The Circuit of a Day

- High alertness: 10:00
- Highest testosterone secretion: 09:00
- Bowel movement likely: 08:30
- Melatonin secretion stops: 07:30
- Sharpest rise in blood pressure: 06:45
- Lowest body temperature: 04:30
- Deepest sleep: 02:00
- Noon: 12:00
- 14:30 Best coordination
- 15:30 Fastest reaction time
- 17:00 Greatest cardiovascular and muscle strength
- 18:00
- 18:30 Highest blood pressure
- 19:00 Highest body temperature
- 21:00 Melatonin secretion starts
- 22:30 Bowel movements suppressed
- Midnight: 00:00

The word “circadian” derives from the Latin circa, meaning “approximately,” and dies, meaning “day.” The circadian clock (as shown here representing a person who rises early in the morning and sleeps at night) synchronizes with cycles of light/dark, eating, and activity.

Source: School of Biological Sciences, Royal Holloway University of London. Adapted by Matthew Ray/EHP.

Source: Environ Health Perspect © 2010 National Institute of Environmental Health Sciences Medscape
Dyssynchrony in hypothalamic clocks may lead to altered satiety and feeding.

Dyssynchrony in lymphocyte specific clocks may lead to inflammation.

Dyssynchrony in pancreas specific clocks may lead to insulin insufficiency.

Dyssynchrony in muscle specific clocks may lead to insulin resistance.

Dyssynchrony in heart specific clocks may lead to cardiovascular disease.

Dyssynchrony in liver specific clocks may lead to insulin resistance and steatohepatitis.

Dyssynchrony in adipose specific clocks may lead to obesity and endocrine abnormalities.
**Chrono-nutrition**

1. **Clock regulation**
   - ex. High-fat diet (HFD), Caffeine

2. **Meal-time effects**
   - ex. Skipping breakfast (SB)
   - Nocturnal eating (NE)

**Regular/Time-restricted Feeding**
- Synchronization
- Amplified rhythms
- Healthy

**Irregular/Unusual Feeding**
- Desynchronization
- Attenuated rhythms
- Metabolic disorders

**Central Clock (SCN)**

**Peripheral Clocks (Most Tissues)**

**Feeding Rhythm**

**Metabolic rhythms**
- Lipogenesis, Thermogenesis

**Nutrients**

**Circulating Fat/Lipids**
Time-restricted feeding is a preventative and therapeutic intervention against diverse nutritional challenges.

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