

**XLIII. Electroencephalography**  
**XLIV. Evoked potentials**  
**XXXIII. Estimation of visual acuity**

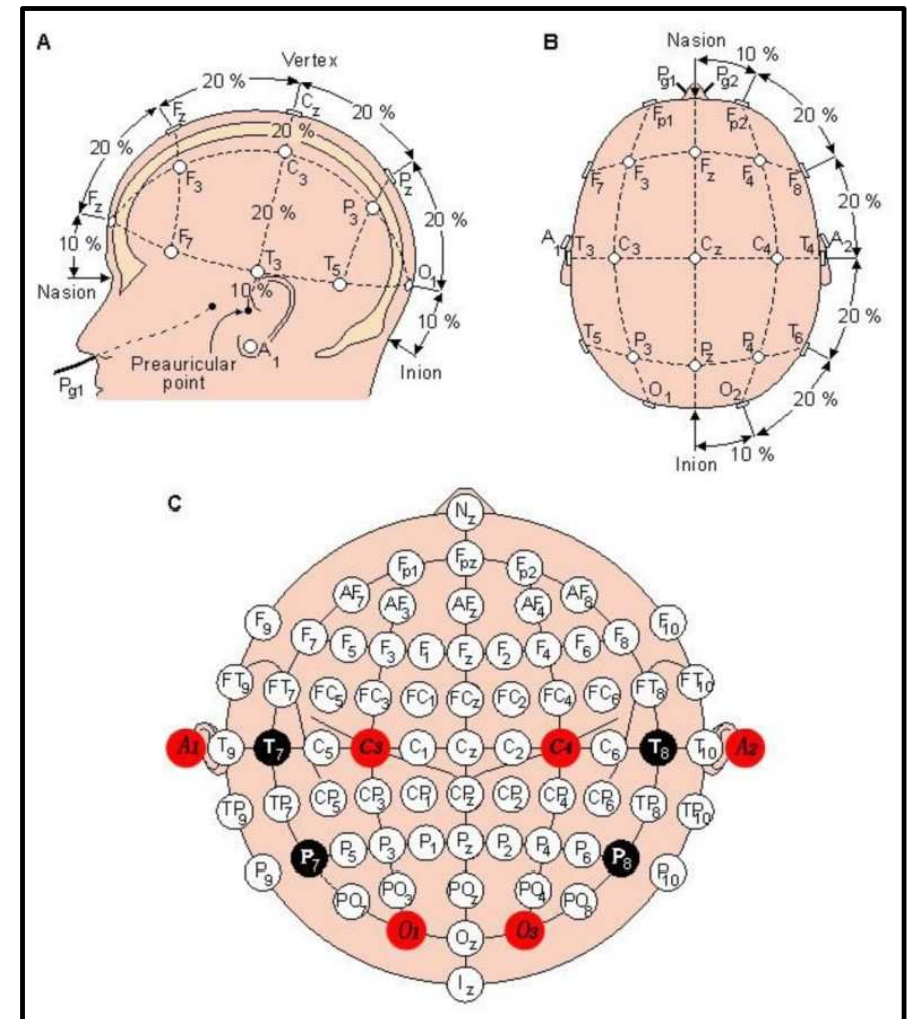
Physiology I – practice  
Autumn, week 10-12

# Electroencephalography (EEG)

- Method used for the registration of electrical potentials of the brain
- Hans Berger (1929)
  
- Scalp EEG
- Electrocorticogram (ECoG)
- Stereoelectroencephalogram (SEEG)
  
