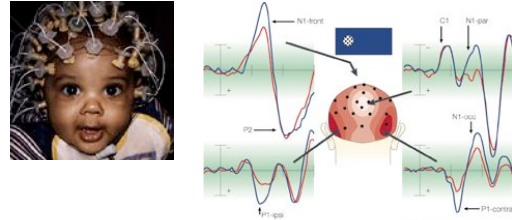


Neurophysiological methods

- ERP
- MRI and fMRI
- NIRS
- DTI
- TMS

- Single-unit recording

Event Related Potential (ERP)



Measurement of brain activity in 128 locations simultaneously

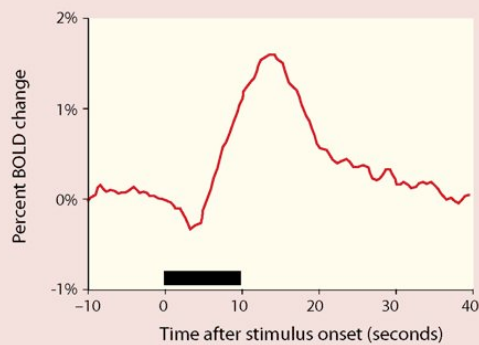
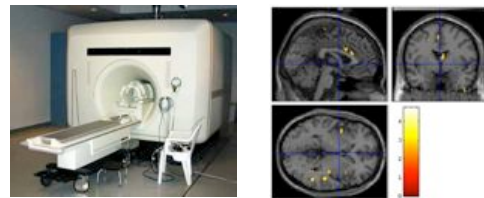
Results of an ERP study



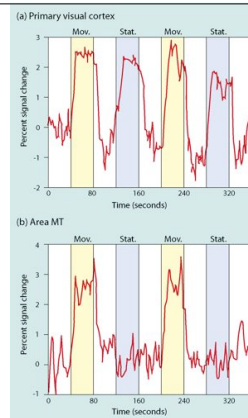
Kaufman et al, 2003

fMRI

- Functional Magnetic Resonance Imaging



Duong, T.Q., Kim D.S., Ugurbil, K., and Kim, S.G. (2000). Spatiotemporal dynamics of the BOLD (fMRI) signals: Toward mapping submillimeter cortical columns using the early negative response. *Magn. Reson. Med.* 44:231-242.



NIRS (Near-Infrared Spectroscopy)

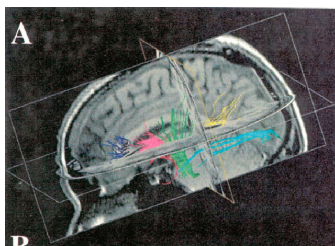
- Non-invasive optical imaging method
- OxiHb and deoxyHb reflects the IR light differently



- Transcranial Magnetic Stimulation



DTI (Diffusion Tensor Imaging): Connections in the human brain

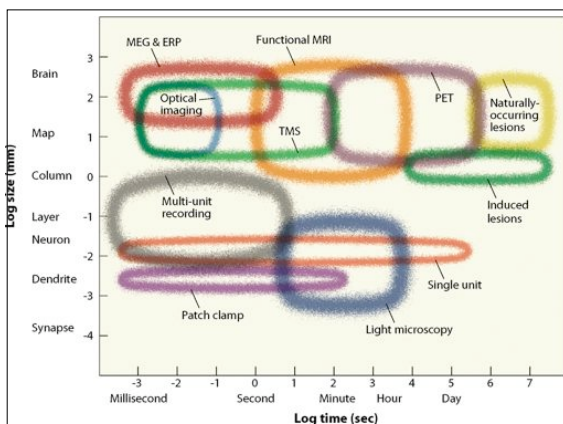
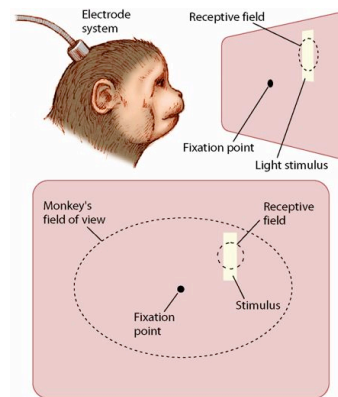


light blue – optic radiation
pink – anterior thalamic radiation
dark blue – genu
yellow – splenium
green – corticospinal tract

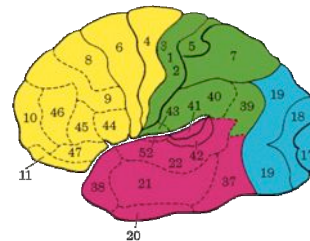
New method: tracking fiber tracts in vivo

Mori et al., 2000

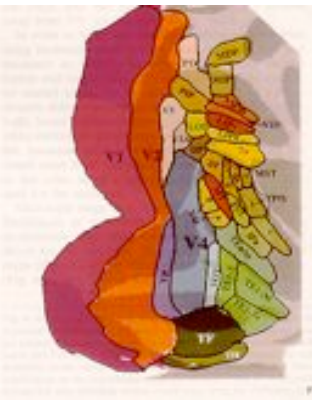
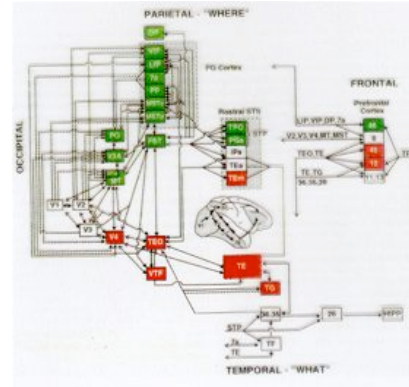
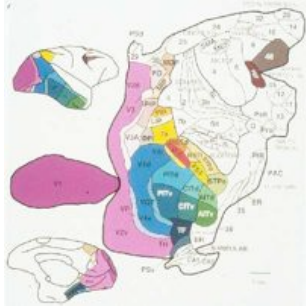
- single-unit recording



Brodmann map (lateral)



Flat map of monkey cortex



Anatomy is not static, new methods always reveal new facts

Van Essen et al, 2001