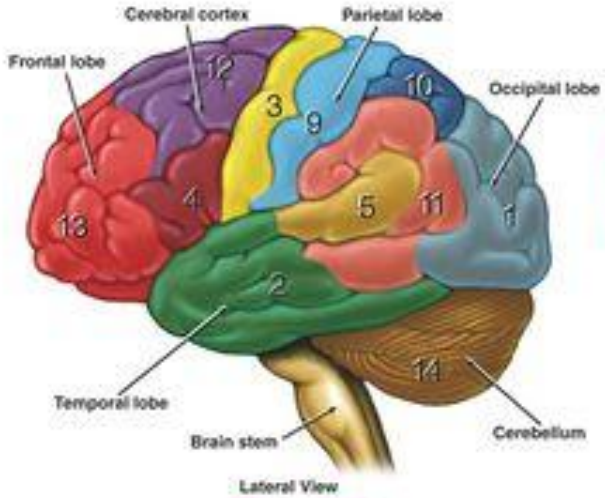
Functional Areas of the Cerebral Cortex

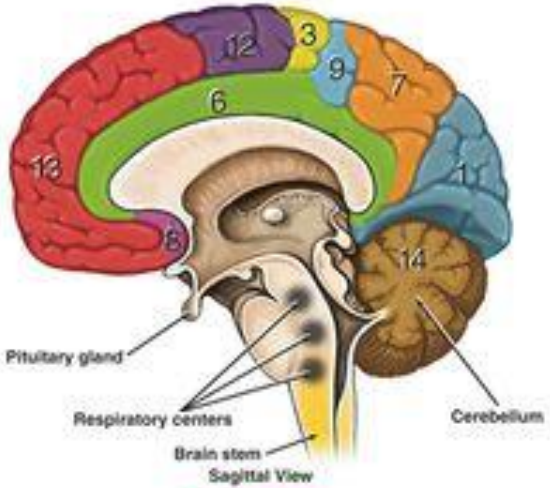
1. **Visual Area:**
   - Sight
   - Image recognition
   - Image perception
2. **Association Area**
   - Short-term memory
   - Equilibrium
   - Emotion
3. **Motor Function Area**
   - Initiation of voluntary muscles
4. **Broca's Area**
   - Muscles of speech
5. **Auditory Area**
   - Hearing
6. **Emotional Area**
   - Pain
   - Hunger
   - "Fight or flight" response
7. **Sensory Association Area**
8. **Olfactory Area**
   - Smelling
9. **Sensory Area**
   - Sensation from muscles and skin
10. **Somatosensory Association Area**
    - Evaluation of weight, texture, temperature, etc. for object recognition
11. **Wernicke's Area**
    - Written and spoken language comprehension
12. **Motor Function Area**
    - Eye movement and orientation
13. **Higher Mental Functions**
    - Concentration
    - Planning
    - Judgment
    - Emotional expression
    - Creativity
    - Inhibition

Functional Areas of the Cerebellum

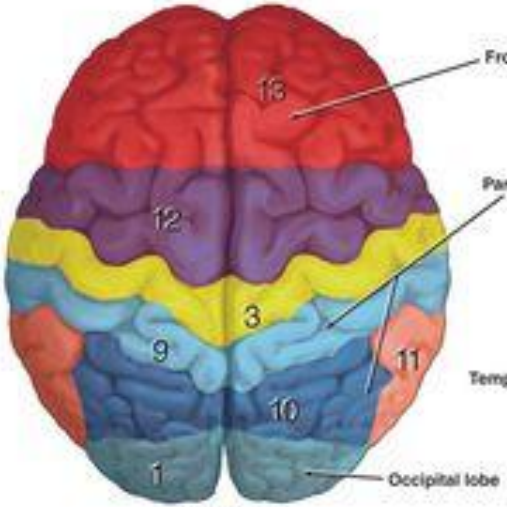
14. **Motor Functions**
    - Coordination of movement
    - Balance and equilibrium
    - Posture



