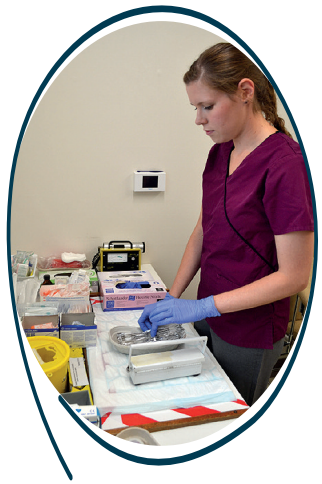
The Scientists

Medical physicists play an important role in introducing new diagnostic tests and take part in research to develop new techniques and equipment. They also analyse data and images as well as ensuring the accuracy of the imaging equipment.

Nuclear medicine technologists and radiographers have a wide range of roles, including preparing and injecting the tracer, checking the imaging equipment and taking images of the patient. This involves working closely with the patient and their relatives.

Radiation protection experts make sure that radiation safety measures are adequate and are being followed and they also provide radiation safety advice for staff and the public.



IPEM Institute of Physics and Engineering in Medicine

This series of leaflets highlights the science and the scientists behind some widely used medical techniques. They are produced by the Institute of Physics and Engineering in Medicine. To find out more about Medical Physics or Biomedical Engineering, or to request free leaflets or posters in this series, contact us:

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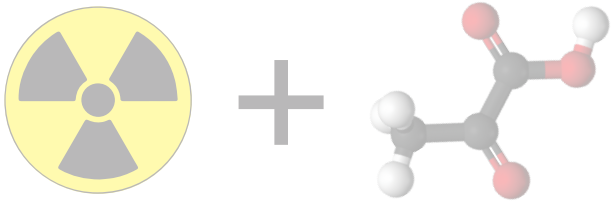


The techniques described in this leaflet are only suitable in certain cases and some are not yet widely available. If you need nuclear medicine, your doctor will advise you.

This leaflet was produced with the help of IPEM's Nuclear Medicine Special Interest Group.

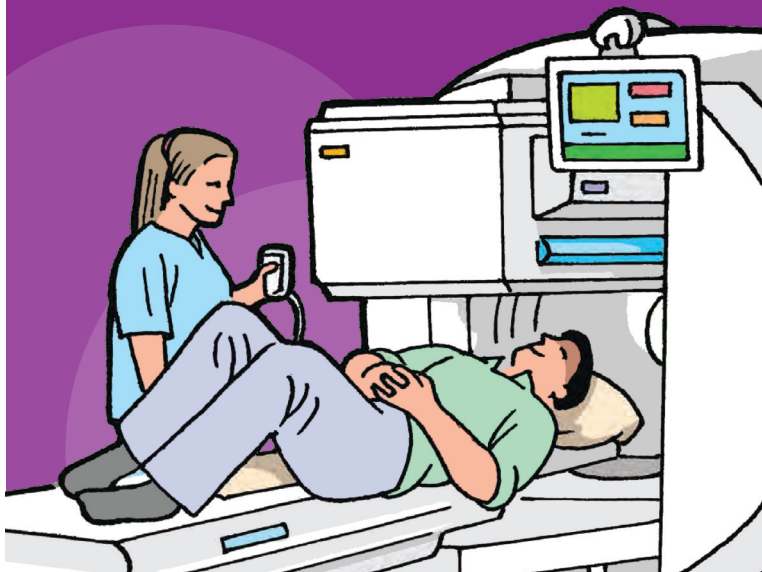
November 2017

IPEM

The Science & The Scientists

Diagnosing disease with radioactivity

Nuclear medicine imaging uses radioactive materials to produce unique pictures of the body's inner workings. These images can be vital for a wide range of medical investigations, including tests for cancer, kidney disease and Alzheimer's.

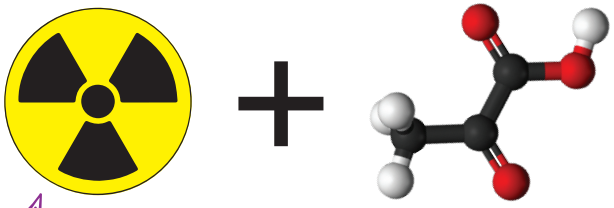


The Science

Physicists, doctors, radiographers and technologists work together in the nuclear medicine team. They give the patient a short-lived radioactive tracer, usually by injection.

The team carefully choose a tracer to minimise the patient's exposure to radioactivity and to target the body part under investigation. For example, to check brain function, they would choose a tracer containing a chemical used by the brain, such as oxygen or glucose.

