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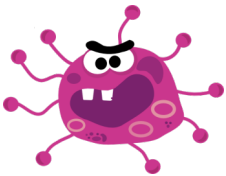
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Our January 2021 Newsletter for Healthy Living

Melatonin Does So Much

Melatonin is a hormone synthesized in your pineal gland and many other organs. While it is most well-known as a natural sleep regulator, it also has many other important functions. For example, melatonin: is a potent antioxidant, with the rare ability to enter your mitochondria; plays an important role in cancer prevention; is important for brain, cardiovascular and gastrointestinal health; helps quell inflammation; and, helps regulate gene expression via a series of enzymes. It also helps recharge glutathione, and glutathione deficiency has been linked to Covid-19 severity.

Melatonin has also been shown to play a role in viral infections and, according to a June 2020 research paper in Life Sciences journal, it may be an important adjunct to COVID-19 treatment.



According to the authors, melatonin attenuates several pathological features of COVID-19, including: excessive oxidative stress and

inflammation; exaggerated immune response resulting in a cytokine storm; acute lung injury, and acute respiratory distress syndrome. They point out that melatonin is also “effective in critical care patients by reducing vessel permeability, anxiety, sedation use, and improving sleeping quality, which might also be beneficial for better clinical outcomes.”

The scientific review paper, published October 2020 in Virus Research journal, also summarizes the many potential mechanisms by which

melatonin can protect against and ameliorate viral infections, and also reviews research looking at melatonin’s beneficial effects against a variety of viruses. Based on these collective findings, they believe melatonin may offer similar protection against SARS-CoV-2.

Data from Cleveland Clinic also supports the use of melatonin. Here, the researchers analyzed patient data from the Cleveland Clinic’s COVID-19

“Melatonin would normally reduce the highly proinflammatory cytokine storm... preventing lung damage .”

registry using an artificial intelligence platform designed to identify drugs that may be repurposed. Patients who used melatonin as a supplement had, on average, a 28% lower risk of testing positive for SARS-CoV-2. Blacks who used melatonin were 52% less likely to test positive for the virus.

Research suggests melatonin may have the ability to combat COVID-19 via several different mechanisms. For example, it’s been shown to regulate immune responses and prevent cytokine storm. As explained by the authors of one such study, when your immune cells are in a hyper-inflammatory state, their metabolism changes in a way similar to that of cancer cells: *“Similar to cancer cells ... immune cells such as macrophages/monocytes under inflammatory conditions abandon mitochondrial oxidative phosphorylation for ATP production in favor of cytosolic aerobic glycolysis (also known as the Warburg effect) ... The change to aerobic glycolysis allows immune cells to become highly phagocytic, accelerate ATP production,*

intensify their oxidative burst and to provide the abundant metabolic precursors required for enhanced cellular proliferation and increased synthesis and release of cytokines ... Because of melatonin’s potent antioxidant and anti-inflammatory activities, it would normally reduce the highly proinflammatory cytokine storm and neutralize the generated free radicals thereby preserving cellular integrity and preventing lung

damage.”

As reported in a 2010 study in the Journal of Critical Care: *“Melatonin is an effective anti-inflammatory agent ... Its anti-inflammatory action has been attributed to inhibition of nitric oxide synthase with consequent reduction of peroxynitrite formation, to the stimulation of various antioxidant enzymes thus contributing to enhance the antioxidant defense, and to protective effects on mitochondrial function and in preventing apoptosis.”*

Since Cleveland Clinic looked at the supplements patients reported using, it seems reasonable to assume they were using it as you typically would. Most melatonin supplements contain between 0.5 mg and 5 mg. In the case report mentioned earlier, patients were given 36 mg to 72 mg of melatonin intravenously per day, which would likely be excessive for prophylactic use. That said, research has found no adverse effects for dosages ranging from 20 mg up

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What’s Inside This Issue

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The Power of Peppers

Researchers from Cleveland Clinic in Ohio reviewed health records of more than 570,000 people from four large studies and found, as compared to those who rarely or never ate chili peppers, that those who ate them on a regular basis reduced their risk of death from heart-related sources by 26%, from cancer by 23% and from all-cause mortality by 25%. This reduction

at the American Heart Association virtual conference titled “Scientific Sessions 2020” suggest that those who regularly eat chili peppers could have a longer life. The researchers hypothesize this is a result of the antioxidant, anti-inflammatory, anticancer and blood glucose mediating properties known to be present in chili peppers. Each of these factors may play a role in reducing the

limitations, including that the four studies only had limited information on health data and confounding factors that may have influenced the results. He also noted the amounts and types of chili pepper the participants ate during the studies were also different. The researchers are continuing to analyze the data and plan to publish the literature review.

“We were surprised to find... consumption of chili pepper was associated with overall risk-reduction of all-cause mortality.”

in the potential risk of death is significant and could make an impact on the number of people with heart disease and cancer. An American Heart Association report released in January 2019 found 48%, or 121.5 million, adults in America had cardiovascular disease.

