Lecture 36 -- 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'Ortous 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”