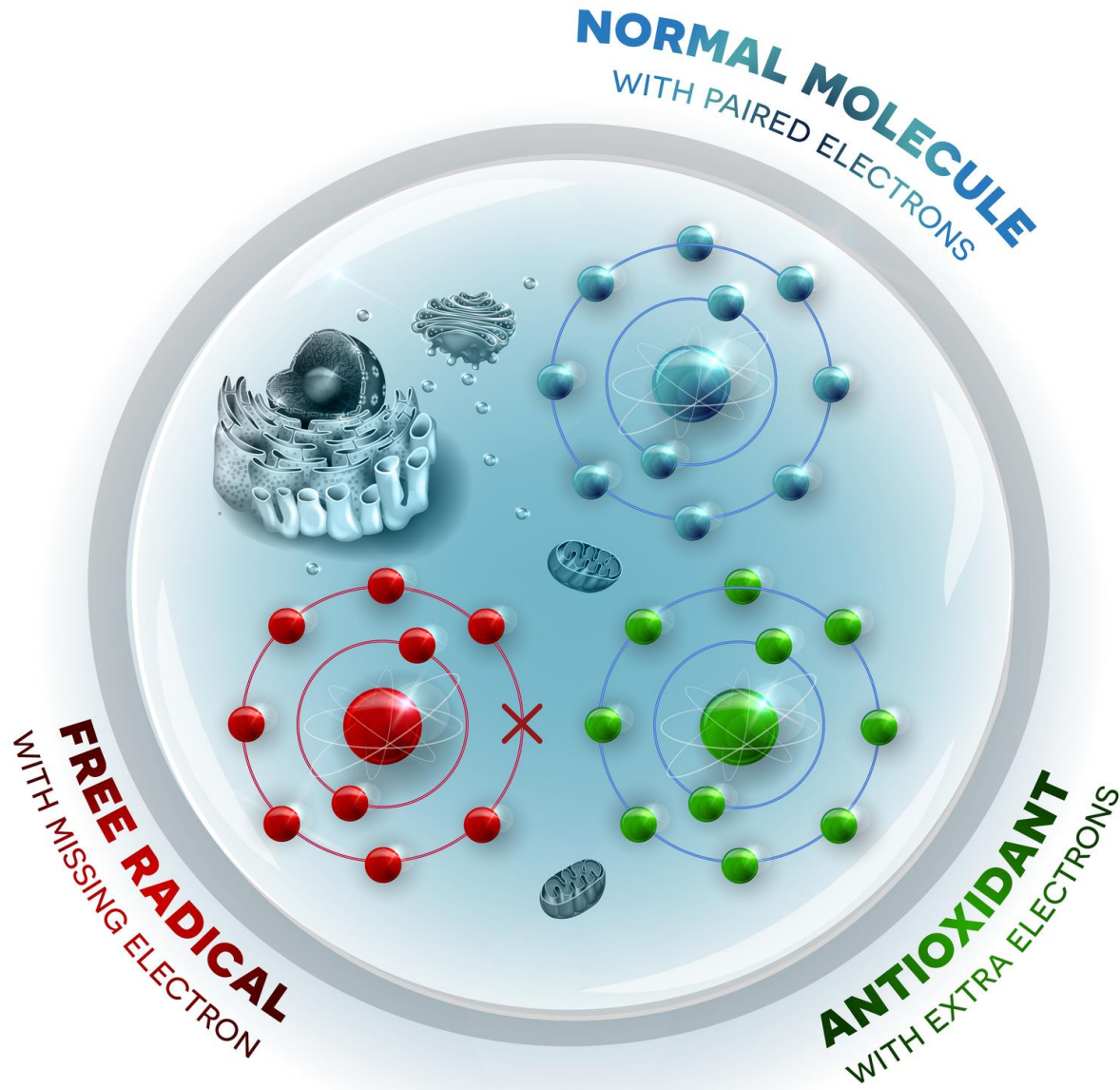
## MITOCHONDRIAL MELATONIN

- SYNTHESIZED WITHIN THE MITOCHONDRIA
- WORKS IN COLLABORATION WITH GLUTATHIONE, THE NEXT HIGHEST ANTIOXIDANT PRODUCED IN THE BODY
- INCREASES THE ACTIVITY OF SUPEROXIDE DISMUTASE, THE *NEXT* HIGHEST ANTIOXIDANT IN THE BODY
- THESE POWERFUL ANTIOXIDANTS QUENCH THE FREE RADICALS GENERATED BY MITOCHONDRIAL ENERGY

# ANTIOXIDANTS & FREE RADICALS

"Antioxidant" is a general term for any compound that can counteract unstable molecules called free radicals that damage DNA, cell membranes, and other parts of cells. Because free radicals lack a full complement of electrons, they steal electrons from other molecules and damage those molecules in the process.