- Macro EEG
- Micro EEG

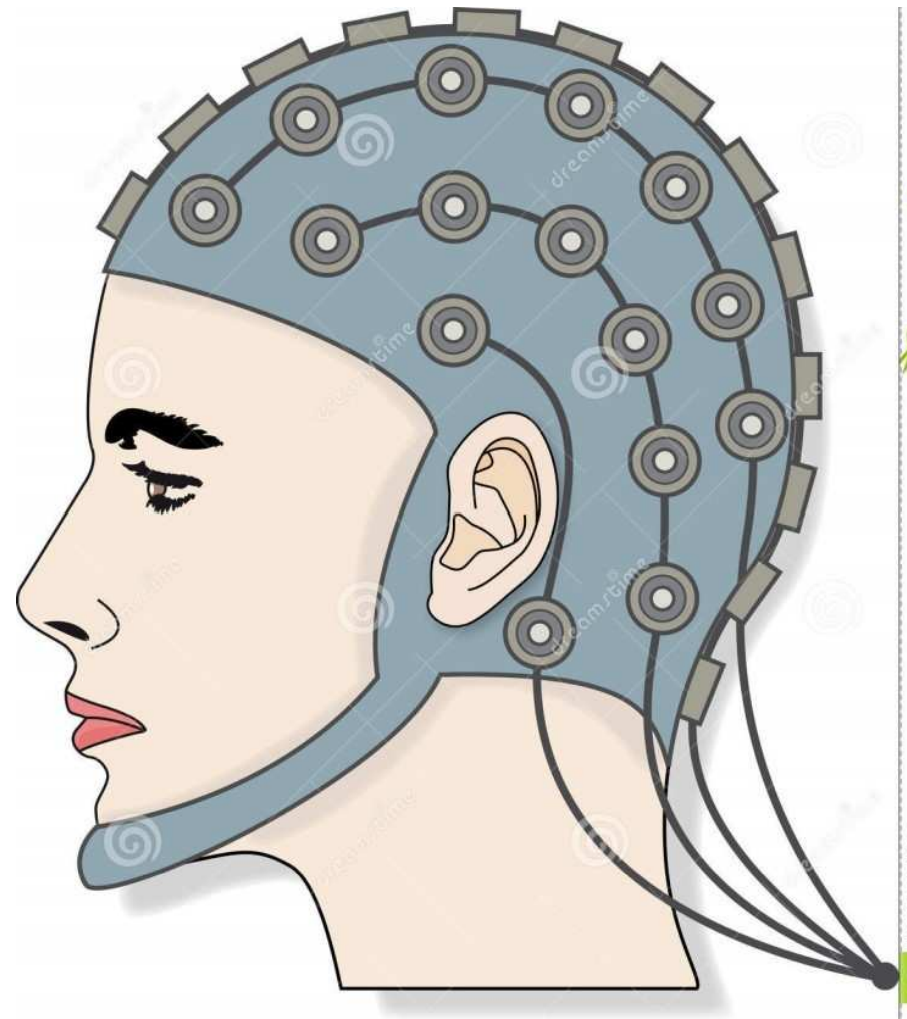
# Electroencephalography

- Placement of electrodes:  
system 10-20



# Electroencephalography

- Attachment of electrodes during scalp EEG



# Electroencephalography

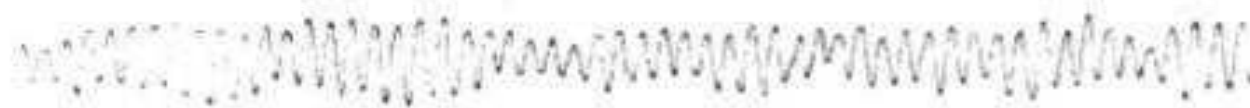
- Alpha rhythm
  - Frequency **8-13 Hz**, noticeable with eyes closed, in the awake, healthy and mature brain, especially in parietooccipital lobes
- Beta rhythm
  - Frequency **14-30 Hz**, noticeable with open eyes, sometimes constantly over the frontal area. The phenomenon of suppression of the alpha rhythm by opening eyes – alpha attenuation reaction (AAR).
- Theta rhythm
  - Frequency **4-7 Hz**, noticeable in children, in healthy adults only during shallow sleep stages
- Delta rhythm
  - Frequency **1-3 Hz**, in neonates and infants, in healthy adults only during deep non-REM sleep

