SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

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Department of Biomedical Engineering

Vision Tit 2 Vision Title 3

Course Name: 19BMB301 Diagnostic & Therapeutic Equipment

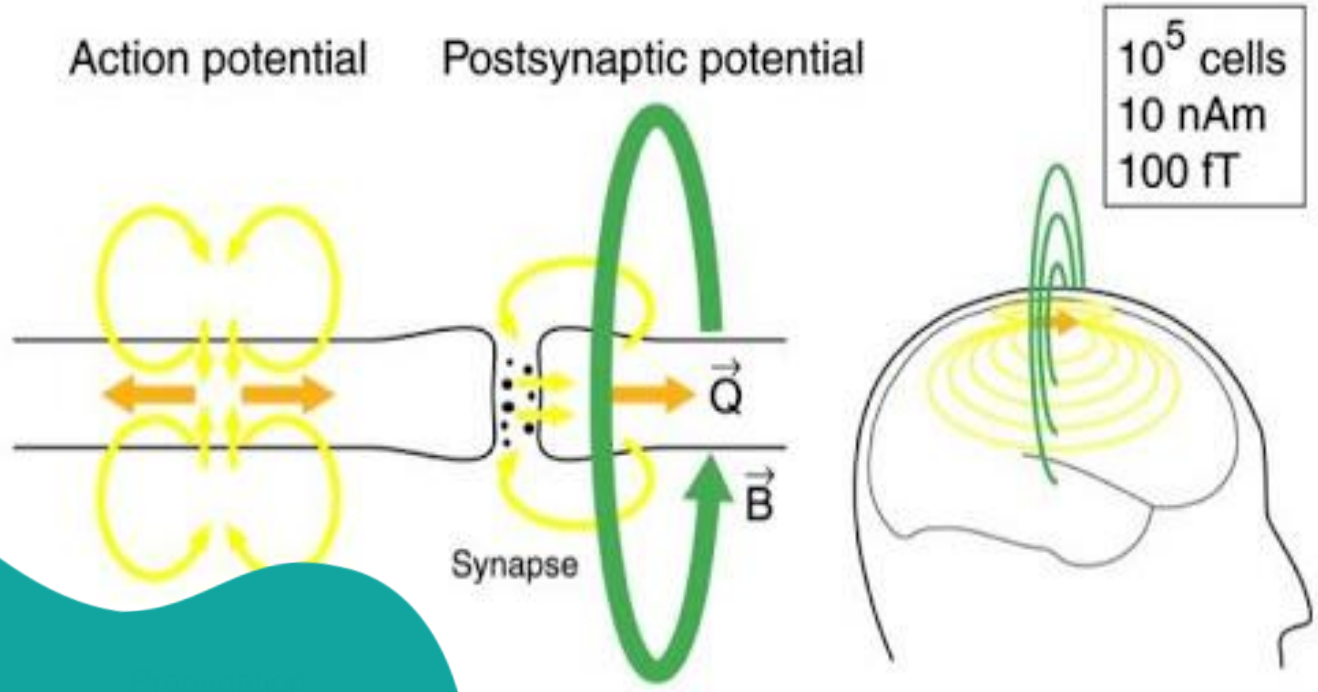
III Year : V Semester

Unit I – Cardiology and Neurological Equipment

Topic : MEG

Magneto Encephalography

- MEG → functional neuroimaging technique for mapping brain activity by recording magnetic fields produced by electrical currents occurring naturally in the brain using very sensitive magnetometers.
- Records the magnetic flux arises from source current
- Current is always associated with magnetic field

