**Applications of NST (Nuclear Science and Technology) in Medicine**

Hi, I'm Alireza.

In this video, I want to tell you about one of the applications of nuclear technology in medicine.

You may have all seen people with cancer or broken bones. And they go to imaging to diagnose cancer or fracture. In fact, one of the most important applications of nuclear technology in medicine is imaging with it. MRI scanners, PET scans, SPECT scans, CT scans, and ultrasound use nuclear technology to troubleshoot different parts of the body and diagnose illnesses such as cancer and fracture.

Let me tell you a little about PET scans. Positron emission tomography (PET)is a functional imaging technique that uses radioactive substances known as radiotracers to visualize and measure changes in metabolic processes, and other physiological activities including blood flow, regional chemical composition, and absorption. Different tracers are used for various imaging purposes, depending on the target process within the body. For example, 18F-FDG is commonly used to detect cancer, NaF-F18 is widely used for detecting bone formation, and oxygen-15 is sometimes used to measure blood flow.

How to imaging in PET scans: a radiopharmaceutical — that is a radioisotope attached to a drug — is injected into the body as a tracer.

This radiopharmaceutical breaks down in the body and emits gamma rays.

Gamma rays are detected by gamma cameras. A computer analyzes the gamma rays and uses the information to create a three-dimensional image of the body.

And about single-photon emission computed tomography (SPECT), I have to say that is an imaging technique similar to PET. that uses radioligands to detect molecules in the body. SPECT is less expensive and provides inferior image quality than PET.

let me explain more about the importance of these imaging technologies with an example.

Nowadays, more than one billion people worldwide suffer from diseases related to the nervous system. Scientists are using new technologies to study the mechanisms of the nervous system and related diseases and disorders. One of the most important technologies that help scientists in this field is imaging technologies. These imaging technologies include MRI, MRS, fMRI, PET scans, and SPECT scans. Research using these technologies has had a significant impact on the treatment of more than 1,000 neurological disorders. For example, PET studies have helped scientists understand how drugs work in the brain or what happens during various activities such as learning. PET studies have also been useful in understanding certain brain disorders such as stroke, depression, and Parkinson's.In the next few years, PET could also enable scientists to identify the biochemical nature of mental and neurological disorders and understand how effective treatment can be in patients.

And finally, I have to say that there are many applications of nuclear technology in medicine, and imaging technologies are just one aspect of the applications of nuclear technology in medicine.

We hope that with the advancement of nuclear science and medicine science, new diagnostic methods and treatments for various diseases will be designed.