



This is a brief guide to the tests that help diagnose epilepsy. Not everyone will need every test. If you are unsure why your doctor has suggested certain tests and not others, then it is best to ask.

The EEG

An electroencephalogram (EEG) is a recording of the brain's electrical rhythms, looking at how the brain *functions*. It is simple, painless and harmless. Small discs called electrodes are placed on the surface of the scalp by parting the hair and holding them in place with temporary glue, or sometimes a special cap. The electrical activity of the brain is recorded, and may reveal changes that are helpful in diagnosing epilepsy.

An EEG usually takes about one hour. The person relaxes with eyes closed for most of the test, and may be asked to open and close their eyes at times, breathe deeply for a few minutes and later be exposed to a flashing light. This flashing may provoke brain wave changes on the EEG.

An EEG performed while asleep can give additional information.

EEG ambulatory monitoring

In certain cases, particularly if the doctor wants to record an event or seizure, it is necessary to obtain a recording over several hours or days. A compact portable EEG recorder may be worn which records brain activity while the person carries out normal daytime activities, and during sleep. The person will also be asked to keep a diary of symptoms.

EEG/video monitoring

At times it is necessary to perform simultaneous EEG and video recording. This combined information can be valuable in understanding a person's seizures and helps to obtain an accurate diagnosis. Continuous monitoring may be needed for hours or days, depending on the frequency of symptoms and seizures. It is therefore necessary to admit the person to hospital for several days, sometimes reducing or withholding medication to make seizures more likely.

CT scanning

Computerised Tomography (CT) is a non-invasive test, which uses x-rays to take pictures of the brain looking at the *structure* of the brain. The person lies on a table, and the head of the table is placed into the CT unit. Pictures are taken at many angles to generate the brain images. Sometimes a dye is injected into a vein of the arm or hand to enhance the quality of the images. The entire procedure takes 30-45 minutes. The test is painless except for the discomfort of the injection if this is required. Rarely, the person may experience an allergic reaction to the dye. This may cause a skin rash, mild symptoms of flushing, nausea and some difficulty with breathing.

As complete stillness is required during the test, young children and people with an intellectual disability may require sedation or a light, general anaesthetic.

MRI scanning

MRI or Magnetic Resonance Imaging, which also looks at *structure*, produces extremely clear and detailed images of the brain - without the use of x-rays. The person lies within a strong magnetic field and radio frequency waves are used to produce energy changes in the brain that are measured and then used to generate images, either two or three dimensional. The magnetism and radio frequency waves appear safe and they are not known to harm the cells.



For an MRI, the person is put on a table and placed inside the scanner, which is like a tunnel. As this can be stressful for people who dislike confined spaces, a mirror at the person's head provides a view of the room, while a call button and an intercom allows communication with the technician.

During the scan, the machine makes a loud thumping noise, like the beating of a drum, and if the sound is annoying wearing earplugs can help. Again, complete stillness is required during this test and young children and people with an intellectual disability may require sedation or a light, general anaesthetic. The entire procedure takes 30-60 minutes.

SPECT scanning

Single Photon Emission Computerised Tomography (SPECT) also uses a computer to generate pictures that look at the blood flow within the brain. A radioactive substance is injected into a vein and is carried to the brain in the bloodstream. Areas of the brain where blood flow is increased will contain more radioactivity and produce brighter images. A scan is then performed which produces a picture of the brain showing where blood flow is increased or decreased. Blood flow in the area triggering seizures can be reduced in between seizures and temporarily increased during seizures.

Scans usually take 20-30 minutes and are usually performed in hospital as part of EEG/video monitoring for surgical assessment.

PET scanning

Positron Emission Tomography (PET) appears similar to SPECT but the radioactive substance goes to areas of the brain that are actively working, so it looks at the glucose metabolism within the brain. In the area triggering seizures, brain cells are often functioning at lower levels between seizures.

Fasting is generally necessary prior to scanning and the scan takes approximately 30-60 minutes. EEG monitoring may also need to be performed during the PET. This scan is also usually only performed as part of a surgical assessment.

The actual process is similar to what the person experiences with CT, MRI or SPECT.

This information is given to provide accurate, general information about epilepsy. Medical information and knowledge changes rapidly and you should consult your doctor for more detailed information. This is not medical advice and you should not make any medication or treatment changes without consulting your doctor.