

Localisation

Specific areas of the brain have specific functions.

Frontal Lobe – motor area which controls voluntary movement, damage results in loss of control of fine movements. In both left and right hem, controls opposite side.

Parietal Lobe – Somatosensory - sensory information e.g. heat, pressure, touch. Opposite sides

Occipital Lobe – visual cortex – eye sends info from the right visual field to the left visual cortex. Damage to left will cause blindness in part of right visual field in both eyes.

Temporal Lobe – auditory area – damage may cause hearing loss.

Broca's – left frontal lobe – responsible for speech production.

Wernicke's – left temporal lobe patients with damage can speak but can't understand language.

☺ case study evidence – Phineas Gage ☺ neurological evidence – OCD patients ☺ Brain scan evidence – Tulving – semantic and episodic memory ☺ plasticity

Circadian rhythms -24hr cycle

Sleep/wake cycle – primarily controlled by the SCN but needs light to reset everyday.

Siffre – lived in cave and found that his free running body clock increased to 25 hours. When repeated at 60, his body clock increased to 36 hours.

☺ case study method used and small sample- generalisation.

Different conclusions at different ages

☺ Drug treatments – pharmacokinetics - drugs most effective at certain times of the day. ☺ Application to shift

Ultradian - A cycle less than 24 hours e.g. 5 stages of sleep.

Sleep stages - about 90 minutes, repeated numerous times throughout the night. Stage 1 and 2 – light sleep. Alpha then theta waves. Stages 3 and 4 – delta waves (slow waves), deep sleep. Stage 5 – REM sleep. Body paralysed, brain very active.

☺ Evidence to support – REM sleep correlated with

Lateralisation

The idea that the two halves of the brain are functionally different and that certain mental processes and behaviours are mainly controlled by one hemisphere. Split brain study - Sperry – P's had corpus callosum removed. Presenting the image to one hemisphere of a split-brain patient meant that the information could not be conveyed from that hemisphere to the other.

Describe what you see – left hemisphere can describe, right can't. *Recognition by touch* – left hemisphere can describe and identify an item. Right can't describe but can identify. *Matching faces* – right hemisphere dominant in terms of recognizing faces.

☺ Sperry's research is a key contribution to our understanding of brain processes. ☺ standardised procedures used – fixation point. ☺ issues with generalisation – 11 people, history of epilepsy.

Plasticity and functional recovery

Plasticity – ability for the brain to change throughout life. Can occur any time in life, new neural connections can occur as a result of learning and experience. Synaptic pruning – 'removes' unused connections.

Maguire – Taxi drivers – greater volume of grey matter in the posterior hippocampus (spatial and navigational skills). Greater difference for those with more experience.

Functional recovery – following trauma or physical injury the brain adapts and changes. Healthy parts of the brain take over the function of damaged areas.

1. Axonal sprouting – new nerve endings.
2. Reformation of blood vessels
3. Recruitment of homologous areas on opposite side of the brain.

Eval: application (neurorehabilitation), reduces with age, childhood it adapts more. Support from animal studies. Negative plasticity – drug use.

Infradian - Cycle longer than 24 hours.

Menstrual cycle approx. 28 days – changes in hormone levels which regulate ovulation. Oestrogen causes ovary to develop and egg and release. Progesterone helps womb lining grow thicker.

McClintock – pheromone study found that women who smell the pheromones of other women altered the length of their cycle.

☺ method limitations – other factors influence menstrual cycle e.g. stress, diet and exercise.

Seasonal affective disorder - 'winter blues', winter months trigger low mood. Circannual rhythm – yearly cycle. Melatonin potentially a cause.

☺ Evidence to support stages of sleep – sleep lab.

☺ Practical applications – phototherapy.

Biopsychology (year 13)

Ways of studying the brain

fMRI – changes in blood oxygenation and flow. Brain more active = more oxygen = images seen on scanner.

☺ High spatial resolution – detail to the millimetre. ☺ Temporal resolution – 5 second time lag behind the image on the screen

EEG – measure electrical activity of the brain. Skull cap e.g. sleep brain waves.

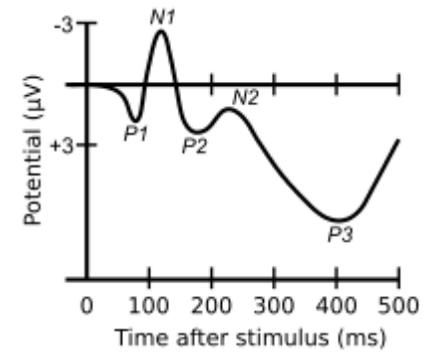
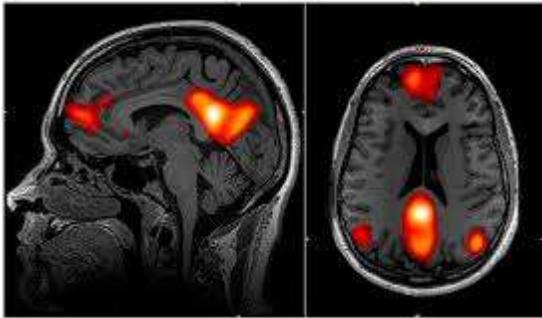
☺ diagnosis of illnesses such as epilepsy. Contributed to understanding of ultradian rhythms. ☺ not useful for pinpointing the exact source of neural activity.

ERPs – uses statistical averaging techniques, all extraneous brain activity from the original EEG recording is filtered out leaving only those responses that relate to the presentation of a specific stimulus or performance of a specific task.

☺ more specific than EEG. Excellent temporal resolution. ☺ lack of standardisation.

Post-mortem – analysing a person's brain after death. Brains of those who have a rare disorder or unusual deficit are compared against a neurotypical brain.

☺ Damage to the brain may not be linked to deficits under review. Informed consent. ☺ Understanding of key processes of the brain e.g. Broca



The menstrual cycle

EEG RECORDINGS DURING SLEEP

