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# Journal on Radiology

**Fumihisa***

*Department of Radiology, University of Utah, Salt Lake City, United States*

Radiology is the medical discipline that uses medical imaging to diagnose and treat diseases within the bodies of animals, including humans. A variety of imaging techniques like X-ray radiography, ultrasound, computerized tomography (CT), and medicine including positron emission tomography (PET), fluoroscopy, and resonance imaging (MRI) are wont to diagnose or treat diseases.

## Projection (plain) radiography

Radiographs (originally called roentgenographs, named after the discoverer of X-rays, Wilhelm Conrad Rontgen) are produced by transmitting X-rays through a patient. The X-rays are projected through the body onto a detector; a picture is made supported which rays undergo (and are detected) versus people who are absorbed or scattered within the patient (and thus aren't detected). Rontgen discovered X-rays on November 8, 1895 and received the primary Nobel Prize in Physics for his or her discovery in 1901.

## Fluoroscopy

Fluoroscopy and angiography are special applications of X-ray imaging, during which a fluorescent screen and image intensifier tube is connected to a television system. This enables real-time imaging of structures in motion or augmented with a radiocontrast agent. Radiocontrast agents are usually administered by swallowing or injecting into the body of the patient to delineate anatomy and functioning of the blood vessels, the urogenital system, or the alimentary canal (GI tract). Two radiocontrast agents are presently in common use. Barium sulphate (BaSO4) is given orally or rectally for evaluation of the alimentary canal. Iodine, in multiple proprietary forms, is given by oral, rectal, vaginal, intra-arterial or intravenous routes. These radiocontrast agents strongly absorb or scatter X-rays, and in conjunction with the real-time imaging, allow demonstration of dynamic processes, like peristalsis within the alimentary canal or blood flow in arteries and veins. Iodine contrast can also be concentrated in abnormal areas more or but in normal tissues and make abnormalities (tumors, cysts, inflammation) more conspicuous. Additionally, in specific circumstances, air are often used as a contrast agent for the digestive system and CO2 are often used as a contrast agent within the venous system; in these cases, the contrast agent attenuates the X-ray radiation but the encompassing tissues.

## Ultrasound

Medical ultrasonography uses ultrasound (high-frequency sound waves) to see soft tissue structures within the body in real time. No radiation is involved, but the standard of the pictures obtained using ultrasound is very hooked in to the skill of the person (ultrasonographer) performing the exam and therefore the patient's body size. Examinations of larger, overweight patients may have a decrease in image quality as their subcutaneous fat absorbs more of the sound waves. This leads to fewer sound waves penetrating to organs and reflecting back to the transducer, leading to loss of data and a poorer quality image. Ultrasound is additionally limited by its inability to image through air pockets (lungs, bowel loops) or bone. The primary ultrasound images were static and two-dimensional (2D), but with modern ultrasonography, 3D reconstructions are often observed in real time, effectively becoming "4D".

## Nuclear medicine

Nuclear medicine imaging involves the administration into the tolerant radiopharmaceuticals consisting of drugs with affinity surely body tissues labeled with radioactive tracer. the foremost commonly used tracers are technetium-99m, iodine-123, iodine-131, gallium-67, indium-111, thallium-201 and fludeoxyglucose (18F) (18F-FDG).

The heart, lungs, thyroid, liver, brain, gallbladder, and bones are commonly evaluated for particular conditions using these techniques. While anatomical detail is restricted in these studies, medicine is beneficial in displaying physiological function. The excretory function of the kidneys, iodine-concentrating ability of the thyroid, blood flow to cardiac muscle, etc. are often measured. The principal imaging devices are the gamma camera and therefore the positron emission tomography scanners, which detect the radiation emitted by the tracer within the body and display it as a picture. With computer processing, the knowledge is often displayed as axial, coronal and sagittal images (single-photon emission computerized tomography - SPECT or Positron-emission tomography - PET). Within the latest devices, medicine images are often fused with a CT scan taken quasisimultaneously, therefore the physiological information are often overlaid or coregistered with the anatomical structures to enhance diagnostic accuracy.

***Address for Correspondence:** Fumihisa, Department of Radiology, University of Utah, Salt Lake City, United States*



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