

BRAIN FUNCTIONING: INTEGRATION

2/2/93, 2/1/96, 2/3/98, 2 Feb 05, 6 Feb 08, 3Feb10

From Jacob and Francone, Thibibadeau and Patton, Marieb and Martini's 6th: 552-558, 7th: 536-543,

Integrative functions: 1) consciousness, 2) use of language, 3) emotions and 4) memory

CONSCIOUSNESS: (p 542) RAS arouses *and* maintains consciousness

RAS relays sensory data to thalamus, radiations stimulate **cortical neurons (consciousness)**

Without **continual stimulation** fr RAS, loss of consciousness, **cannot arouse**

Depress RAS (barbiturates, alcohol), lose consciousness, amphetamines stimulate

EEG: (p 542) can be used to diagnose epilepsy, brain tumor, hemorrhage, etc:

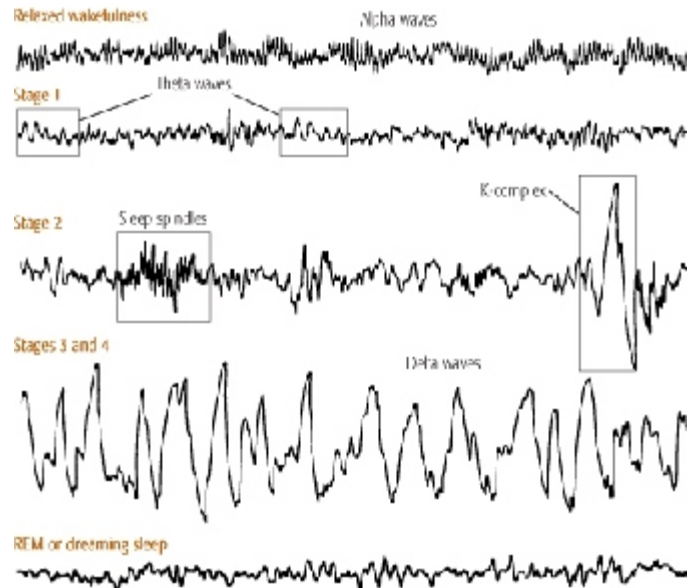
beta:	15-60 hertz	5-10 mvolts	mentally alert, working on problem, visual stim.
alpha:	8-10 hertz	50 mvolts	calm, relaxed, wakefulness
theta:	4-7 Hz	high voltage	children, stressed adult, disorders (tumor, etc)
delta:	1-5 hertz	20-200 mvolts	deep sleep, anaesthesia, or waking adults with brain disorder

SLEEP: Two types (p 542):

slow-wave sleep	delta waves:	(SWS) deep sleep
REM:	beta waves:	"paradoxical sleep" appear to be conscious, 20 % of night's sleep (~1.5 hrs)

If REM is curtailed: anxiety, irritability, increased appetite, eventually hallucinations.

deprived of REM people spend more time in REM when possible (later), REM when awake: **hallucinations**



Sleep is induced by **hypnogenic zones** inhibiting RAS

in medulla, pons, midbrain, thalamus and **suprachiasmatic** nucleus to preoptic nucleus in the hypothalamus

meditation can train person to relax into alpha waves

epilepsy (1% pop) abnormal synchronous discharges, 3 Hz fr millions of neurons. These trigger discharges in many systems : smell, muscle, vision, auditory., depress RAS

Petit mal: *deja vu* (already seen), strange smell, sense of unreality,

Grand mal: loss of consciousness, powerful muscle contractions

most seizures are idiopathic ("unknown disease")

USE OF LANGUAGE: speaking, listening, writing, reading,

Found in L hemisphere in 90% population

(95% of R handed persons, 65% of L handed persons.)

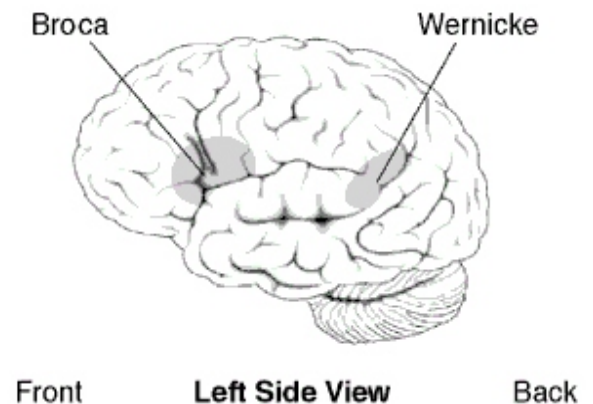
L brain better at **analysis**

R hemisphere at **holistic view**

Two areas involved in language, noted by studying **aphasias** (without speech): (p 485)

Broca (#44) _____ damage to portions of **lateral L frontal lobe** controlling mouth and tongue caused most damage to speech, **controls muscles of speech**

Wernicke (#40) damage to **temporal lobe** near auditory center also affected speech, interpretation, comprehension,



Proposed model of language, communication:

Connecting tract tells Broca's what Wernicke's thinks when speaking: **coordinates speech**

Angular gyrus connects with visual cortex:

contains programs **converting visual input into auditory pattern** in Wernicke's area.

Damage to angular gyrus leads to **alexia or agraphia**