The 2020 statistical update showed cardiovascular disease continues to be the No. 1 cause of death, accounting for 859,125 deaths in 2017 and claiming more lives every year than chronic lower respiratory disease and all forms of cancer combined. According to the National Cancer Institute, there will be an estimated 1.8 million people diagnosed with cancer in the U.S. and an estimated 606,520 people will die in 2020. The sheer number of people who may experience an impact on their longevity by making simple changes to their nutritional intake is overwhelming.

While chili peppers are not the answer for everyone, it is important to note that scientific evidence continues to mount supporting the hypothesis that you can take control of your health by making consistent changes in your lifestyle choices. You may find chili peppers in your favorite Tex-Mex foods or Indian curry. Preliminary data presented

risk of cardiovascular disease or cancer.

To reach this determination, the team analyzed 4,729 studies and included four large studies with health outcomes from China, the U.S., Iran and Italy. They were surprised that past published studies demonstrated that regularly eating chili peppers could reduce the overall risk of all-cause mortality. Senior author Dr. Bo Xu commented, “It highlights that dietary factors may play an important role in overall health.”

Xu, a cardiologist at Cleveland Clinic, went on to say in a press release: *“We were surprised to find that in these previously published studies, regular consumption of chili pepper was associated with an overall risk-reduction of all-cause, CVD (cardiovascular disease) and cancer mortality. The exact reasons and mechanisms that might explain our findings, though, are currently unknown. Therefore, it is impossible to conclusively say that eating more chili pepper can prolong life and reduce deaths, especially from cardiovascular factors or cancer. More research, especially evidence from randomized controlled studies, is needed to confirm these preliminary findings.”*

Xu cautioned there were sever-

Capsaicin is the bioactive compound in chili peppers responsible for the hot and spicy kick, and the likely compound researchers named as a potential explanation for the benefits they found. Chili pepper is a fruit pod belonging to the nightshade (Solanaceae) family. Other members of the Solanaceae family include tomato, potato, eggplant, cayenne pepper and paprika. The plant is a perennial shrub that grows up to 1 meter (3.2 feet) in height and is native to Central America.



Capsaicin is concentrated in the seeds and the inner white membrane found when you cut the pod open. The plant produces capsaicin as a protection against fungal attack. Peppers with more capsaicin are spicier and hotter.

Although the benefits of foods that contain capsaicin are plentiful, eating chili peppers is not a cure-all and some people cannot tolerate the compound or the flavor. As with many other things, too much of a good thing is not always a better thing. While not a magic bullet, chili peppers may be one weapon you can add to your arsenal of healthy food and lifestyle choices that help you take control of your health.

Reference: *Medicine Net*, November 9, 2020. American Heart Association, 2020 *Heart Disease and Stroke Statistical Update Fact Sheet*. National Cancer Institute, *Cancer Stat Facts. Scientific Sessions 2020*. American Heart Association, November 9 2020. *HealthDay*, November 9, 2020. Cleveland Clinic, September 20, 2019. *PNAS* 2008; 105(33).

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to 100 mg. Starting low, at 1 mg or less, and at night, before bed, is recommended. Rising melatonin levels is the reason you feel sleepy in the evening, so it's ill advised to take it in the morning or during the day, when your natural level is (and should be) low. Melatonin is also best taken sublingually, either in the form of a spray or sublingual tablet. Sublingually, it can enter your blood stream directly and doesn't have to go through the digestive tract. As a result, its effect will be felt more rapidly.

Another supplement of crucial importance in the age of COVID-19 is vitamin D. Interestingly, melatonin en-

hances vitamin D signaling, and optimizing your vitamin D may be one of the most beneficial steps you can take to lower all of the risks associated with COVID-19, from reducing your risk of testing positive to lowering your risk of severe infection and death. Together, melatonin and vitamin D synergistically act to optimize your mitochondrial function. In fact, your mitochondria are the final common target for both.

Synthesis of both vitamin D and melatonin is also dramatically reduced with advancing age, and old age is a primary risk factor for COVID-19 death. So, while vitamin D3 and melato-

nin supplementation may be beneficial for most people, it's particularly important for the elderly. Keep in mind, however, that it makes little sense to take a supplement unless you're also seeking to optimize your body's natural production. In the case of melatonin, this includes making sure you get good sleep on a regular basis.

Reference: *Journal of Critical Care* 2010 Dec; 25(4):656.e1-6. *Pharmacological Research* April 2012; 65(4):437-44. *Journal of Pineal Research* December 17, 2002; 34(1). *International Journal of Molecular Sciences*, 2013 Jan; 24; 14(2):2410-30. *Current Neuropharmacology*, 2017 Apr; 15(3):365-8. *Life Sciences* June 1, 2020; 250:117583. *Virus Research* October 2, 2020; 287: 198108. *PLoS Biology* November 6, 2020 DOI:10.1371/journal.pbio.3000970. Cleveland Clinic November 9, 2020. *Medical Drug Discoveries* June 2020; 6:100044.