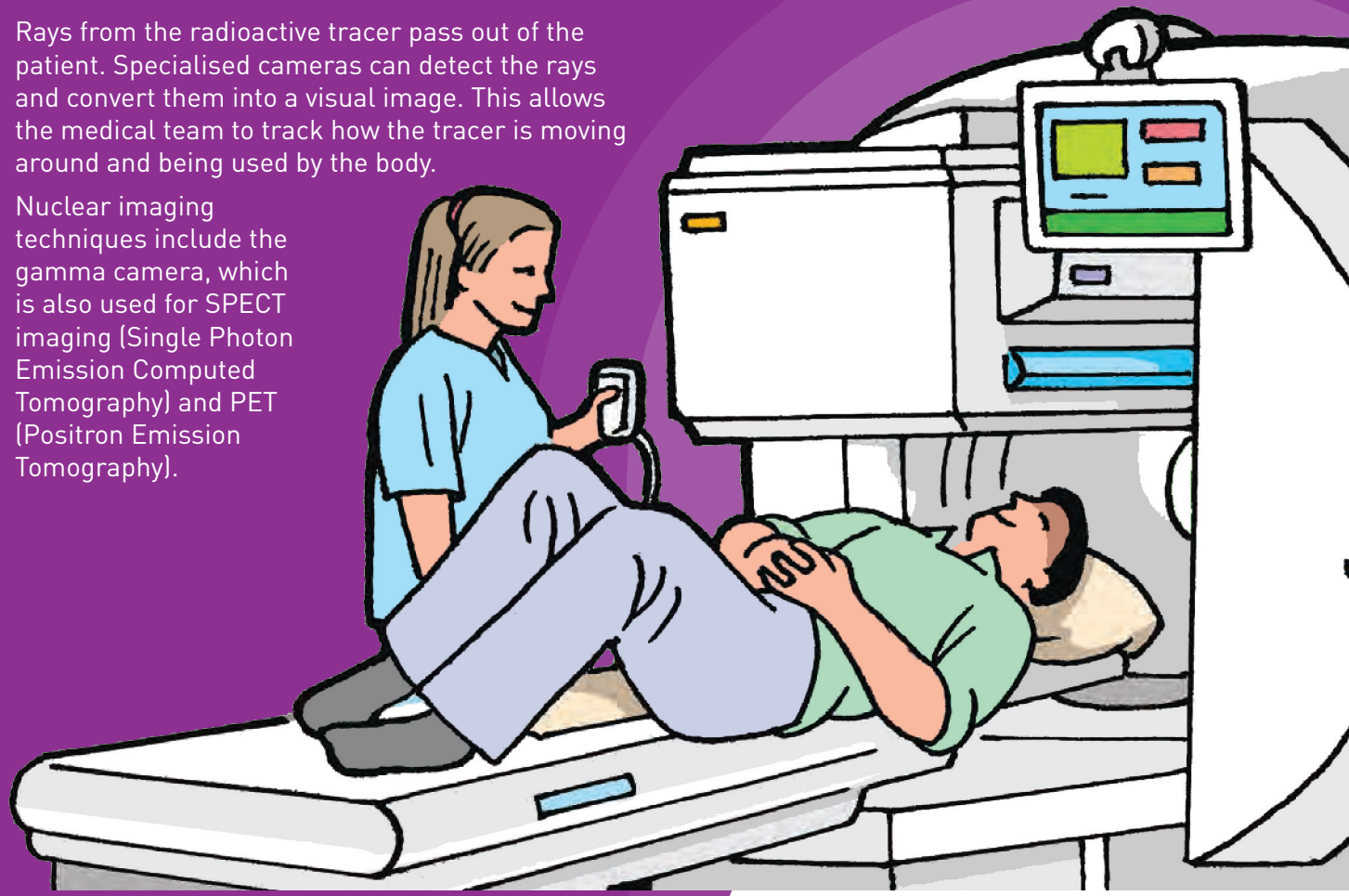
The tracer is carried around the body in the bloodstream.



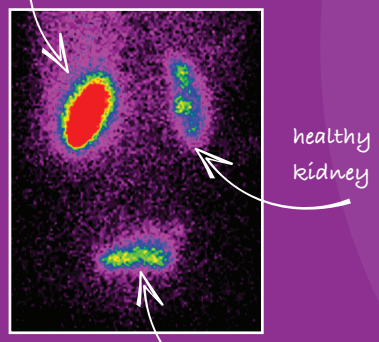
tracer = low dose of radioactive substance linked to a chemical that interacts with human cells.

Rays from the radioactive tracer pass out of the patient. Specialised cameras can detect the rays and convert them into a visual image. This allows the medical team to track how the tracer is moving around and being used by the body.

Nuclear imaging techniques include the gamma camera, which is also used for SPECT imaging (Single Photon Emission Computed Tomography) and PET (Positron Emission Tomography).



Nuclear medicine images are different from other medical scans, such as x-rays or magnetic resonance imaging (MRI): they reveal how well the body is working, rather than just showing its structure. This gamma camera image reveals a kidney problem.



Nuclear medicine scans can be combined with other types of scan that show structural detail to produce images that are even more useful.

Nuclear medicine can also be used to treat diseases such as cancer.

combined PET/X-ray image of whole body