

What is Chronobiology?

- The word CHRONOBIOLOGY comes from 2 Latin words 'CHRONOS' meaning time and 'Bios' meaning biology
- Our biology is organized not only in space but also in time
- There are many different rhythmic patterns that our body follows. The most commonly know is the Circadian Rhythm. This is a rhythm that operates within an approximate 24 hour cycle and controls our physiology, metabolism and mood
- Every plant, animal and human have clocks



- The principles of chronobiology are being studied in areas ranging from the administration of medication to timing of medical testing



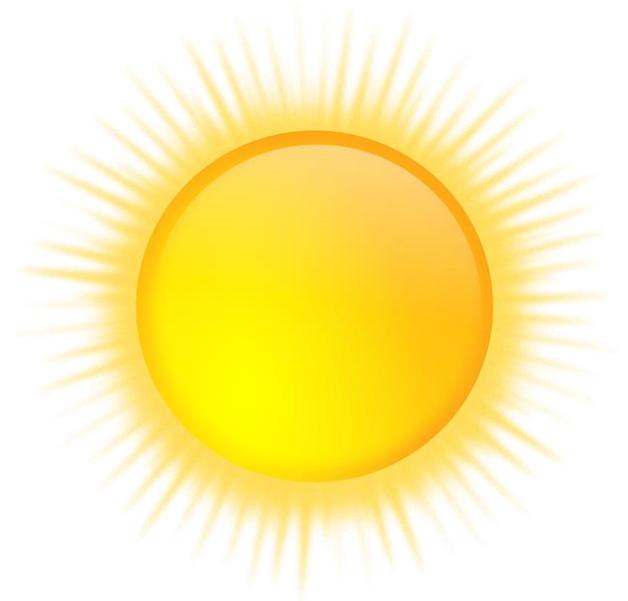
- For instance chronobiological studies have found that administration of HBP medication at night can greatly reduce incidence of heart attacks

Key Pieces

- Suprachiasmatic Nucleus in the hypothalamus is our master clock that controls our biological rhythms.
- In response to light/dark input it signals the pineal gland to produce the hormone Melatonin
- Melatonin is a key hormone for the functioning of our biological clock
- When the retinas stop sensing as much blue wavelength light, the suprachiasmatic nucleus signals the pineal gland to make melatonin.

Clock Influencers

- Zeitgebers are external cues that can influence our biological clock
- Common zeitgebers include:
 - Light
 - Food (timing of eating)
 - Medication
 - Exercise

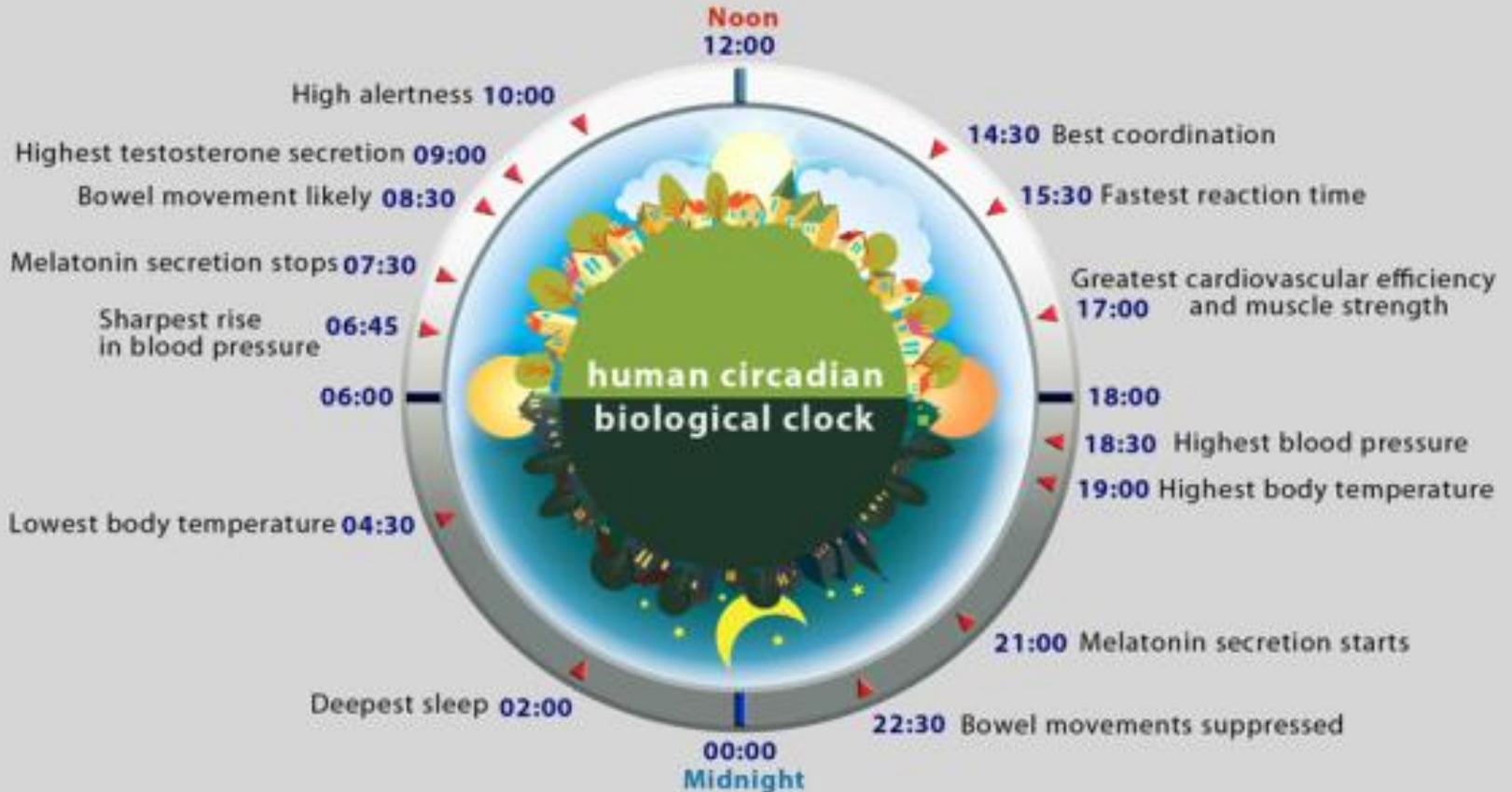


What can Happen When Our Clock is Out of Sync?

- Diabetes
- Obesity
- Heart Disease
- Mood Disorders



Basic Body Clock Diagram



Practical Applications

- Weight loss promotion
- The Importance of healthy sleep routines
- Explaining dangers of excessive Blue light exposure
- Optimal time for eating and nutrient absorption

References

Bedtime Chronotherapy with Conventional Hypertension Medications to Target Increased Asleep Blood Pressure Results in Markedly Better *Chronoprevention* of Cardiovascular and Other Risks than Customary On-awakening Therapy

[https://www.heartfailure.theclinics.com/article/S1551-7136\(17\)30059-4/pdf](https://www.heartfailure.theclinics.com/article/S1551-7136(17)30059-4/pdf)

Disruption of circadian clock linked to obesity, diabetes and heart attacks

<https://www.sciencedaily.com/releases/2013/02/130221091829.htm>

Circadian Rhythm Disturbances in Depression

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2612129/>

Dr. Michael Smolensky

The Body Clock Guide to Better Health