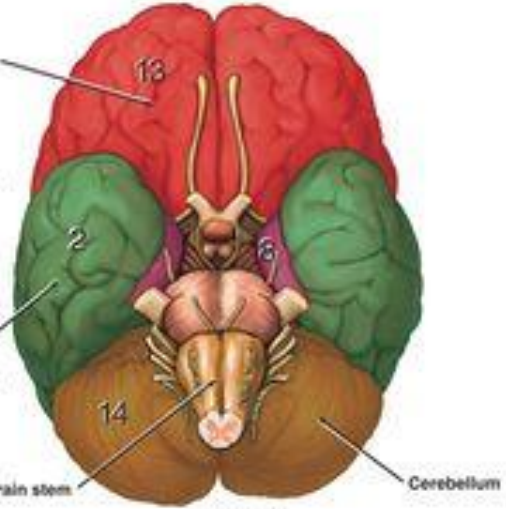
Lateral View



Sagittal View

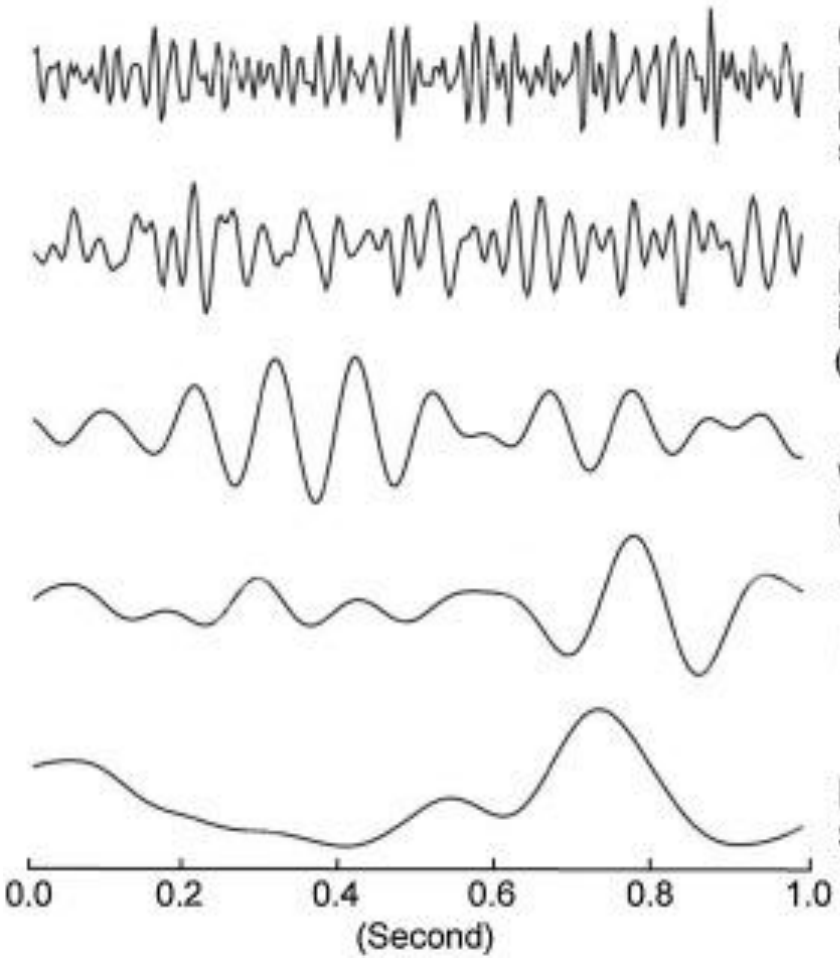


Superior View



Inferior View

Human brain oscillations



Generally linked to:

Gamma 25-140 Hz

Learning, cognitive processing, mental sharpness, normal visual consciousness, rapid-eye movement, sleep, decoding multiple sensory signals