Antioxidants neutralize free radicals by giving up some of their own electrons. In making this sacrifice, they act as a natural "off" switch for the free radicals. This helps break a chain reaction that can affect other molecules in the cell and other cells in the body. But it is important to recognize that the term "antioxidant" reflects a chemical property rather than a specific nutritional property. (1)





# THE ANTIOXIDANT/FREE RADICAL PARADOX

## FREE RADICALS ARE DAMAGING

While free radicals are damaging by their very nature, they are an inescapable part of life. The body generates free radicals in response to environmental insults, such as tobacco smoke, ultraviolet rays, and air pollution, but they are also a natural byproduct of normal processes in cells.

## FREE RADICALS ARE HEALING

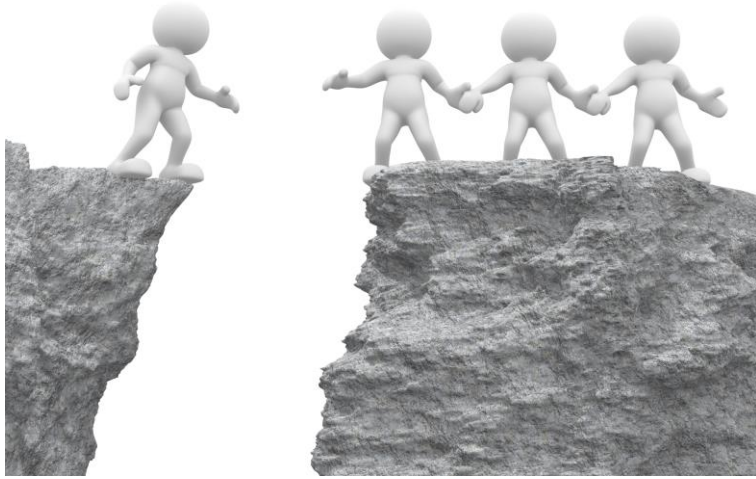
When the immune system musters to fight intruders, for example, the oxygen it uses spins off an army of free radicals that destroy viruses, bacteria, and damaged body cells in an oxidative burst. Some normal production of free radicals also occurs during exercise. This appears to be necessary in order to induce some of the beneficial effects of regular physical activity, such as sensitizing your muscle cells to insulin.

## ANTIOXIDANTS ARE HEALING

Because free radicals are so pervasive, you need an adequate supply of antioxidants to disarm them. Your body's cells naturally produce powerful antioxidants, such as alpha lipoic acid, melatonin, glutathione, catalase, and SOD. The foods you eat supply other antioxidants, such as vitamins C and E. Plants are full of compounds known as phytochemicals, many of which seem to have antioxidant properties as well. For example, after vitamin C has "quenched" a free radical by donating electrons to it, a phytochemical called hesperetin (found in oranges and other citrus fruits) restores the vitamin C to its active antioxidant form.

## ANTIOXIDANTS CREATE FREE RADICALS

When an antioxidant destroys a free radical, this antioxidant itself becomes oxidized. Therefore, the antioxidant resources must be constantly restored in the body. Thus, while in one particular system an antioxidant is effective against free radicals, in other systems the same antioxidant could become ineffective.



THIS IS WHERE ANTIOXIDANTS  
FROM FOODS COME IN

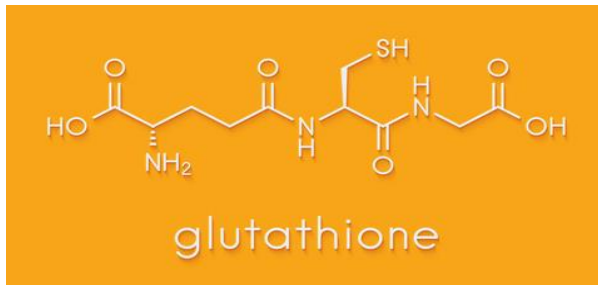


Antioxidants from our diet play an important role in helping endogenous antioxidants for the neutralization of oxidative stress. The nutrient antioxidant deficiency is one of the causes of numerous chronic and degenerative pathologies. Each nutrient is unique in terms of its structure and antioxidant function ([6](#), [38](#)).



