



Circadian Rhythms

Your Body's Internal Clock

What are Circadian Rhythms?

Circadian rhythms are biological cycles lasting ~24 hours.

They regulate:

- Sleep–wake cycle
- Body temperature
- Hormone secretion

Main idea: They are endogenous (internal) but influenced by the environment.

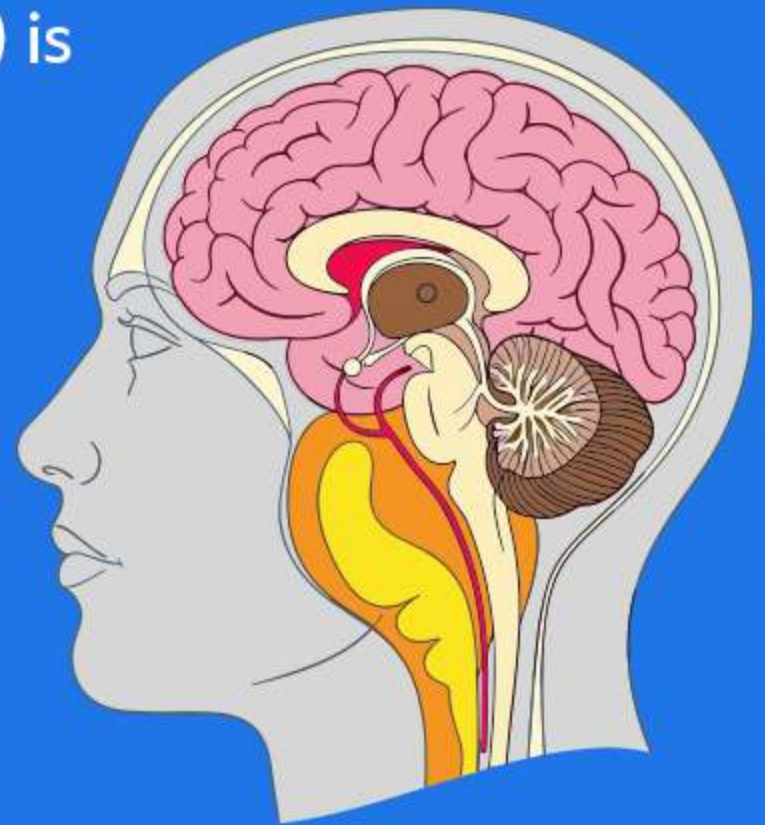


The Biological Clock (SCN)

The Suprachiasmatic Nucleus (SCN) is the master clock.

- Located in the hypothalamus
- Controls timing of physiological processes
- Synchronizes body functions

SCN = “central pacemaker”



