



Diagnostic Nuclear Medicine

Nuclear medicine is a subspecialty within radiology that helps evaluate different organ systems, including kidneys, liver, heart, lungs, thyroid, and bones. For many diseases, nuclear medicine is the most reliable method for making diagnoses and determining appropriate treatments.

While therapeutic nuclear medicine may use large amounts of radioactive materials, *diagnostic* nuclear medicine uses small amounts of radioisotopes, typically technetium-99m, given intravenously or orally. In order to target a specific organ system, the radioisotope, or "tracer", is combined with a chemical known to accumulate in that system. This compound is called a "radiopharmaceutical agent." When it collects in the organ being evaluated, a gamma camera detects gamma rays emitted by the tracer. This data is fed into a computer where it is used to produce images and other information about the organ system.

Nuclear medicine has been used for more than half a century to diagnose and treat many diseases.

Who is protecting you

U.S. Nuclear Regulatory Commission (NRC)

Under the Atomic Energy Act, the Nuclear Regulatory Commission (NRC) is responsible for regulating uses of radioactive material, including radiopharmaceuticals. NRC requires licensing of all nuclear medicine facilities. The license assures that the facility has a radiation protection program to protect both the patients and the staff. In addition, the staff must meet certain standards of training and experience to be allowed to administer radioactive material to patients.

The States

Each state has one or more radiation programs that ensure the safe use of radioactive materials. NRC has transferred regulatory authority over the use of this material to 34 NRC Agreement States. In these states, the regulatory authority inspects facilities to ensure the staff is trained properly and the equipment is operating safely.

Food and Drug Administration (FDA)

The FDA's Center for Drug Evaluation and Research regulates radiopharmaceuticals, ensuring effectiveness and patient safety.

National Institute of Standards and Technology (NIST)

The mission of NIST is to develop and promote measurement, standards, and technology to enhance productivity, facilitate trade, and improve the quality of life. Although a non-regulatory federal agency, NIST develops the standards for correct patient dosage of radiopharmaceuticals.

What you can do to protect yourself

Talk to a doctor about the risks associated with using nuclear medicine. If you are receiving treatment, follow all instructions given to you by your physician or the radiation safety officer at the facility. Patients who are pregnant, might be pregnant, or are breast feeding should notify their doctors before undergoing treatment.

Resources

You can explore this radiation source further through the resources at the following URL:

<http://www.epa.gov/radtown/nuclear-medicine.html#resources>

We provide these resources on-line rather than here so we can keep the links up-to-date.