## MELATONIN & MITOCHONDRIA

*“Melatonin has established effects as an antioxidant and free radical scavenger both in vitro and in animal models. This is also evident in melatonin’s prominent role in mitochondria, which is reviewed in the next section. Melatonin is synthesized in, taken up by, and concentrated in mitochondria, the powerhouse of the cell. Mitochondria are also the major source of reactive oxygen species as a byproduct of mitochondrial oxidative metabolism.” [source](#)*

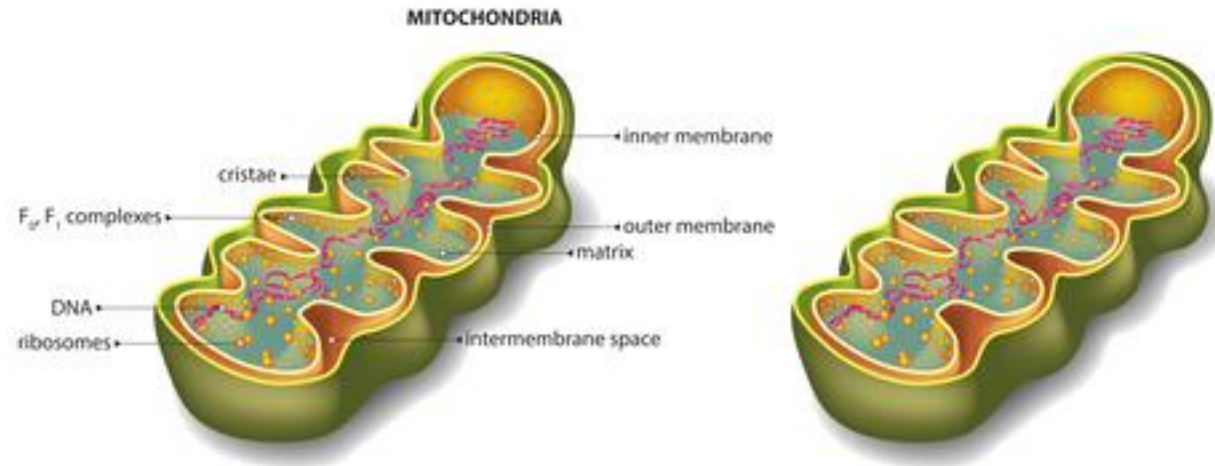


## MELATONIN & GLUTATHIONE

*“In the human body — aside from having direct antioxidant effects — it also stimulates the synthesis of **glutathione** and other important antioxidants like superoxide dismutase and catalase.*

*Melatonin increases glutathione through a genomic effect on the enzyme that regulates the synthesis of gamma glutamylcysteine synthase, the rate limiting enzyme in glutathione synthesis. Melatonin activates that enzyme.*

*Glutathione tends to be found in high concentrations in cells, although some is also found, to a lesser degree, in the extracellular space and the mitochondria. Meanwhile, 95% of the melatonin in your body is concentrated within the mitochondria inside the cells.” [Source](#)*



*“It [melatonin] also removes free radicals and prevents the degeneration of the mitochondria, and why this is so important is because mitochondria are really the center of the action within a cell. In other words, there's strong evidence that aging, frailty of aging, senescence of cells as we age, relate to molecular damage at the level of the mitochondria, and melatonin seems to be very efficient at protecting mitochondria from that damage.”*

And more:

[The potential influence of melatonin on mitochondrial quality control: a review](#)

[Melatonin: A mitochondrial resident with a diverse skill set](#)

# HOW MITOCHONDRIAL MELATONIN IS GENERATED

MITOCHONDRIAL MELATONIN PRODUCTION IS ONE OF THE REASONS WHY REGULAR SUN EXPOSURE IS SO CRUCIAL. MOST PEOPLE UNDERSTAND THAT SUN EXPOSURE ON BARE SKIN GENERATES VITAMIN D, COURTESY OF UVB (ULTRAVIOLET B RADIATION). FEW, HOWEVER, UNDERSTAND THAT THE NEAR-INFRARED SPECTRUM, WHEN HITTING YOUR SKIN, TRIGGERS THE GENERATION OF MELATONIN IN YOUR MITOCHONDRIA.



HMM...

I've recently talked about the many dangers of sunscreen use in another program. [\(You can see that program here.\)](#) This is another plug for managing sun exposure wisely! Interesting that sunburn happens when antioxidant reserves run low, and melatonin - arguably the very highest of all - depends on the sun's rays for its very production! I recommend my [Wondrous Skin PM Cream](#) with added melatonin for people going in for radiation therapy because melatonin itself is such a burn-blocker!





## FUNCTIONS OF MELATONIN

MELATONIN PLAYS A ROLE IN A  
SURPRISINGLY NUMBER OF AREAS  
OF HEALTH... LET'S TAKE A LOOK!