Beta 13-32 Hz

Normal wakeful consciousness and concentration, it is suppressed during walking.
(Beta1: 13-20 Hz, beta2: 21-32 Hz)

Alpha 8-13 Hz

Wakeful rest with eye closed
(Alpha1: 7-8.9 Hz, alpha2: 9-10.9 Hz, alpha3: 11-12.9 Hz)

Theta 4-8 Hz

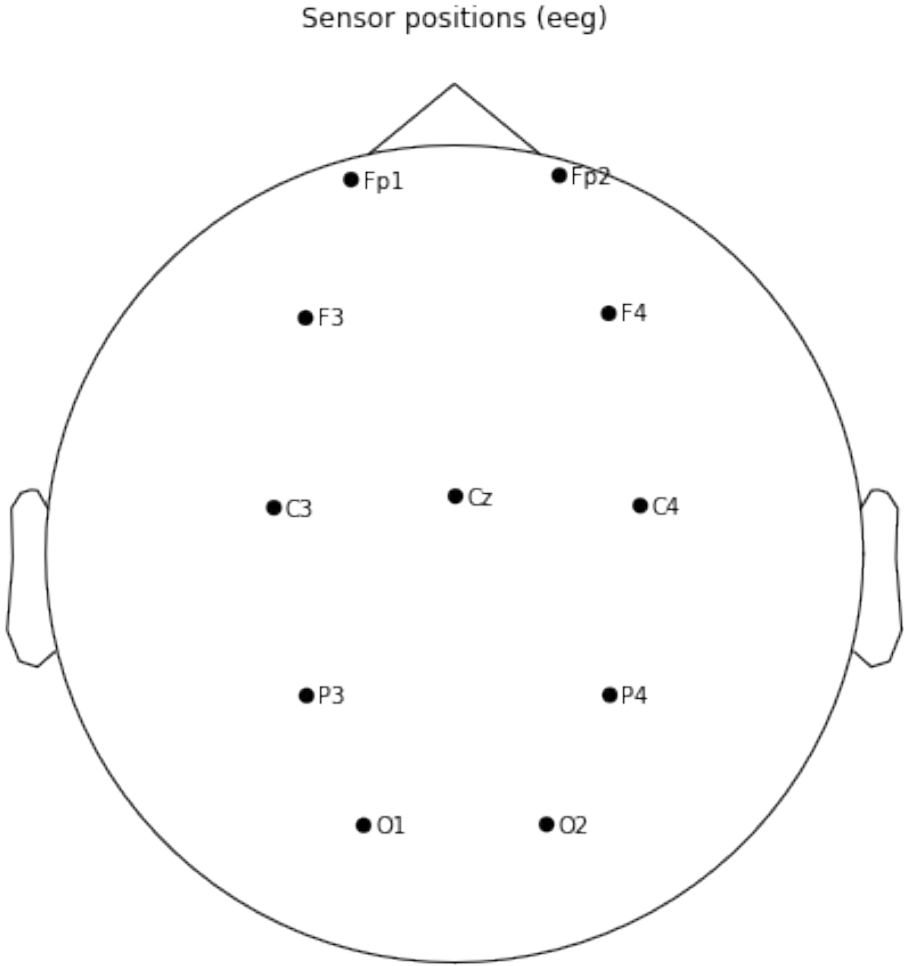
Drowsyness, unconsciousness, meditative state

