

Melatonin: Sleep Hormone & More

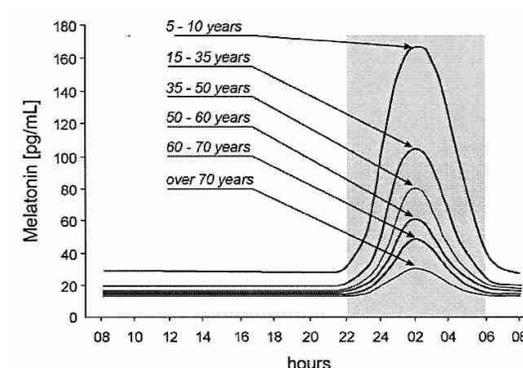
By Trenton Dunn, Pharm.D.

What is Melatonin?

Melatonin is a hormone created by the body in the pineal gland using the amino acid tryptophan (found in chocolate, oats, milk, poultry, etc). This hormone is made and secreted at the onset of darkness in conjunction with normal circadian rhythms, normally peaking from 11p.m. to 3p.m. There are receptors in the body for melatonin known as MT1, MT2, and MT3 receptors, each having different roles that are not fully understood; however it is known that MT1 and MT2 both correspond to sleep. We also know that these receptors are desensitized (fail to respond as well) easily.

Why is this important?

It is currently understood that melatonin levels decline as a person ages; melatonin first begins production around 4 months of age (about the age nighttime is associated with sleep), peaking at 3-4 years old. By the time a person reaches 70 years, peak production of melatonin is 25% of what it was as a young adult. The decline has numerous potential implications as a person ages including decreased sleep quality, decreased sleep time, and increased time to go to sleep.



What can Melatonin be used for?

Improvements in Sleep

This is the most accepted function of melatonin and has been proven to be effective in improving sleep through many studies. The little known fact to the public is that the required dose is substantially smaller than commonly offered, 1mg to 0.3mg instead of the commonly seen 1mg to 10mg strengths. These large strengths often overwhelm the melatonin receptors and desensitize them, essentially making sleep more difficult instead of easier. These large doses (creating physiologic levels 4-60x normal levels) also correspond to the hangover effect and vivid dreams reported by people using melatonin. On average, melatonin will decrease time to sleep by about 7 minutes, increase sleep time by about 15 minutes, and increase sleep efficiency by about 3%. These numbers may seem relatively small but can make a large difference in restfulness of the sleep. If those 15 minutes gained occurred during a period in which normally awakens for a brief period, a longer time is maintained during restorative sleep. It's important to remember that the body needs total darkness to secrete its own melatonin.

Hypertension

Though not fully understood, melatonin has a relationship with blood pressure. Controlled release melatonin has been shown through clinical trials to lower nocturnal blood pressure by about 6/3 mmHg. Unsure of the data's impact on clinical outcomes, this indication has not been sought by manufacturers.

Antioxidant

This process is important when examining physiology. Free radicals are highly reactive molecules that are generated when the body makes energy using the electron transport chain in mitochondria. When these free radicals (oxidants) build up they can attach themselves to DNA and a host of other molecules to damage them. Typically these radicals are reduced and converted by normal enzyme function within the body. Most studies have shown melatonin to be a great antioxidant as a molecule in laboratory studies; however, more recent research points to its activation of enzymes for its antioxidant property. The mechanism by which this works is also poorly understood, warranting further research in this area.

Cognitive Decline

Very little is known how melatonin correlates to cognitive decline. The decreasing levels of melatonin in the body as it ages along with corresponding decline in cognitive function suggests a relationship between the two. No clinical trials have been completed regarding studying this correlation.

Limited Information Available

It's important to note there is a lack of incentive for large clinical trials to be done by drug companies because of melatonin's availability over the counter. It's also important to stay up to date on information regarding this topic given it was only discovered in humans in 1975.

Take Home Points!

- + Melatonin is a hormone made naturally by the body
- + Levels decline with age
- + Very safe (up to 6 grams given without serious adverse effects)
- + Relatively inexpensive
- + Low dose required (0.1mg -0.3mg); common mistake to take large doses
- + Proven to help with sleep; keep room dark
- + Many possibilities yet unstudied

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Melatonin levels image from: <http://www.dr Ramsey.com/melatonin-dosing-and-uses/>