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
       GABAAergic (gamma-aminobutyric acid) – is mainly inhibitory and located in the hypothalamus and basal forebrain and thalamus
       adenosine - accumulates in basal forebrain
       hypocretin/orxin - 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 – hypersonnia – 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”