

Lecture 30 -- Sleep – Kavey

- I. Circadian rhythms
 - Sleep is part of a 24 sleep-wake rhythm
 - Sleep is an active process – not just the absence of brain activity
 - 2 active processes – sleep and wakefulness
 - The term circadian rhythms
 - Jean Jacques d'Ortois de Mairan's plant demonstration of circadian rhythm
 - The body's circadian rhythms – e.g. body temperature
 - The suprachiasmatic nucleus of the hypothalamus
 - Jet lag

- II. Neuroanatomical and neurochemical mechanisms
 - Transection, stimulation and lesion studies of the brain
 - sites of wakefulness – Moruzzi
 - sites of sleep
 - REM sites
 - Onset and offset of REM sleep
 - Neurochemical regulation of awake and sleep and REM and Non-REM
 - adrenergic serotonergic cholinergic glutamatergic
 - Glutamate is involved in stimulation of awake
 - GABAergic (gamma-aminobutyric acid) – is mainly inhibitory and located in the hypothalamus and basal forebrain and thalamus
 - adenosine - accumulates in basal forebrain
 - hypocretin/orexin - hypothalamus

- III. Human studies of sleep
 - The sleep lab
 - Sleep is not a homogeneous state
 - The stages of sleep
 - Cycling in sleep
 - REM vs Non-REM sleep
 - Characteristics of REM sleep
 - Heart and respiratory function in sleep
 - Changes with age

- IV. Sleep deprivation gives hints as to function of sleep
 - Cognitive, mood, personality, motor changes
 - REM deprivation – REM pressure and REM rebound

- V. Sleep disorders
 - Insomnia – hypersomnia – parasomnia – biological clock
 - Narcolepsy - disorder of excessive sleepiness
 - The tetrad – cataplexy, sleep paralysis, hypnagogic/hypnopompic
 - Sleep apnea
 - Sleep walking
 - REM sleep behavior disorder

Relevant reading: chapters 47 and 48 in “Principles”