# FUNCTIONS OF MELATONIN

- Affects the release of sex hormones
- Aids the immune system
- Acts as an antioxidant
- Blocks estrogen from binding to receptor sites
- Decreases elevated cortisol levels
- Helps balance the stress response
- Helps prevent cancer and treats some cancers
- Improves mood
- Improves sleep quality
- Stimulates the parathyroid gland
- Is cardioprotective
- Stimulates the production of growth hormone
- Decreases risk of heart disease
- Promotes healthy cholesterol levels
- Regulates skin pigmentation
- Relieves jet lag
- Dilates and contracts blood vessels
- Inhibits the release of prolactin, follicle stimulating hormone (FSH), and luteinizing hormone (LH)
- Inhibits the release of insulin from the beta cells in the pancreas
- Protects skin cells against UV damage

# OTHER HEALTH BENEFITS OF MELATONIN

- Melatonin has also been reported to:
- Relieve acid reflux/GERD
- Promote eye health
- Alleviate tinnitus
- Relieve symptoms of Seasonal Affective Disorder (SAD)
- Relieve symptoms of Alcohol Use Disorder (AUD)
- Offer benefits for
  - Endometriosis
  - high blood pressure
  - Migraines
  - Cancer
  - TMJ
  - Thrombocytopenia
  - Sunburns (with topical application)



## WHAT MIGHT TELL ME I NEED MORE MELATONIN?

THERE ARE SEVERAL SIGNS AND  
SYMPTOMS THAT MIGHT INDICATE A  
NEED FOR MORE MELATONIN. LET'S  
EXPLORE!



# SIGNS & SYMPTOMS OF MELATONIN DEFICIENCY

- Insomnia
- Fatigue
- Anxiety/Depression
- Early morning awakening
- Interrupted sleep
- Stress
- Increased risk of cancer
- Seasonal affective disorder
- Immunological disorders
- Heart disease
- Menopausal changes
- Neurological disease
- Cancer
- Menstrual irregularities
- Elevated estrogen:progesterone ratio
- Headaches
- Concentration problems
- Restlessness
- Mood changes
- Irritable bowel
- Premature aging
- Jet lag
- Cardiovascular disease
- High blood pressure
- Daytime drowsiness
- Weight gain/obesity
- Lower antioxidant levels
- Diabetes

# CAUSES OF MELATONIN DEFICIENCY

There are several causes of melatonin deficiency, including age, stress, shift work or jet lag, blue light exposure, poor diet, and certain medications.

- As we age, the pineal gland becomes less able to produce melatonin, which can result in decreased sleep quality.
- Stress can also impact the production of melatonin, as cortisol levels can interfere with the body's natural sleep patterns.
- Shift work or jet lag can disrupt the circadian rhythm, leading to decreased melatonin production.
- Blue light exposure from electronic devices can also impact the body's ability to produce melatonin, and poor diet or certain medications may interfere with the production of this important hormone. [Source](#)