Humidity, Hydration, Prevention

Controlling the humidity level in your home, or even simply in your bedroom while you sleep, may lower your risk of contracting infectious diseases like influenza, colds or possibly even COVID-19 during the winter months. Humidity is an often-

“Mucus dehydration caused by breathing air of low humidity leads to decreased mucociliary clearance.”

overlooked factor in the spread of viruses, which become more transmissible in cold, dry winter climates. This is why many viral diseases are seasonal in nature, peaking during the colder, less humid winter. Researchers from the Massachusetts Institute of Technology, collected data from 125 countries regarding pandemic responses, COVID-19 cases and environmental data, including estimates of indoor relative humidity. They analyzed the data for a period of three months, revealing that indoor relative humidity had the most significant correlation with daily new coronavirus cases and daily COVID-19 deaths.

In the northern hemisphere, as indoor humidity levels rose in the summer, COVID-19 deaths had a sharp decline. Likewise, in the southern hemisphere, COVID-19 deaths rose as humidity levels declined during the winter months. “It’s so powerful, it’s crazy,” lead researcher Dr. Stephanie Taylor told Wired. Though the research hasn’t been published yet, years of research support the importance of humidity levels when it comes to warding off infectious disease. Back in 2011, researchers found that SARS, another type of coronavirus, was more stable in low temperature, low humidity environments compared to those in higher temperatures and relative humidity.

It’s also been found in animal transmission studies that when relative humidity is kept in the range of 40% to 60%, viruses become inactivated. “It is assumed that temperature and humidity modulate the viability of viruses by affecting the properties of viral surface proteins and lipid membrane,” researchers wrote in the Annual Review of Virology. “... An ideal humidity for preventing aerosol respiratory viral transmission at room temperature appears to be between 40% and 60% RH (relative humidity).” The mucosal surface of your respiratory tract is involved in part of a multi-tiered defense system against inhaled pathogens. Your mucus can catch bacteria and viruses, allowing you to expel them via a cough or swallow them before they’re able to enter your cells.

However, proper mucus hydration is required for this to work efficiently, and when you breathe dry, low humidity air it dries out the mucus layer and immobilizes cilia, hair-like structures that help move pathogens out of the body with

their wave-like motions.

Airway epithelial cells act as the second line of defense after the mucus layer, acting as a physical barrier within your respiratory tract. Inhaling dry air has been found to lead to “epithelial cilia loss, detachment of epithelial cells, and inflammation of the trachea” in animal studies, and may also impair epithelial cell repair in the lung after infection with influenza. Mucociliary clearance (MCC) is another one of your lungs’ defense mechanisms, which helps eliminate inhaled pathogens and irritants from the epithelial surface in your respiratory tract. Inhaling cold, dry air also impairs MCC, leading to impaired viral clearance following infection with influenza, for example.

As noted in the Annual Review of Virology: “Given that the MCC depends on the maintenance of double mucus layers with two different viscosities and a delicate osmotic balance, proper mucus hydration is required for an efficient mucus transport. A review on the relationship between temperature and humidity of inhaled air and properties of airway mucosa found that 100% RH at core temperature is the optimal condition for the efficient mucosal functions and airway defense in humans. Mucus dehydration caused by breathing air of low humidity leads to decreased MCC.”

Considering the strong seasonality of influenza, and the fact that flu outbreaks have been associated with reductions in absolute humidity, researchers decided to raise humidity levels in a preschool to see if it would affect influenza infections. Humidifying classrooms from January to March to approximately 45% RH led to a significant reduction in influenza A virus, both in the air and on objects. The control rooms, which were not humidified, had 2.3 times more cases of influenza-like illness than the humidified rooms.

In an opinion piece published in the Journal of Global Health, it’s again highlighted that indoor relative humidity greater than 40% will significantly reduce the infectivity of aerosolized influenza virus particles. The article, which

was written by a collaboration of Croatian, U.S. and German researchers, also suggested that humidified air could be a solution to protecting hospital patients and fighting Covid-19: “In addition to being a protection against initial infection, functional mucosal barrier is also important in suppression of viral progression in already infected patients. Since many hospitals have very dry air,

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providing humidified air to patients in early stages of the disease may be beneficial. ...”

Using a portable humidifier in your bedroom during the winter months could reduce the survival of influenza virus in the air, according to a study published in Environmental Health. A model of a two-story residential residence was used under two ventilation conditions: forced hot air and radiant heating. Portable humidifiers were used to control moisture content in the air, which was monitored for absolute humidity and concentrations of influenza virus. The addition of a portable humidifier with an output of 0.16 kilograms of water per hour in the bedroom increased absolute humidity 11% and relative humidity 19% during sleeping hours compared to having no humidifier present. Along with the increases in humidity came a decrease in the survival of influenza virus, by 17.5% to 31.6%. The distribution of water vapor through the whole home was also beneficial, with increases of 3% to 12% AH/RH associated with reductions in influenza virus survival of 7.8% to 13.9%. The results suggest that adding a humidifier to your bedroom could be an easy way to protect against the flu and other infections.

Reference: *Wired* November 12, 2020. *Advances in Virology* 2011; 2011:734690. Epub 2011 Oct 1. *Annual Review of Virology* September 2020, Vol. 7:83-101. *PLoS One*, 2018; 13(9): e0204337. *Journal of Global Health*, 2020; 10(1). *Environmental Health*, Vol. 9:55 (2010).