# EEG waves

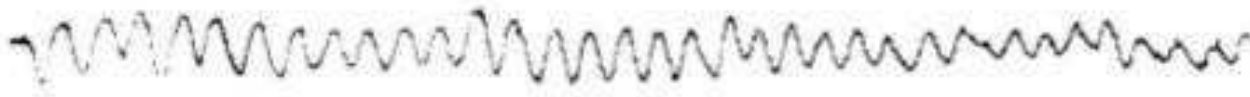
Beta



Alpha



Theta



Delta



# EEG record - example



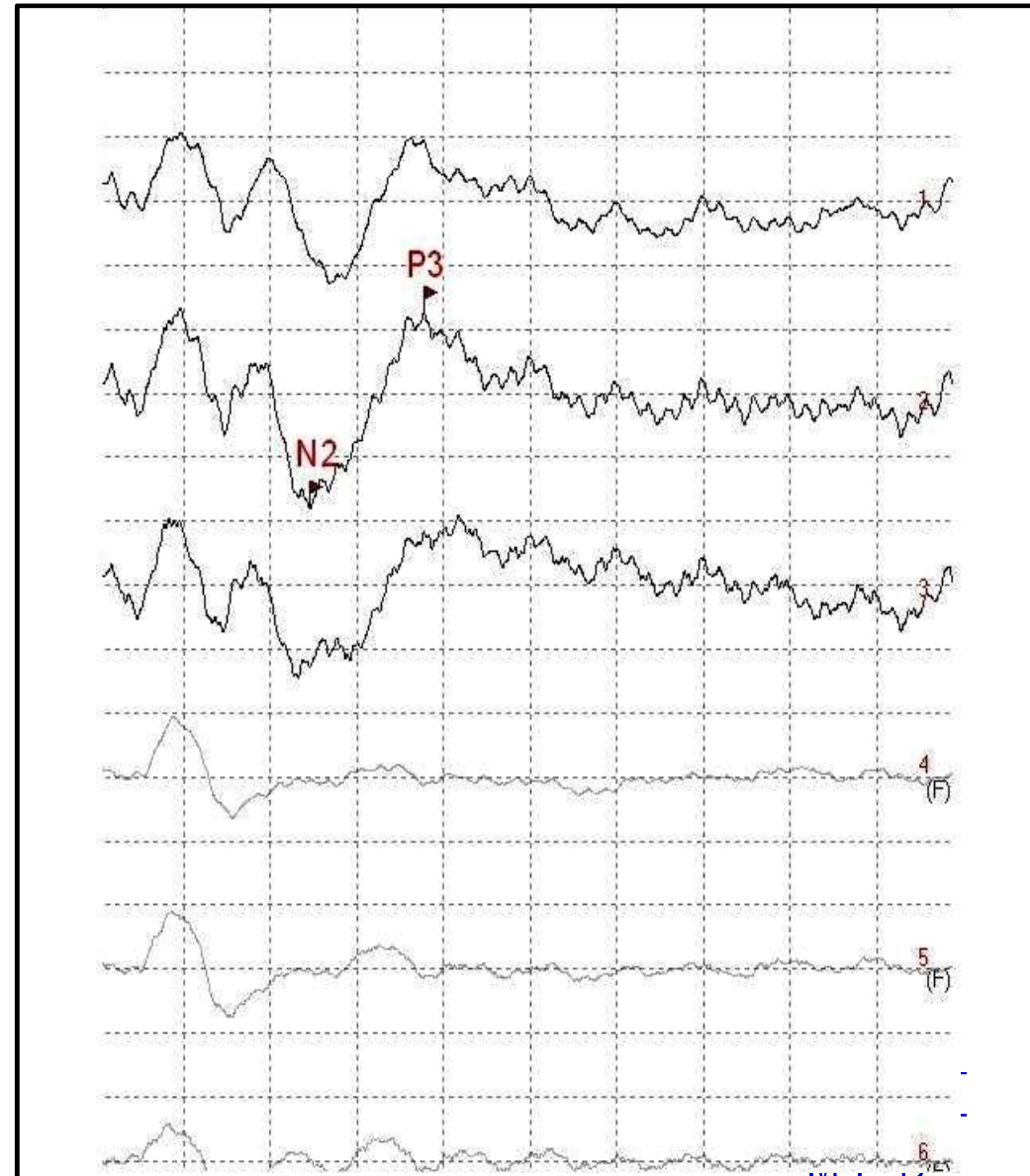
# Evoked potentials (EP)

- Electrical manifestation of brain activity triggered by external sensory stimulus
- Evaluation of the functional state of the nerve pathway
- Types of EP:
  - VEP (visual)
  - AEP (auditory)
  - SEP (somatosensory)
  - MEP (motoric)
  - SSEP (stable)
  - ERP (cognitive)



# Evoked potentials

- Wave p300 (mean latency 300 ms)

