



The Importance of Circadian Rhythm and sleep/wake homeostasis

NHS Borders
Children & Young People's Occupational Therapy



Hi. Welcome back to our sleep mini-series. In this video we are going to look at the importance of Circadian Rhythm and the Sleep/wake homeostasis.

Circadian Body clock

First, we are going to look at the function of our circadian body clock.

Just like plants our body works on a 24 hour cycle the same time span as a day which is determined by the earth's rotation on its own axis.

This 24-hour cycle is brought about by the circadian rhythm – a rhythm which is generated inside the brain and affects the body.

Each of our cells and organs have a clock- however if all of them were working independently this would create chaos.

Therefore, a central circadian clock which acts like a conductor, coordinates these clocks to work together in uniform time.

This conductor is a structure of the brain known as the suprachiasmatic nucleus or SCN for short.

The circadian clock generated by the SCN regulates performance and immunity and is most likely involved in appetite.

But the most important function controlled by circadian clock is sleep-wake cycle.

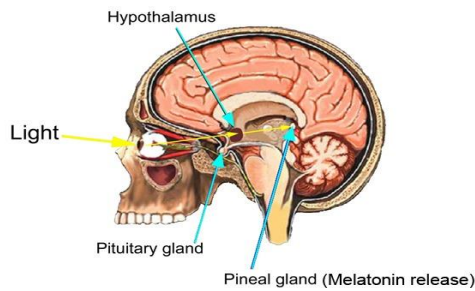
Just like this plant your body knows what time it is and when to sleep.

And all this is made possible by light.

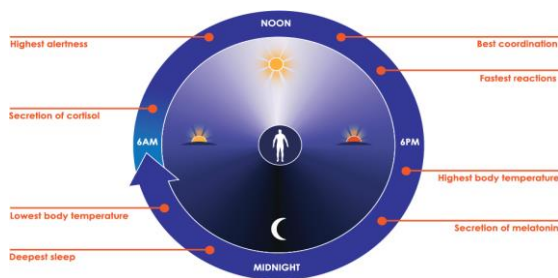
Melatonin

Melatonin is a naturally occurring hormone that promotes sleep. It is produced in the pineal gland. This gland is light-sensitive, and the production of melatonin is regulated by cycles of light and dark.

Melatonin is necessary for proper regulation of the body's circadian rhythm, metabolism rates, and other daily functions.



Melatonin is produced in the pineal gland in the midbrain.

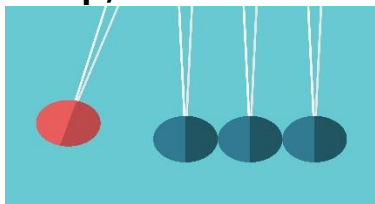


This circle demonstrates the peaks and flows of the secretion of our sleep and wake hormones throughout the day.

In the evening as the light begins to fade, this will prompt the production of melatonin. The sun rising in the morning will prompt the production of cortisol which is our awake hormone.

These hormone levels naturally fluctuate throughout the sleep/wake cycle.

Sleep/wake homeostasis



Our second important system is sleep/wake homeostasis.

This acts like a pendulum pulling between sleep and wake- the things that will promote sleep drive are natural daylight/ fresh air/ exercise and considering digestion.

If we have had a good amount of quality sleep, then our pendulum will begin to swing in the opposite direction waking us up feeling refreshed and ready for the day. If your child is not waking naturally and you are struggling to wake them in the mornings this can be an indicator, they are not getting long enough periods of unbroken sleep.

Our next short video will look at the different phases of sleep – please come back and view the next of the mini-series.



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