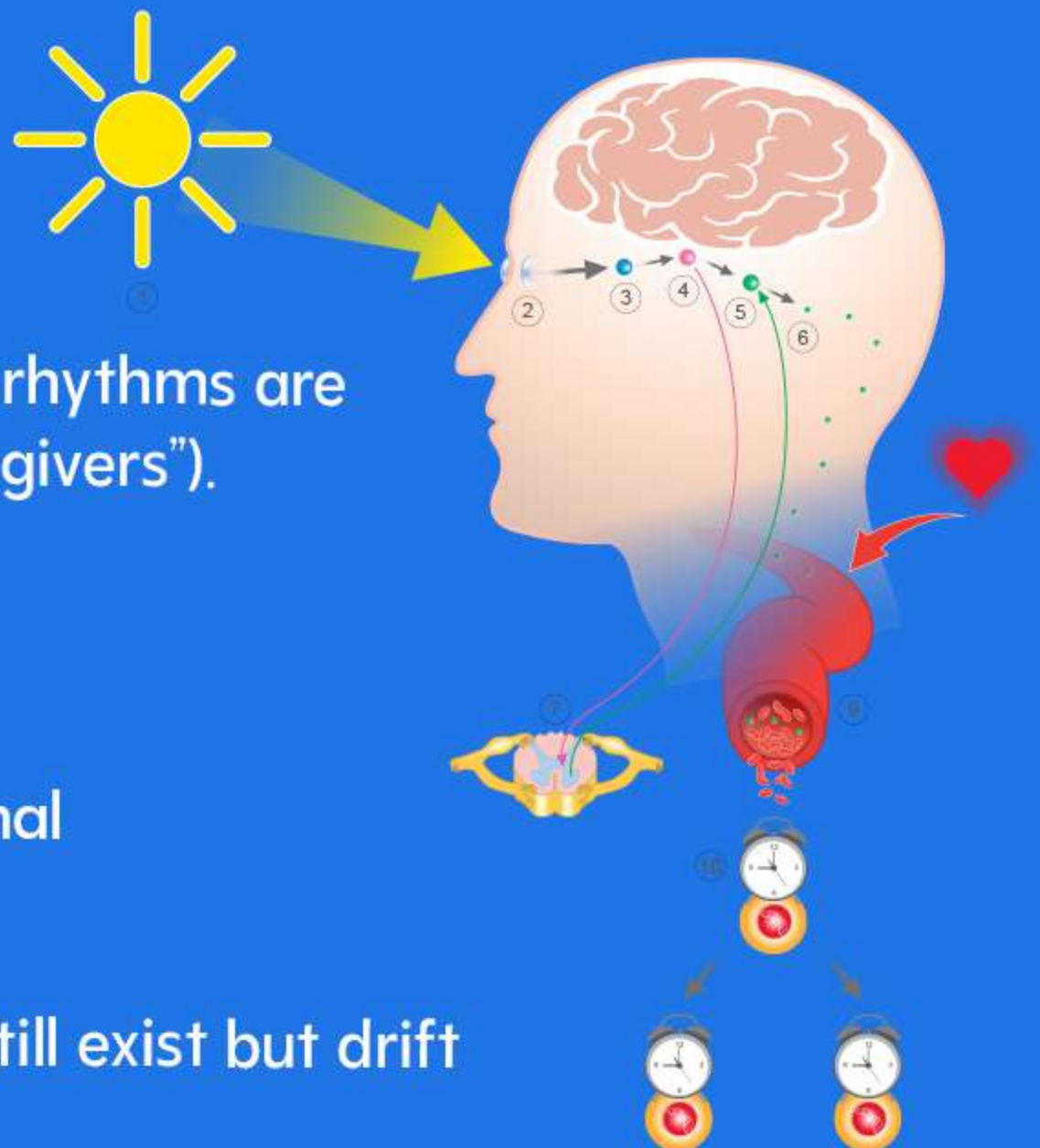
Role of Light (Zeitgeber)

External cues that reset rhythms are called Zeitgebers (“time-givers”).

Most important: Light

- Light - retina - SCN
- SCN adjusts the internal clock

Without light, rhythms still exist but drift (free-running rhythm)

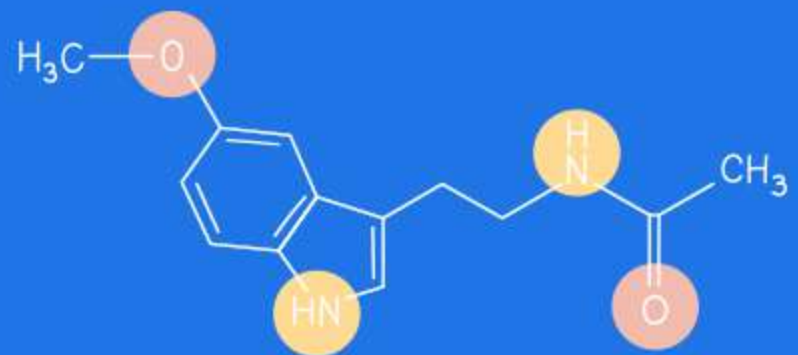


Melatonin & Sleep

Melatonin = sleep hormone

- Secreted by the pineal gland
- Increases in darkness
- Decreases in light

SCN - controls pineal gland -
regulates melatonin



Free-Running Rhythms

When external cues are removed:

- Rhythms continue - but not exactly 24 hrs
- Usually slightly longer (~24.2 hrs)



Humans in isolation still show sleep cycles -
proves internal clock exists

Circadian Rhythm Disruptions

Disruptions lead to:

- Jet lag
- Shift Work Sleep Disorder (SWSD)
- Sleep disturbances

Mismatch between internal clock & external environment



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