# BLUE LIGHT & MELATONIN



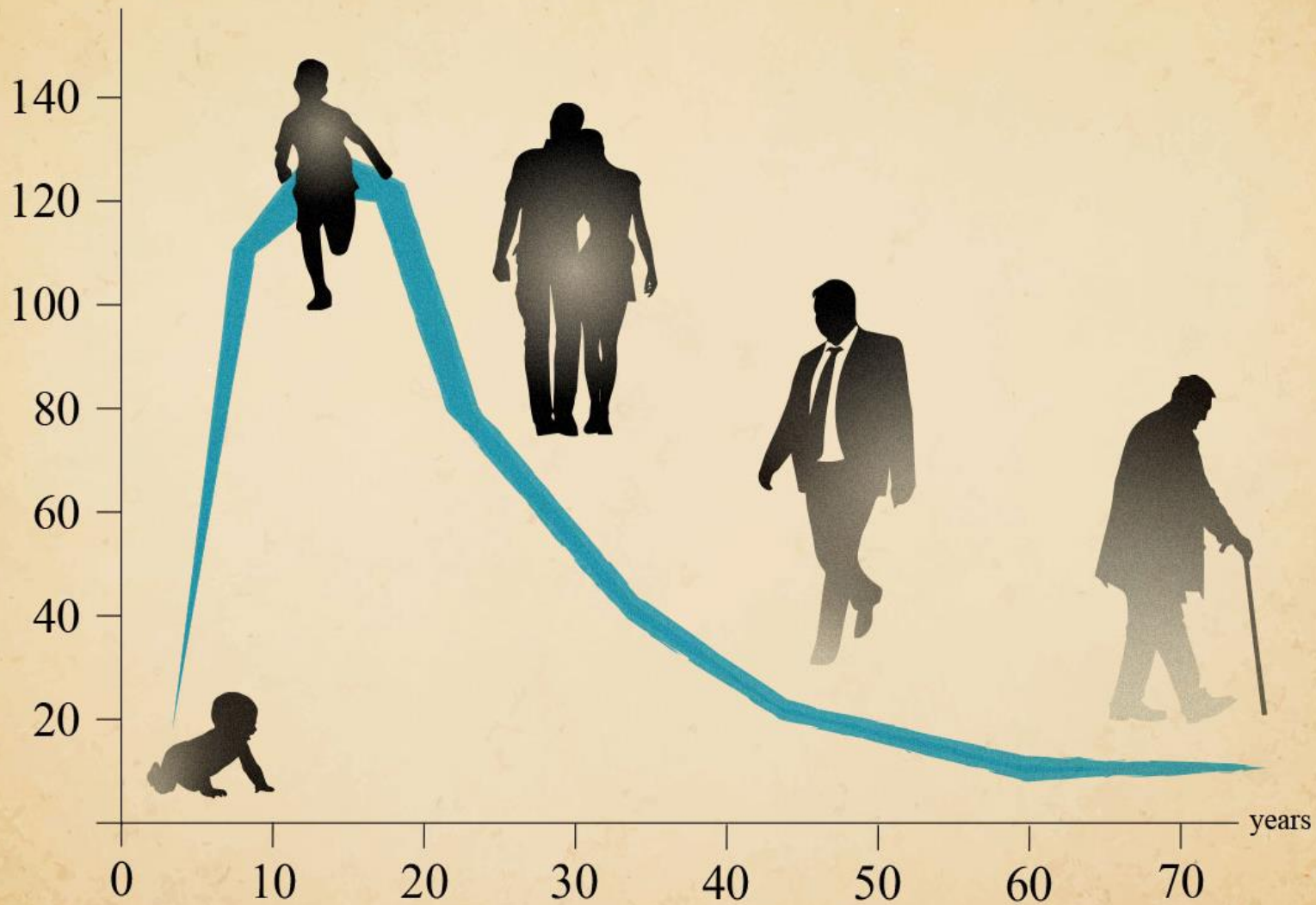
Blue light affects the production of the hormone melatonin, which is best known as the hormone regulating sleep.

When the eyes are exposed to blue light, it sends a signal to the brain's suprachiasmatic nucleus (SCN), which regulates the body's internal clock. This signal suppresses the production of melatonin, which can help to increase alertness and reset the body's circadian rhythm to be more awake and active during the day.

Conversely, when blue light exposure decreases, such as in the evening or at night, the production of melatonin increases, which signals to the body that it's time to sleep.

This is why it's important to limit exposure to blue light at night, particularly from electronic devices like smartphones and computers, as this can disrupt the production of melatonin and interfere with the body's natural sleep-wake cycles.

