

# Melatonin



## What You Should Know

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### Research shows that melatonin may\*:

- increase life span and survival in animal studies<sup>10</sup>
- improve sleep quality, especially during aging<sup>1,2</sup>
- reduce jet lag or help adjust sleep times for shift workers<sup>3</sup>
- relieve certain types of depression such as SAD (seasonal affective disorder)<sup>4,5</sup>
- support Growth Hormone production<sup>11</sup>
- stimulate the immune system<sup>14</sup>
- increase antioxidant defenses<sup>10</sup>
- be protective for the brain and improve recovery from stroke<sup>12</sup>
- reduce migraines<sup>9</sup>
- reduce side-effects from chemotherapy<sup>15</sup>
- enhance the death of the cancer cells during chemotherapy while protecting healthy cells<sup>15</sup>
- protect the liver against toxic injuries<sup>13</sup>
- alleviate glaucoma<sup>7</sup>
- reduce stress hormones<sup>8</sup>
- reduce blood pressure<sup>8</sup>

**M**elatonin is a hormone with many functions. Most importantly it is involved in the control of the circadian (day/night) biological rhythms. Melatonin mediates the body's response to variations of natural light availability from indoor/outdoor exposure or due to seasons (winter/summer). Darkness into the eye tells the brain to make melatonin so the body can prepare for sleep mode. Its production should peak at night.<sup>2, 4</sup>

This important hormone also regulates immunity, the stress response, and some aspects of the aging process including growth hormone production. In addition to all of this, melatonin is a very potent antioxidant that easily penetrates the cell membranes and even binds and protects the nuclear DNA.<sup>10</sup>

This necessary hormone is synthesized in the human body, mostly in the brain, by the pineal gland from precursors as shown below:

**Tryptophan** ⇌ **5-HTP** ⇌ **Serotonin** ⇌ **Melatonin**

The synthesis steps depicted above require cofactors such as vitamin B6, SAM-e, iron and a folate-derived compound THB (tetrahydrobiopterin). Other cells in the body, such as immune cells, synthesize small amounts of melatonin as well.

**Great care is taken in ensuring the purity and quality of the source of Designs For Health Melatonin (3mg/cap).** Melatonin production declines significantly with age, due to various causes such as pineal calcification, possibly inadequate brain tissue function and sensitivity, and other unknown factors.<sup>6</sup>

**Factors that may reduce melatonin production at any age are the following:**

#### *Lifestyle*

- Poor sleeping habits: going to bed too late, sleeping during the day
- Inadequate darkness for the duration of the night (night lamps, clocks with light, outside street lighting, curtains that allow light through)
- Insufficient exposure to natural light during daytime, such as during winter at certain latitudes, and too much time spent indoors
- Excessive mental stress, high adrenaline and/or cortisol at night
- High caffeine or alcohol consumption too close to bed time

#### *Diet and supplements*

- Inadequate brain availability of precursors such as tryptophan or serotonin, which may occur during stressful states or high protein/low carbohydrate diets
- Inadequate availability of cofactors necessary for serotonin and melatonin synthesis: vitamin B6, SAM-e (S-Adenosyl Methionine), iron and folate

#### *Medications*

- benzodiazepines, beta-blockers, loop diuretics, aspirin.

Many health care practitioners assess and/or measure their patients melatonin production and choose to guide them to bring their melatonin levels into an optimal range through a combination of lifestyle interventions, diet and supplementation.

Melatonin deficiency may be defined based on quality of sleep and difficulty falling asleep, as well as specific urinary metabolites. By the age of 60, the body's production may fall close to 50% of youthful levels. Due to its effects on sleep and many other metabolic functions, it is hypothesized that replacement that restores melatonin to youthful levels may have a multitude of benefits, see below.

## Melatonin and Sleep

Supplemental melatonin was shown in studies to help with falling asleep when taken about 30 min before the desired sleep time. It has a plasma half life of 30-60 min from the time it is absorbed in the blood stream. The most common dose found effective for sleep was 3 mg. 5-HTP can be used in conjunction with melatonin, as a precursor to serotonin, which can support further endogenous melatonin production during the night to help with staying asleep.

When using melatonin for sleep enhancement, additional synergistic nutrients may be necessary to counteract excessive stress: Taurine and GABA, reduce the effects of the stress hormones, such as adrenaline, while omega-3 fatty acids (EPA/DHA) reduce the production of the hormones cortisol and adrenaline in response to mental stress. Magnesium also has been shown to reduce certain age-related changes in sleep patterns.

## Melatonin and Longevity

Many animal studies have demonstrated increased overall survival and lifespan in the melatonin treatment groups.<sup>10</sup> It is hypothesized that the longevity effect of melatonin could be due to its antioxidant<sup>10</sup>, neuroprotective<sup>12</sup>, immune stimulatory<sup>14</sup>, growth hormone supportive<sup>11</sup>, stress reduction<sup>8</sup>, and quality of sleep improvement<sup>1, 2</sup> effects.

## Studies Report on the Supportive Role of Melatonin in Cancer and Chemotherapy

"Melatonin (MLT) is the main hormone released from the pineal gland and has proved to have physiological antitumor activity. MLT has been shown to exert anticancer activity through several biological mechanisms: antiproliferative action, stimulation of anticancer immunity, modulation of oncogene expression, and anti-inflammatory, anti-oxidant and anti-angiogenic effects. In some studies, MLT was given orally at 20 mg/day during the dark period of the day. **Moreover, the percentage of patients with disease stabilization and the percentage 1-year survival were both significantly higher in patients concomitantly treated with MLT than in those treated with supportive care alone.** The objective tumor response rate was significantly higher in patients treated with chemotherapy plus MLT than in those treated with chemotherapy alone. Moreover, MLT induced a significant decline in the frequency of chemotherapy-induced asthenia, thrombocytopenia, stomatitis, cardiotoxicity and neurotoxicity. **These clinical results demonstrate that the pineal hormone MLT may be successfully administered in medical oncology in the supportive care of untreatable advanced cancer patients and for the prevention of chemotherapy-induced toxicity.**"<sup>15</sup>

## Conditions For Which Melatonin is Not Recommended

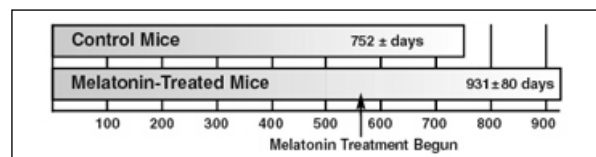
- Autoimmune conditions such as Lupus or arthritis, because the immune stimulatory effect of melatonin may exacerbate the action of certain types of lymphocytes or B-cells involved in the pathogenic course of these diseases
- Immune related cancers such as lymphoma and leukemia
- Pregnancy, lactation or during the time where fertility is desired

## Interactions With Drug Therapy

Melatonin may not be suitable to administer along with MAO inhibitors and corticosteroid therapy.

## References

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**Fig. 5.** Increased lifespan in mice due to administration of melatonin at a dose of 10 mcg/ml in their drinking water at night (Maestroni, et al, 1988)