Brain Imaging Techniques

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Studying effects of brain tumors and traumas

The effects of damage to particular areas of the brain can be revealed by comparing scans of a brain that has been damaged by a stroke, injury, or tumor with changes in the behavior of the patient. In some cases the experimenter may lesion (purposely destroy a part of the brain) the brain.

Stimulating parts of the brain

A surgeon will stimulate parts of the brain while a patient is undergoing brain surgery. The surgeon will then ask the patient what he or she is thinking, feeling, seeing, smelling, or remembering. In this way, we learn where smells, memories, and so forth are located in the brain.

Electroencephalograph (EEG)

Psychologists present stimuli to persons and, through EEG, monitor the electrical activity in different parts of their brains. In this way, they learn what parts of the brain are involved in different functions.

Computerized axial tomography (CAT or CT Scan)

X-ray beams are sent from different angles through a patient’s head. Computers provide a cross-section picture of the brain from a variety of angles. This method tells us about geographic sections of the brain.

Magnetic resonance imaging (MRI)

Radio-frequency impulses cause temporary realignments in hydrogen atoms in the body. The pattern in which hydrogen atoms return to their normal positions, recorded by computers, vary in different disorders such as dyslexia, a reading disability. MRI also provides information about brain structures.

Positron emission tomography (PET scans)

In PET scans, a harmless radioactive gas, mixed with glucose, is injected into the bloodstream. The amount of radioactivity, measured by a PET scan, indicates which parts of the brain are most active for certain behaviors.

Functional MRI (fMRI)

Combines both a MRI and PET scan.

Transcranial Magnetic Stimulation (TMS)

To temporarily enhance or depress activity within a specific part of the brain. A magnetic coil is mounted on a small paddle and held over a specific area of the brain for a short period of time.