melatonin pg/ml



## The Decline of Melatonin Production with Age

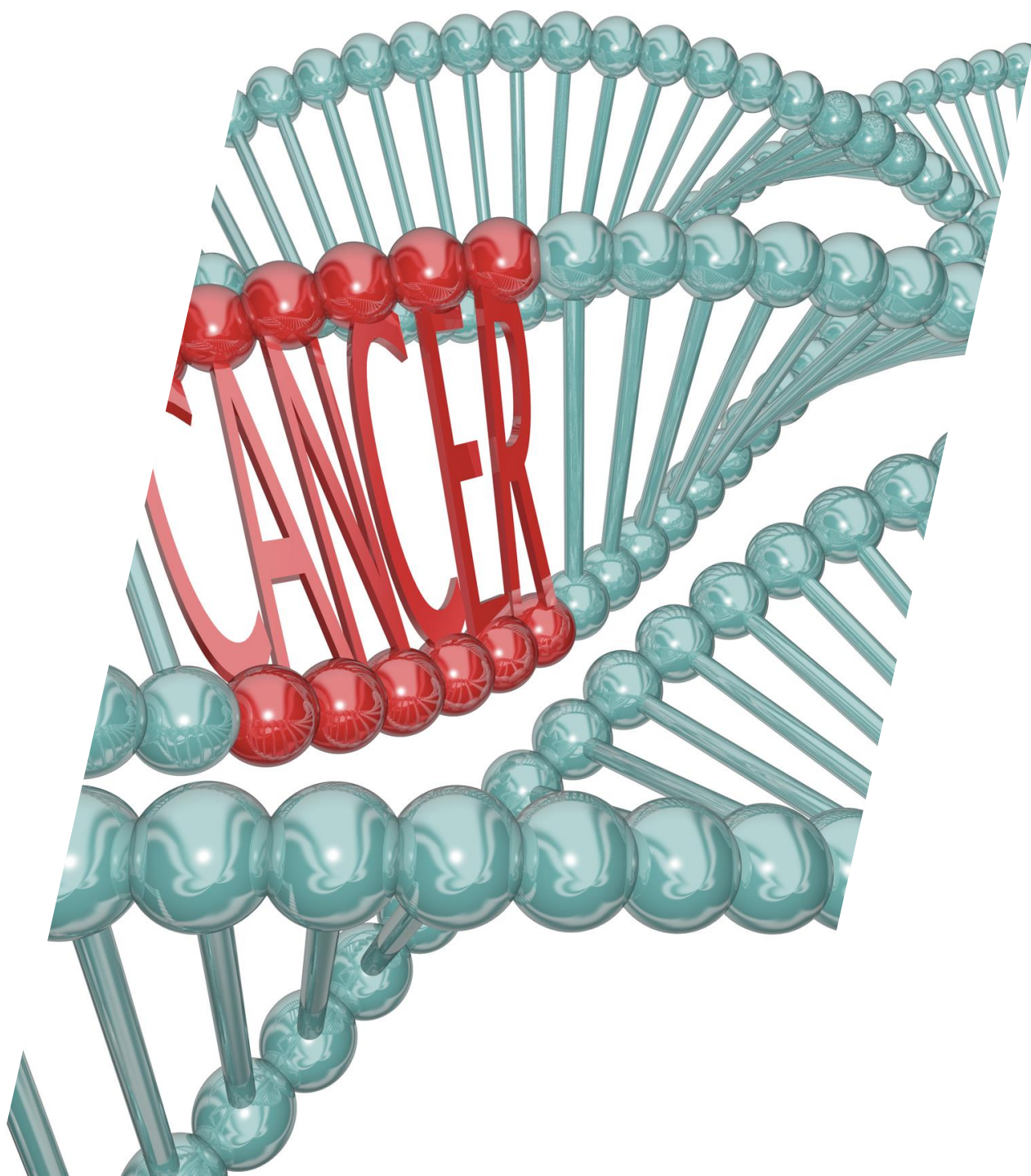
Melatonin levels decline gradually over the life-span and may be related to lowered sleep efficacy, very often associated with advancing age, as well as to deterioration of many circadian rhythms.

# SAFELY REPLENISHING MELATONIN LEVELS

A KEY TO ROBUST HEALTH







## MELATONIN & CANCER

MELATONIN WORKS TO PREVENT AND TO FIGHT CANCER ON SEVERAL DIFFERENT LEVELS, MAKING MELATONIN SUPPLEMENTATION A TERRIFIC ADDITION TO A DAILY HEALTH REGIMEN AND SPECIFICALLY WHERE CANCER IS A CONCERN



# METABOLIC ANTI-CANCER EFFECTS OF MELATONIN: CLINICALLY RELEVANT PROSPECTS

***“Simple Summary:*** *Metabolic reprogramming is required for both malignant transformation and tumor development, including invasion and metastasis. Melatonin (5-methoxy-N-acetyltryptamine) is a methoxyindole that is synthesized in the pineal gland. Importantly, melatonin has anticancer effects by stimulating apoptosis, regulation of survival signaling, suppression of metastasis and angiogenesis and regulation of epigenetic modifications that contribute to malignant transformation. Furthermore, melatonin affects steps associated with the Warburg phenotype and suppresses the switch from oxidative phosphorylation to aerobic glycolysis through the regulation of critical enzymes and glucose transporters. Melatonin is involved in regulation of p53 and HIF-1, directly participate in signaling cascades that modulate aerobic glycolysis, gluconeogenesis, the tricarboxylic acid cycle and the pentose phosphate pathway. A significant impact of melatonin in the modulation of metabolic cascades represent a unique opportunity to inhibit pathways metabolic reprogramming.”*

# MELATONIN & CANCER

- [Metabolic Anti-Cancer Effects of Melatonin: Clinically Relevant Prospects](#)
- [Melatonin in Cancer Treatment: Current Knowledge and Future Opportunities](#)
- [Melatonin for the prevention and treatment of cancer](#)
- [Use of Melatonin in Cancer Treatment: Where Are We?](#)
- [Adjuvant melatonin for the prevention of recurrence and mortality following lung cancer resection](#)
- [An updated review of mechanistic potentials of melatonin against cancer: pivotal roles in angiogenesis, apoptosis, autophagy, endoplasmic reticulum stress and oxidative stress](#)
- [Melatonin and pancreatic cancer: Current knowledge and future perspectives](#)
- [Effects of Melatonin and Its Analogues on Pancreatic Inflammation, Enzyme Secretion, and Tumorigenesis](#)
- [Melatonin inhibits lung metastasis of gastric cancer in vivo](#)
- [An Overview of Melatonin and Breast Cancer](#)
- [Melatonin inhibits triple-negative breast cancer progression](#)
- [Melatonin inhibits lipid accumulation to repress prostate cancer progression](#)
- [Melatonin improves chemotherapy effectiveness, increases survival and reduces side-effects](#)

