

Program: Why We Sleep

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Introduced by: Bill Dick

Guests: Bill Allan, Ron Banta, Glenna DeBrotta, Ed Koolish, Rees Morgan

Attendance: 128

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All animals sleep (except dolphins, who sleep with half a brain at a time). The sleep cycle in humans is 90 minutes; it consists of Non-Rapid Eye Movement (NREM) sleep (four stages) followed by REM sleep. The brain and the body are too busy during the day to do certain functions.

We have a giant file reorganization of the brain and body during sleep. During sleep, emotions are recalibrated, the immune system is boosted, and blood pressure is lowered healing the cardiovascular system. Painful or unneeded memories are removed, learning is improved, past and present knowledge are melded, the metabolic state is improved, creativity is inspired, unnecessary neural connections are deleted, and some neural connections are strengthened.

Sleep is induced by the circadian rhythm, melatonin and adenosine. The Suprachiasmatic Nucleus (20,000 cells out of 100 billion cells in the brain) sends out signals to all parts of the brain. Signals are then sent to the organs controlling sleep. The circadian rhythm was discovered in 1729 by JeanJacques d'Ortous de Mairan when he learned of the rhythm in plants. The circadian rhythm governs mood and emotions, eating and drinking, amount of urine, metabolic rate and body temperature, and the release of some hormones.

In 1938, Nathaniel Kleitman and Bruce Richardson studied the body's rhythms at Mammoth Cave, KY in total darkness for six weeks. They found that the rhythm was 24 hours and 15 minutes long. In 1952, Eugene Aserinsky and Nathaniel Kleitman studied sleep by using polysomnography (EEG, eye movement and muscle activity). They found four stages of NREM sleep, the last two were the deepest; and REM sleep which appears like a recording when awake. During REM, the body is paralyzed except for the eyes.

Humans sleep for eight hours (or some sleep and some naps). In Fatal Familial Insomnia, the patient cannot sleep and in a few months body functions declines and death ensues. In the womb, the fetus is awake some. Sleep changes through the years until efficient sleep is difficult by old age. During NREM sleep, the brain weeds out unnecessary neural connections, recalibrates brain circuits, deletes nonessential memories and strengthen individual memories. REM sleep strengthens neural connections, removes the emotional sting of painful memories, melds past and present knowledge, inspires creativity, improves ability to learn, and promotes problem solving. In NREM sleep, nonessential memories are deleted, and individual memories are strengthened.

During sleep the immune system is boosted allowing it to fight infection and malignancies. The metabolic state is improved (glucose and cortisol), and cardiovascular fitness is improved. We dream mostly during REM sleep. MRI scans can show the brain is active during dreams. Many examples were given citing people remembering their dream in the morning leading to some new discovery.

There are over 100 sleep disorders with the most common being insomnia and sleep apnea. Sleep apnea leads to daytime drowsiness and many metabolic disorders. Sleep deprivation in the

workplace is serious and some companies have reserved areas for naps. Sleep deprivation for students is also serious. Improper sleep is not conducive to learning; many school systems have pushed back the school start time by one hour. Proper sleep is very important in the medical and nursing fields. Better care, with less mistakes, is given by properly rested professionals.

In Greece, men are healthier when they take afternoon naps as their ancestors did. Many new sleep features will be on the market soon. One device will check room temperature, so that better sleep is possible. LED (blue) light stimulates the brain. It is contained in all smart phones, tablets and TVs. Screens will be available that change the light to more of a red light which is less stimulating to the brain.

SLEEP TIPS

Sunshine in daytime

Sleeping Sleep on Schedule – Same Time Waking and

Avoid Caffeine after 12 N or 4 p.m.

Avoid Alcohol Just Before Bedtime

Avoid Large Meals Before Bedtime

Avoid Medication That Delay Sleep

Relax Before Bedtime – Music or Read

Hot Bath Before Bedtime

Dark, Cool, Gadget-Free Bedroom

No TV or Computer ½ hour before bedtime

Don't Lie in Bed Awake – Get Up and Go Back Later



Bill Dick