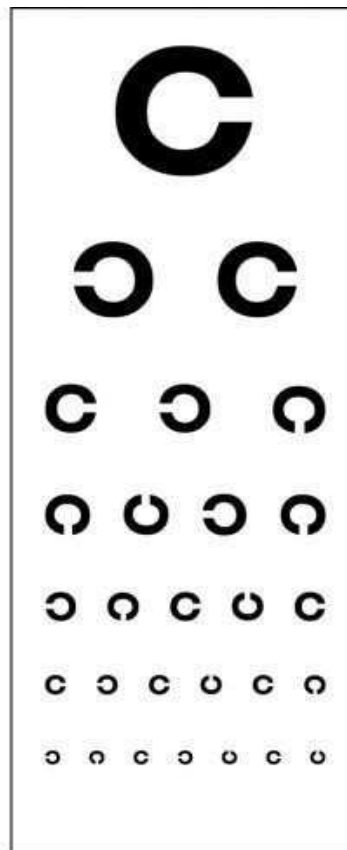


# Visual acuity examination – optotypes

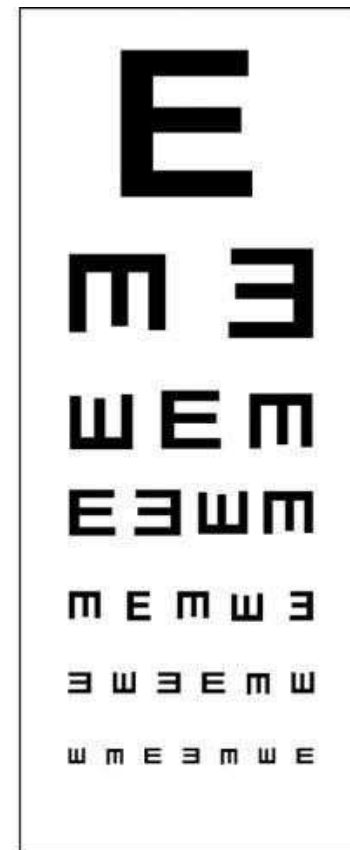
Snellen



Landolt



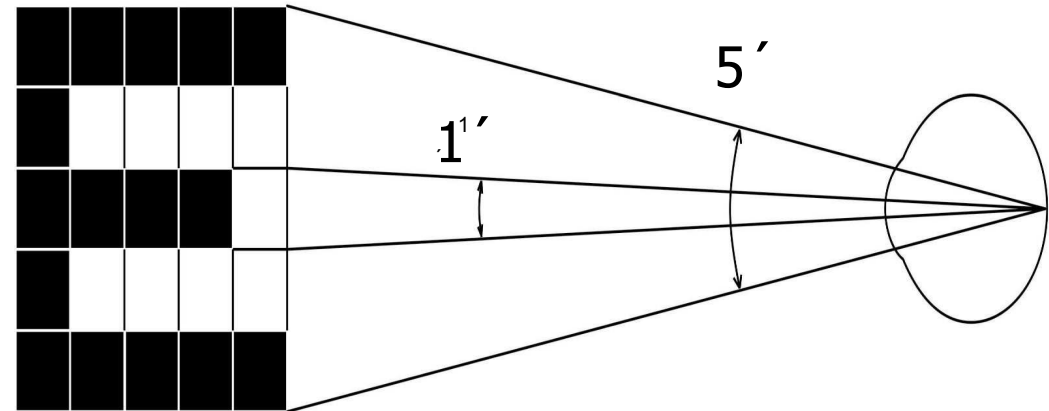
Pflüger



# Visual acuity examination – optotypes

- Physiological background:

- the eye can distinguish 2 points as 2 points when the light rays from these two points fall on the retina at an angle of 1 arc minute



- Examination:

- Each row of optotypes has a number on the side that expresses the distance from which the rays from 2 points (for their differentiation and correct reading of the sign) fall on the retina at an angle of 1 arc minute
- The most frequently used distance is 5 m

- The result of the examination:

- Visus – we write it as a fraction: the numerator is the distance from which we are examining, the denominator is the number of the line read without error

for the right eye ....  $V_{OD} = 5/5$  ..... healthy eye, good visual acuity

for the left eye.....  $V_{OS} = 5/10$  .... an eye with impaired visual acuity