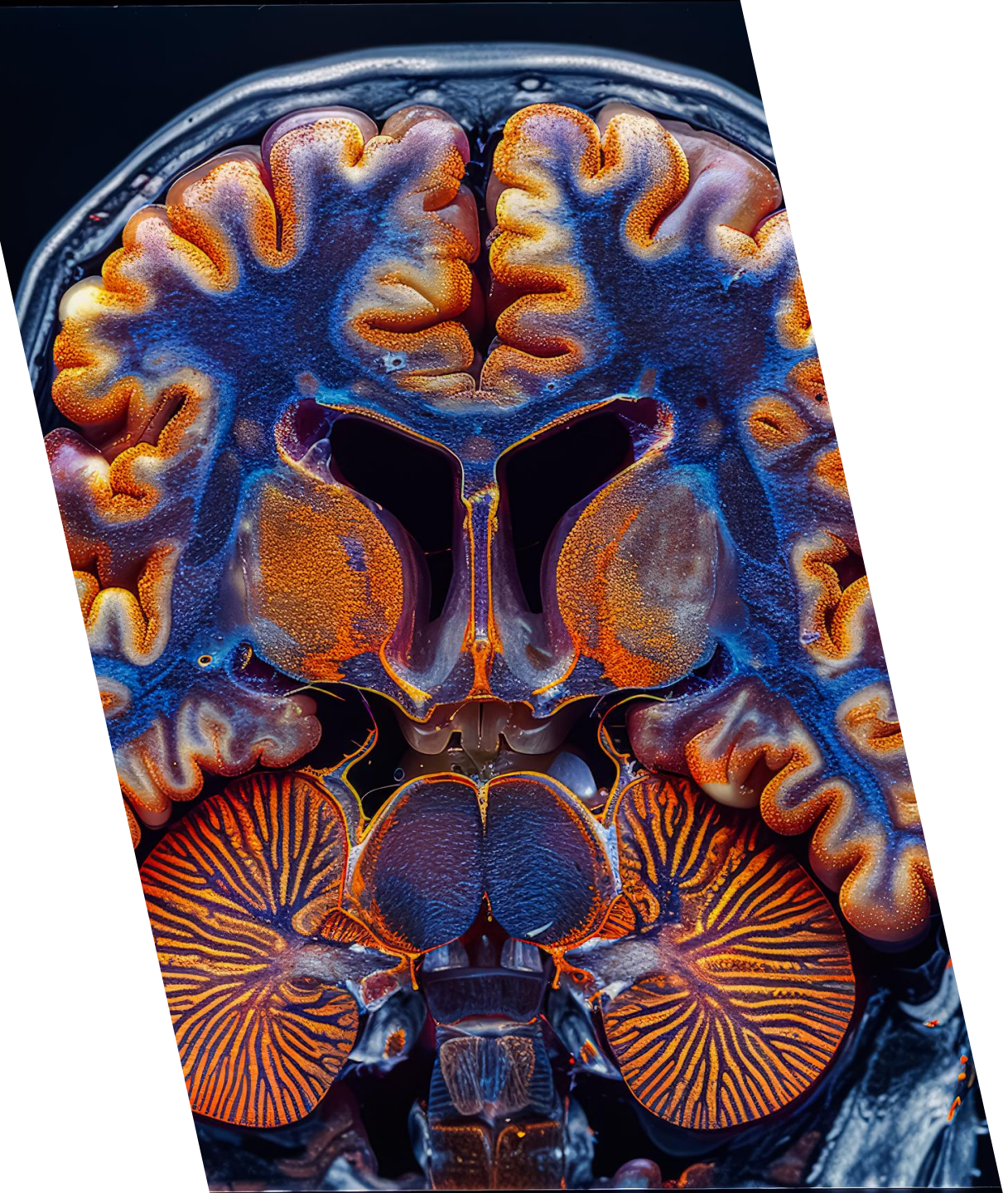
CLICK HERE TO WATCH THIS EXCELLENT VIDEO!

# HIGH DOSE MELATONIN THERAPY: AN IDEAL ADJUVANT ANTI-CANCER THERAPY

Frank Shallenberger, MD, HMD, ABAAM

# MELATONIN & NEURODEGENERATIVE DISEASES

ALZHEIMER'S, PARKINSON'S, ETC.