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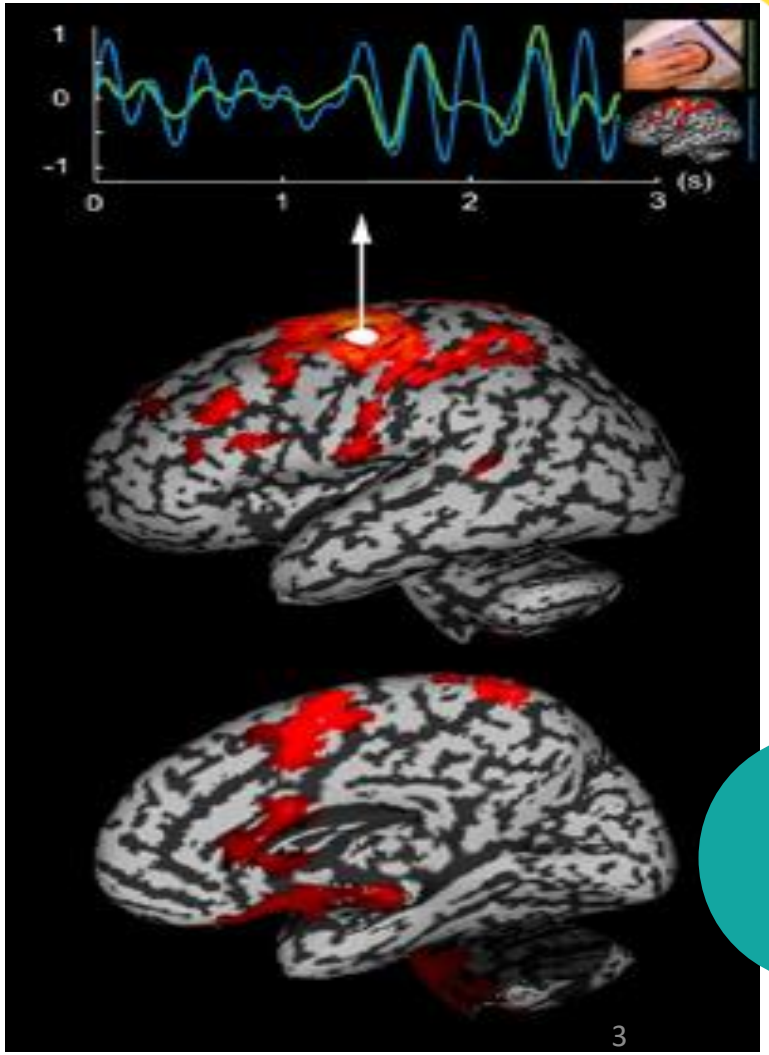
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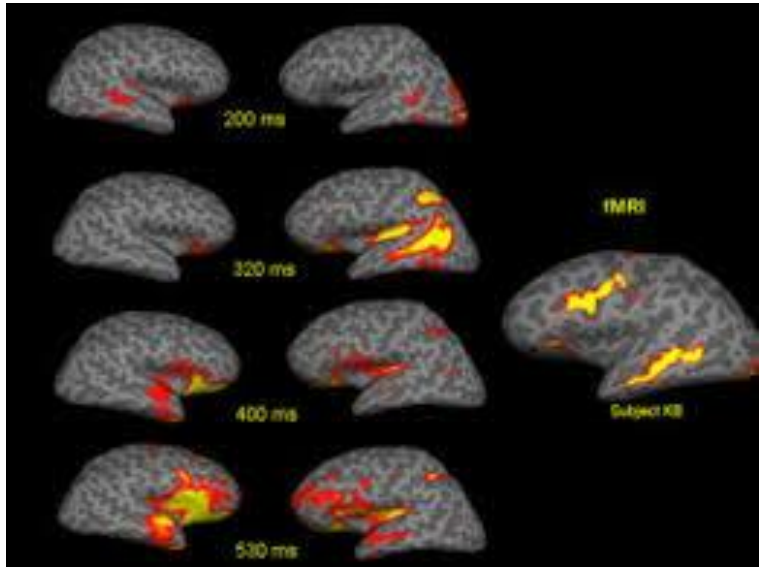
200 ms
320 ms
400 ms
530 ms
fMRI
Subject KB

Recording of Magnetic flux

- Recorded by special sensors called magnetometers
- Magnetometer is a loop of wires placed parallel to the head surface
- The strength of magnetic flux at a certain point determines the strength of current produced in magnetometer
- Current produced in magnetometers are extremely weak and must be amplified
- **Super conductive quantum interference device (SQUIDS)**
- It is filled with liquid helium to keep them at externally low temperature
- Different types of sensors
  - Magnetometer – magnetic flux through single coil
  - Gradiometers – difference in Magnetic flux between 2 points

MEG Uses

- Epilepsy
- Seizure location
- Lesion
- Tumor

EEG Biofeedback Instrumentation

- In general, Feedback is used to control a process is applied to biological process with in the body → " **Biofeedback**"
- Biofeedback instrumentation includes a transducer and amplifier to measure the body variable that is to be controlled by biofeedback process.
- Magnitude of the measured variable is converted to suitable **visual, auditory output** is presented to the subject
- Success of biofeedback depends on interpretation of data & training of the subjects so that they can use results effectively.

- Patient bodily functions/activity like heart rate, EEG, Muscle activity is measured by a transducer which then amplified and compared
- This error signal is converted to visual & auditory signal, by seeing or hearing the signal a patient can control his/her signal (physiological activity)