Most living things display changes in biochemistry, physiology, and behaviour that occur regularly about every 24 hours. This is known as our biological clock or circadian rhythm and is set by environmental cues—light being one of the most important.

"Melatonin has been called the Dracula of hormones because it only comes out at night."

No fear of the dark

Melatonin, a naturally occurring hormone made by the body’s pineal gland, regulates the body’s sleep/wake cycle. It also modifies the function of the nervous system, the endocrine system, and the immune system.

When the presence of daylight is detected by the retina of the eye, this information is relayed to the pineal gland via the suprachiasmatic nucleus (SCN) in the hypothalamus. The SCN then starts the clock for its daytime functions; for example, raising body temperature and releasing stimulating hormones such as cortisol.

As darkness sets in at the end of the day, the SCN clock stimulates the pineal gland to produce melatonin and release it into the blood. As melatonin levels in the blood rise,
Pampering the pineal

- Melatonin is synthesized from tryptophan, so ensure there is 1,000 mg of this amino acid in your daily diet from foods such as soy, tofu, nuts, beans, and salmon to help promote melatonin production. The production of melatonin is dependent on vitamins B3 and B6, as well as calcium, magnesium, and zinc.
- Spend 20 minutes outside in natural light in the early part of the day.
- Sleep in a very dark room with no light shining in from the street.
- Exercise regularly.
- Avoid shift work if you can. Keep regular hours, preferably going to bed early and getting up early.

we begin to feel sleepy. Melatonin levels stay elevated all night, reaching a peak between 2 and 4 am, then gradually decrease until the morning light causes an end to production. This is why melatonin has been called the Dracula of hormones—it only comes out at night.

Even though our biological clock activates the pineal gland, melatonin is not produced unless we are in a dimly lit environment. Artificial light can be bright enough to prevent the release of melatonin. Street lights, night lights, and even sleeping with the television on can inhibit the release of melatonin and shift the circadian rhythm. "Sleep per se is not important for melatonin," says Dr. Russel Reiter, neuroendocrinologist at the University of Texas Health Center. "But darkness is."

Bright lights increase cancer

A study by the American National Cancer Institute and the National Institute of Environmental Health Sciences indicates that women who are exposed to artificial light for long periods of time or stay up late at night are at an increased risk for developing breast cancer.

Three different blood samples were taken at different times of the day from the women in the study and injected into rats that had been implanted with breast cancer. The researchers found that the blood taken at 2 am, after the women had been in complete darkness for two hours, appeared to slow tumour growth by 80 percent. But the blood taken after the exposure to light (daylight or artificial) appeared to stimulate the growth of the cancer cells.

"Evidence is emerging that disruption of a person's body clock [may be] associated with cancer in humans and that interference with internal time-keeping can tip the balance in favour of tumour development," said lead researcher Dr. David Blask, adding that this was the first proof that light is indeed a risk factor for cancer. This study supports the findings of the original Harvard study of nurses, which found that shift workers had an elevated risk of breast cancer.

Can supplementing help?

Insomnia, jet lag, and shift work mix up our circadian rhythms, so what can those of us do who have to deal with these matters?

Numerous studies report that supplemental melatonin can be effective in some sleep disorders, particularly insomnia. One such study, in the Journal of Clinical Endocrinology & Metabolism (October 2001) found that the supplemental dose of 0.3 mg of melatonin taken 30 to 60 minutes before bedtime restored sleep in adults over the age of 50. Other studies have revealed the complexity of the appropriate timing and dosage of melatonin, so seek advice from your health care provider if you have prolonged trouble sleeping.

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