# MELATONIN: ALZHEIMER'S & PARKINSON'S DISEASES

- [Melatonin Therapy in Patients with Alzheimer's Disease](#)
- [Melatonin levels in the Alzheimer's disease continuum: a systematic review](#)
- [Melatonin in Alzheimer's disease and other neurodegenerative disorders](#)
- [Melatonin in Alzheimer's Disease](#)
- [Prophylactic melatonin significantly reduces Alzheimer's neuropathology and associated cognitive deficits independent of antioxidant pathways in A \$\beta\$ PPswe/PS1 mice](#)
- [Therapeutic potential of melatonin and its analogs in Parkinson's disease: focus on sleep and neuroprotection](#)
- [Mechanism of the beneficial effect of melatonin in experimental Parkinson's disease](#)
- [Melatonin protects against neurobehavioral and mitochondrial deficits in a chronic mouse model of Parkinson's disease](#)



# MELATONIN & COVID

[COVID-19: MELATONIN AS A POTENTIAL ADJUVANT TREATMENT](#)

[MELATONIN USE FOR SARS-COV-2 INFECTION: TIME TO DIVERSIFY THE TREATMENT PORTFOLIO](#)

[MECHANISMS AND CLINICAL EVIDENCE TO SUPPORT MELATONIN'S USE IN SEVERE COVID-19 PATIENTS TO LOWER MORTALITY](#)

[MELATONIN DRUGS INHIBIT SARS-COV-2 ENTRY INTO THE BRAIN AND VIRUS-INDUCED DAMAGE OF CEREBRAL SMALL VESSELS](#)

[MELATONIN PRODUCED IN THE LUNGS PREVENTS INFECTION BY COVID-19 - NEUROSCIENCE NEWS](#)



# MELATONIN & OTHER BODILY SYSTEMS

BROAD-REACHING EFFECTS





# MELATONIN MISCELLANEOUS

- [Melatonin in Heart Failure: A Promising Therapeutic Strategy?](#)
- [Melatonin and age-related cardiovascular diseases](#)
- [Medical Studies on Melatonin and the Immune system](#)
- [Effect of Melatonin on Psoriatic Phenotype in Human Reconstructed Skin Model](#)
- [Melatonin and Ulcerative Colitis: Evidence, Biological Mechanisms, and Future Research](#)
- [Melatonin and Respiratory Diseases: A Review](#)
- [Potential of melatonin for prevention of age-related macular degeneration: experimental study\]](#)
- [Advancing role of melatonin in the treatment of neuropsychiatric disorders](#)
- [An insight into the scientific background and future perspectives for the potential uses of melatonin](#)
- [Melatonin potentiates the effects of metformin on glucose metabolism and food intake in high-fat-fed rats](#)
- [Melatonin in chronic kidney disease](#)
- [Can Melatonin Put Your Chronic Pain to Sleep?](#)
- [An insight into the scientific background and future perspectives for the potential uses of melatonin](#)

# HOW TO USE SUPPLEMENTAL MELATONIN

EACH TINY MEASURED SCOOP OF PURE MELATONIN POWDER CONTAINS A WHOPPING 60 MG OF MELATONIN – FOR HEALTH PURPOSES AND DEPENDING ON THE PERSON, I TYPICALLY RECOMMEND 60-180 MG NIGHTLY. THIS IS LARGELY BASED ON THE WORK OF RUSSELL REITER.



# IMPORTANT

Supplementing melatonin DOES replenish mitochondrial stores, and this is huge...

*“If you supplement with melatonin, it can also enter cells and get into the mitochondria, as well. And that is also very important ... As you age, mitochondrial melatonin diminishes. If you supplement with melatonin, it will get into your mitochondria and, in fact, do what melatonin does — neutralize free radicals and protect the mitochondria's function.”*

# Topical Melatonin

In a paper published in the medical journal **ENDOCRINE** - "[On the Role of Melatonin in Skin Physiology and Pathology](#)," the authors conclude: **"Therefore, we propose that melatonin (synthesized locally or delivered topically) could counteract or buffer external (environmental) or internal stresses to preserve the biological integrity of the organ and to maintain its homeostasis. Furthermore, melatonin could have a role in protection against solar radiation or even in the management of skin diseases."**



A hand holding a white marker is writing the word "SUMMARY" in white capital letters on a dark grey chalkboard. A horizontal line is drawn under the word. The hand is positioned at the bottom right of the word, with the marker tip pointing towards the end of the line.

# SUMMARY

## TO SUMMARIZE:

- Melatonin is a hormone we make in our bodies but make less of as we age
- Melatonin deficiency results in a vast number of health issues
- Melatonin can be increased in the body via supplementation
- Melatonin supplementation does not impair the body's ability to make melatonin, and there is no toxicity



# THANK YOU!

I hope you've found this presentation both informational and inspirational!

***"You have so much more power than you know..."***

[Wondrous Roots, Inc.](#)

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