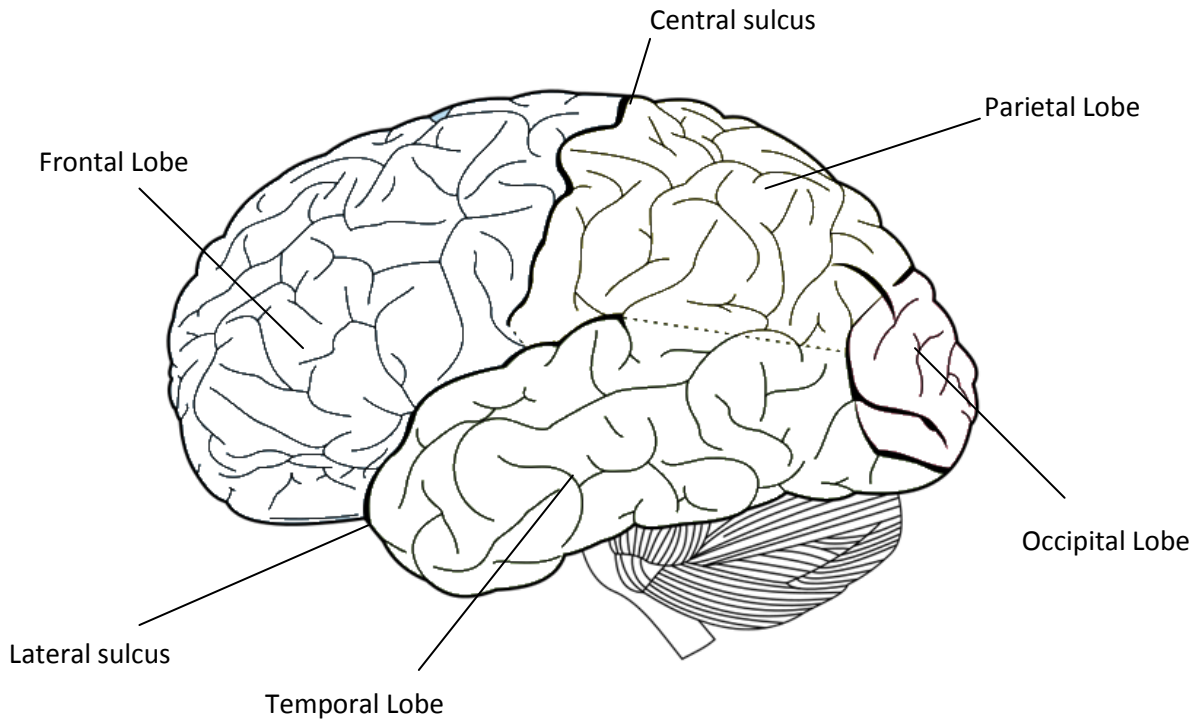


# Localisation of cortical function



The **motor cortex** is located in the frontal lobe. It is a stripe of tissue adjoining the central sulcus. The motor cortex controls voluntary complex movement. It contains a 'motor map' in which different neurones represent different parts of the skeletal musculature. The **sensory cortex** is parallel to the motor cortex, on the other side of the central sulcus. It is responsible for processing information from sensory receptors in the somatic nervous system (touch, heat etc.) Like the motor cortex it contains a 'map' of the body in which different areas represent different parts of the body. The **visual cortex** is located in the occipital lobe. It processes visual information passed to it from the retinas via the optic nerves. The optic nerves cross over so the left visual field is processed by the right visual cortex and vice versa. The prefrontal cortex occupies the parts of the frontal lobe right at the front of the brain. It is the area responsible for high level cognition including problem solving and decision making. It is evolutionarily the most recent part of the brain to have developed. The **primary auditory cortex** is located in the temporal lobe. It adjoins the lateral sulcus, occupying a position about  $\frac{3}{4}$  the way along it. It processes sound information, including identification of sounds and awareness of the spatial location of sounds. Next to it, towards the posterior of the brain, is **Wernicke's area**, one of two main areas responsible for language processing. Wernicke's area is where language comprehension takes place. Language production is controlled by **Broca's area**. This is located in the frontal lobe, adjoining the lateral fissure about  $\frac{1}{4}$  the way from the bottom. Broca's and Wernicke's areas are lateralised in the left hemisphere in most people.

On the brain above, label the areas in **bold**.

Suggest the location of damage in the following stroke patients, explaining your reasoning.

- Patient A does not appear to understand what people say.
- Patient B has limited movement on the right side of the body.
- Patient C cannot speak, but is able to comprehend language.
- Patient D does not respond to visual stimuli presented on the left side.
- Patient E has intellectual impairments affecting problem solving.