

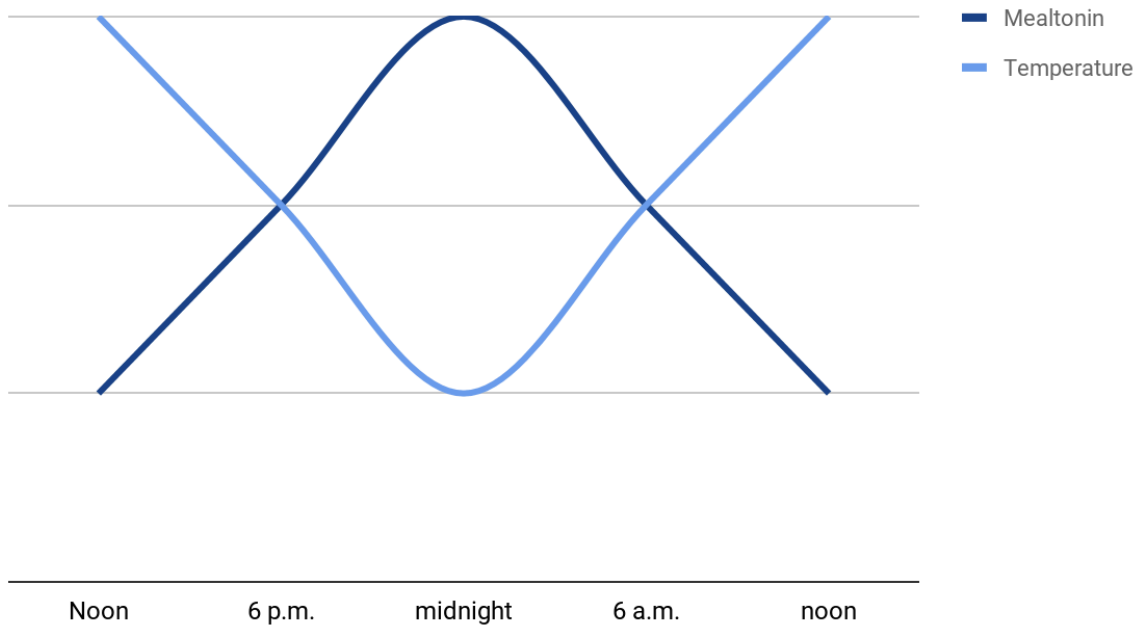
Tryptophan → Serotonin

- Enzyme needed: TPH

Tryptophan → Serotonin ⇌ A-5-H

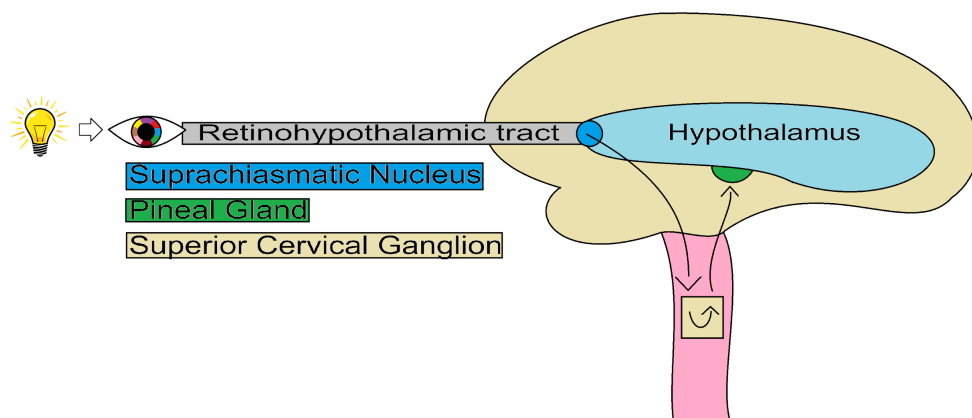
- Time regulated see chart below
- Enzyme needed: AANAT

Temperature vs. Release



Tryptophan → Serotonin ⇌ A-5-H ⇌ Melatonin

- Light regulated see diagram below
- Enzyme needed: HIOMT



Melatonin

- Endogenously produced in the pineal gland
- Very low bioavailability (not a ton and hard to access)
- Short half-life 30-60 minutes
- Rate limiting enzyme HIOMT is regulated by light
 - Artificial light late at night fluctuates the cycle confusing the process and decreasing or stops the release of melatonin
- Regulates your sleep-wake cycle or your circadian rhythm (internal clock)
 - Other hormones highly regulated by the circadian rhythm
 - Thyroid stimulating hormone
 - The thyroid plays a major role in weight gain and weight loss
 - Cortisol
 - Stress hormone is also controlled by the hypothalamus and released by the adrenal gland.
 - Works in a mirror image of melatonin and can be skewed when melatonin levels are not regulated at a consistent level at fairly consistent time (will change as the days get shorter or longer)
 - Is highest in the morning with the rise of the sun (hence awake hormone as well as stress) and continues to be stimulated as long as light is present.

The summer effect

- If artificial light exposure cutoff time stays the same throughout the year the body will have difficulty adapting to the seasons thinking all the days are longer and it is still in summer time.
- Longer days and shorter nights stimulates the body to eat as much food as possible to store up for the winter.
 - Increases cortisol and ghrelin (hunger hormone)
- Shorter days and longer nights stimulate the body to seek less food (since in ancestral times it would be scarce) burning the fat stored up as fuel.
 - Increase leptin (satiety hormone aka the feeling of fullness)

Why is quality sleep important?

- Recovery
 - Rebuilds glycogen stores
- Increase cognitivity
- Improves immune function
- Decreases rate of perceived effort
- Increases glucose tolerance
- Decreases Insulin resistance