Body chemistry and mood

How our chemical makeup may affect our emotions

• Circadian rhythm

Definition

A circadian rhythm is a roughly **24 hour cycle** (Circa + Dia = the Circle of a Day) in the physiological processes of all living beings, including plants, animals, fungi and bacteria.

In a strict sense, circadian rhythms are **endogenously generated**, although they can be modulated by external cues such as sunlight and temperature.

Circadian rhythms are important in **determining the sleeping and feeding patterns** of all animals, including human beings.

There are clear patterns of **brain wave activity**, **hormone production**, **cell regeneration** and other biological activities linked to this daily cycle.
Presentation: Body chemistry and mood

- 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
- Midnight: 00:00
- Noon: 12:00
- Best coordination: 14:30
- Fastest reaction time: 15:30
- Greatest cardiovascular efficiency and muscle strength: 17:00
- Highest blood pressure: 18:30
- Highest body temperature: 19:00
- Melatonin secretion starts: 21:00
- Bowel movements suppressed: 22:30
At one time or another, you---like most people---have probably woken up in a bad mood.
There's no rhyme or reason to it; you just feel grumpy and bad.
The blame may lie with melatonin, a naturally occurring hormone produced in your brain’s pineal gland. Melatonin plays a major role in your sleeping patterns and overall mood.

Function

- To help regulate sleeping patterns and body temperature. On average, a human being does not start producing melatonin until she is around three months of age, which explains babies' strange sleeping patterns.

- During childhood, melatonin levels continue to increase until they reach their peak during puberty

- Then it steadily decreases as we age. And, as melatonin levels decrease, sleep difficulties begin to occur.

- This is why many people have sleeping problems during adulthood.
Significance

- The amount of melatonin present in your blood can influence the way you feel greatly. **Individuals suffering from depression usually have low levels of melatonin.**
- Decreasing melatonin levels can impede a good night's sleep, which in turn can cause
  - **insomnia,**
  - **depression and**
  - **other mood disorders such as seasonal affective disorder (SAD),**
- SAD is a serious depression that occurs in some people during seasons and conditions in which the light that triggers melatonin production is reduced.

(Source: http://www.ehow.com/about_5057391_effect-melatonin-moods.html)
• Serotonin and mood

Serotonin acts as a **neurotransmitter**, a type of chemical that helps relay signals from one area of the brain to another.

Although serotonin is **manufactured in the brain**, where it performs its primary functions, some 90% of our serotonin supply is found

- in the digestive tract and
- in blood platelets.
As a neurotransmitter, serotonin helps to relay messages from one area of the brain to another. Because of the widespread distribution of its cells, it is believed to influence a variety of psychological and other body functions.

Of the approximately **40 million brain cells**, most are influenced either directly or indirectly by serotonin.

This includes brain cells related to:

- mood,
- sexual desire and function,
- appetite,
- sleep,
- memory and learning,
- temperature regulation, and
- some social behavior.
There are many researchers who believe that an **imbalance** in serotonin levels **may** influence mood in a way that **leads to depression**.

Possible problems include:

- low brain cell **production** of serotonin,
- a **lack of receptor** sites able to receive the serotonin that is made,
- **inability** of serotonin to reach the receptor sites, or
- a **shortage** in tryptophan, the chemical from which serotonin is made.

If any of these biochemical glitches occur, researchers believe it can lead to depression, as well as

- obsessive-compulsive disorder,
- anxiety,
- panic, and even
- excess anger.
Although it is widely believed that a serotonin deficiency plays a role in depression, there is no way to measure its levels in the living brain.

There have not been any studies proving that brain levels of this or any neurotransmitter are in short supply when depression or any mental illness develops.

Researchers don't know whether the dip in serotonin causes the depression, or the depression causes serotonin levels to drop.

(Source: http://www.webmd.com/depression/features/serotonin)