

Circadian Rhythms

- Biological rhythms are cyclical behaviours repeating periodically and controlled by endogenous pacemakers (internal bio clock) or exogenous zeitgebers.
- Circadian rhythms are biological cycles lasting 24 hours, like the sleep wake cycle facilitated by time checks and external cues.
- **Sleeping** - Main internal bio clock is the suprachiasmatic nucleus and is located in hypothalamus. Has circadian firing pattern and when damaged in rats **sleeping and feeding patterns** are disrupted (Zucker). SCN regulates secretion of melatonin in pineal gland and is connected to retina of the eye.
- Shows indirect link between exogenous zeitgebers such as light and how melatonin production from pineal gland works with SCN to maintain rhythm. Light reach brain by other means as **Campbell** demonstrated resetting circadian rhythms by shining light on the back of participants knees showing secondary oscillators exist.
- **Core body temperature** - Sees its lowest point at around 4.30am and highest at around 6.00pm. Slight dip after lunch even if a person doesn’t eat.
- **Hormone production** - follows circadian rhythm with cortisol lowest at around midnight and peaking at 6am. Cortisol plays role in keeping alert. Melatonin and growth hormone have circadian rhythm and peak at midnight.

AO2:

- **Aschoff and Weaver** - participants in bunker without external cues and found participants had circadian rhythms between 24-25 hours although some were as high as 29. Demonstrates endogenous pacemakers which persisted even without exogenous zeitgebers.
  
  - Low ecological validity due to lab setting is not indicative of real world settings.
  - Low external validity as this may have affected quality or quantity of sleep
  - Small sample - meaning generalisation to bigger population is difficult.
  - Volunteers not representative as more motivated to take part, or cause demand characteristics as would have been told of study aims.

- **Zucker** - Animal study (difficulty in generalisability and lack external validity) to humans as different anatomy.

  - Morality - Animals can be classed as sentient beings by some yet have no free will in what harm is to come to their bodies. Yet can lead to protection from harm for humans, as understanding of animals can lead to human understanding.

- **Deterministic** - Some studies typical of biological approach as propose behaviour can be explained through structures in brain or hormonal activity. Behaviour is much more complex.

- **Nurture has a role too** - Environmental influences and exogenous zeitgebers can override endogenous pacemakers to some extent. But opposing this **Miles** found a blind man with a circadian rhythm of 24.9 hours struggled to reduce internal pace no matter what exogenous zeitgebers he was exposed to. Some bio clocks might be more engrained.

- **Reductionist** - SCN not only biological clock - Other oscillators in the body that regulate biological rhythms through other means such as temperature and light. Explained by SCN and pineal gland connection oversimplifies human biology which is far more complex.

- **Real world applications** - How timing affects drug treatment and the effects of hormones, digestion and heart rate as these are all controlled too. For ex. Aspirin is more effective if taken in late evening as attacks usually occur in early hours of morning.