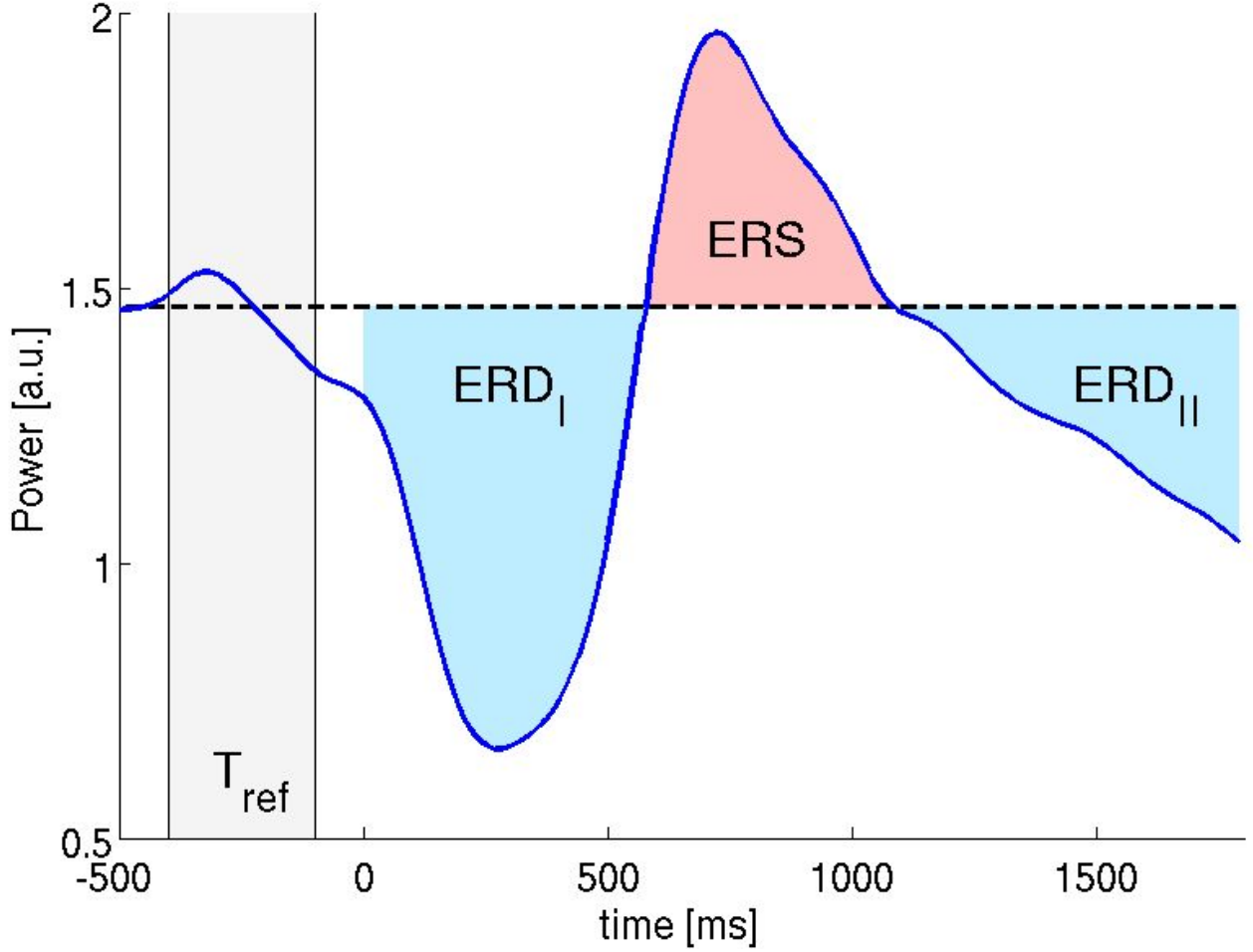
Delta 0.5-4 Hz

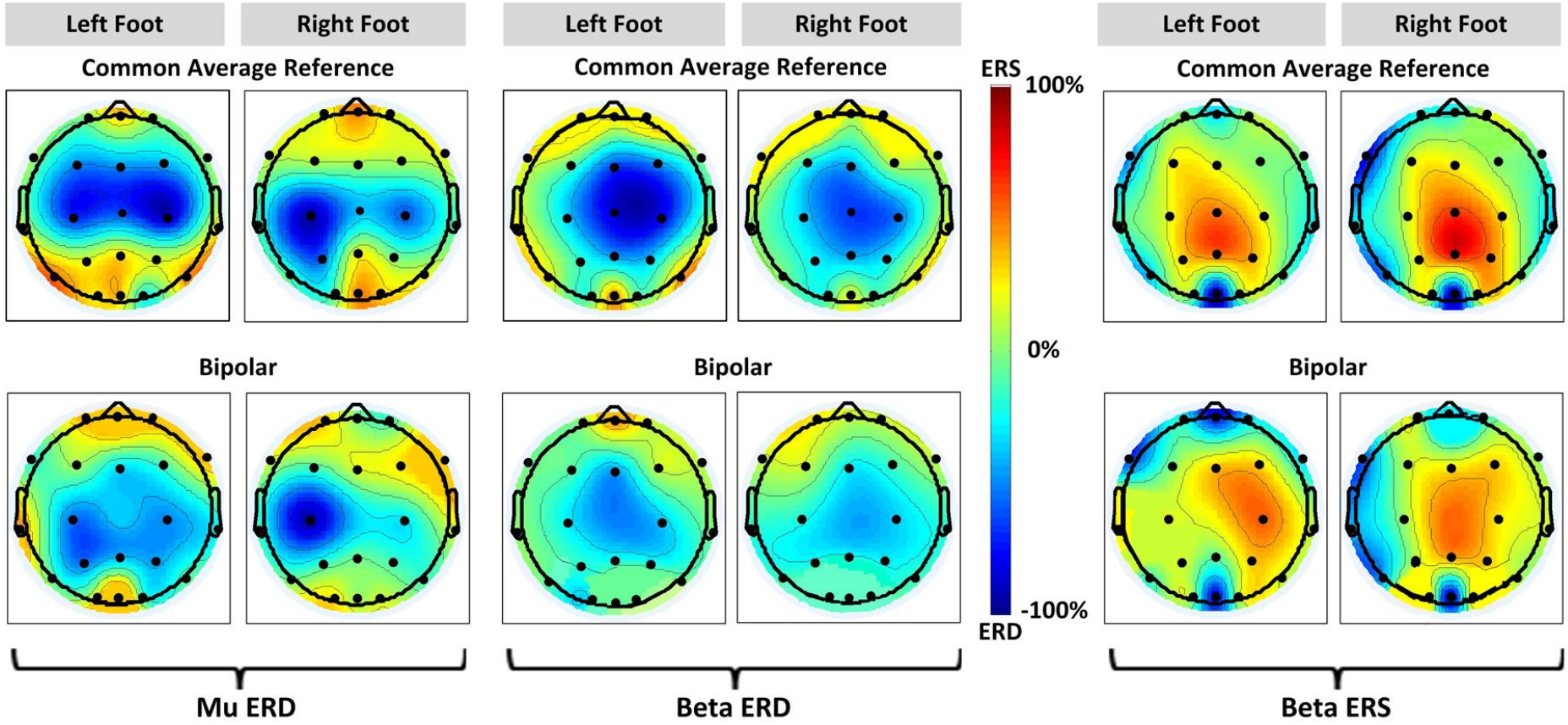
Sleep, unawareness, deep-unconsciousness

Intracortical synchronization

Inter-network synchronization


Sensor positions (eeg)
Fp1
Fp2
F3
F4
C3
Cz
C4
P3
P4
O1
O2


2
1.5
1
0.5
Power [a.u.]
ERS
ERD_I
ERD_II
T_ref
-500
0
500
1000
1500
time [ms]


Left Foot
Right Foot
Common Average Reference
Bipolar
Mu ERD
Left Foot
Right Foot
Common Average Reference
Bipolar
Beta ERD
ERS
100%
0%
-100%
ERD
Left Foot
Right Foot
Common Average Reference
Bipolar
Beta ERS