Methods of Visualising the living human brain.

There are 3 sorts of methods to visualise the living human brain
→ X-ray based techniques
→ radio activity based techniques
→ Magnetic field based techniques.

X Ray based Techniques

X-Ray photography is used for obtaining brain images

When x-ray photography is taken, an x-ray beam is passed through an object & then onto a photographic plate

Each of the molecule through which the beam passes absorbs some radiation, thus only unabsorbed portion of the beam reaches the photographic plate.

X Ray photography is therefore characterised internal structure that differ from the surrounding & in the degree to which they absorb x-rays
Eg. revolver in the suitcase full of clothes.

Contrast X-Ray:
Involves injecting into one compartment of the body a substance that absorbs either more or less than the surrounding tissue. The injected substance thus heightens the contrast between compartment and the surrounding tissue during the X-Ray photography.

Computed Tomography:
It is used to visualize the brain and other internal structure of the body.
During cerebral compiled tomography.
The patient lies with his or her head positioned in the large cylender. On one side of the cylender is the x-ray beam tube that through beam through the head towards the x-ray detected which is on the other side of cylinder

The ray tube and detected rotates automatically around the patients head at one level of the brain. The meage information in the pompute forms a compiled image of a horizontal level of brain

Then the X-ray tube and detector moves along the axis of the levels of brain and process is repeated.

Like this eight to nine horizontal levels of brain sections are scanned and all are combined to form a 3 dimensional representation of the brain.

Radioactivity based technique:

Positron Emission Tomography - It is the first brain imaging technique to provide the image of brain activity (functional) rather than structure of the brain.

In this FDG is injected in the artery of the neck. it can not be metabolised, it therefore accumulate in the active neuron till they gradually broken down.

Each PET scan is the image of radio activity in various parts of on horizontal level of brain.
Eg if PET is taken of the patient who engage for about 30 seconds or more reading it will show the parts of brain which were active during the

Magnetic field based technique

Magnetic Resonance Imaging

It is a structural ~~in~~ brain imaging procedure in which high resolution images are ~~take~~ constructed from the measurement of radio frequency waves that emit as they align with a powerful magnetic field of hydrogen atoms MRI provides clearer images that CT scan.

MRI can produce three dimensional images.

MRI Technology has been used to produce functional images the brain. Functional MRI is the most influencial tool of ~~mind~~ cognitive neuroscience and is widely used for medical diagnosis

fMRI produces images representing the increase in oxygen flow in the blood to active areas of the brain

fMRI is possible due to 2 attributes of oxygenated blood

1. Active part of the brain takes up more oxygenated blood

than they need for energy requirement

2) Oxygenated blood have magenetic properties that influence the radio frequency waves emited by hydrogen atoms in MRI
* The signal recorded by fMRI are BOLD signals.

Transcranial stimulation.
It shows the correlation between the brain activity and cognitive activity.
There are two way which can be done.
Transcranial magnetic stimulation (TMS)
it is a technique that can be used to turn off an area of ~~brain~~ human cortex by creating a magnetic field under a coil positioned next to skull ~~or~~ then the disruption on cognition is assessed.

Transcranial direct current stimulation (tDCS)
It is a technique that can be used to stimulate (turn on) an area of the cortex by applying electrical current through 2 electrodes placed directly on the scalp. It increases the activity in the part of the brain the cognition and behaviour are assessed