



Growing Season: Cultivating the Nuclear Medicine Field

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Augusta University



What is Nuclear Medicine?

Think Imaging Department
.... Xray, US, NM, CT, MRI

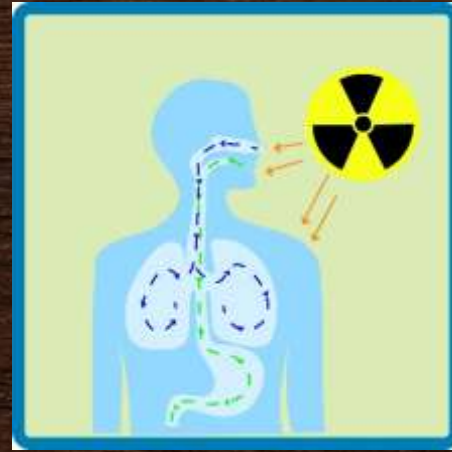


RADIOGRAPHY IMAGES ANATOMY



WHAT IS NUCLEAR MEDICINE?

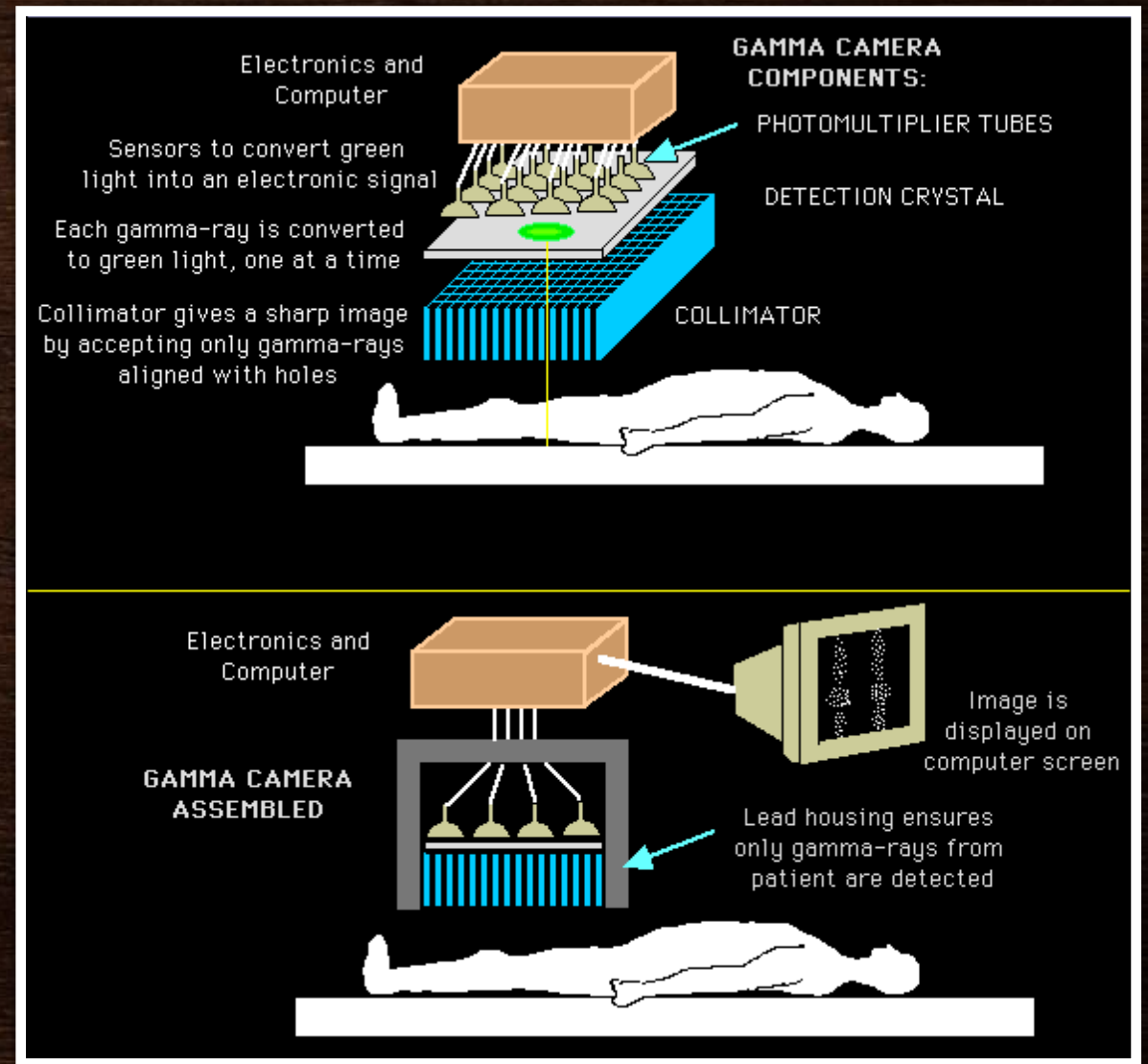
- Images *Physiology*



- Nuclear Medicine uses cutting-edge technology to assist physicians in diagnosing and treating a variety of diseases (80 Dx/20 Tx)

Nuclear Medicine

Images Physiology



How are Nuclear Medicine Scans Performed?

- Radiopharmaceutical Administration
- Patient eats, drinks, inhales, or receives an intravenous injection
- Tracer accumulates in a specific organ/system based on physician order
- Imaging commences within seconds, minutes, or days depending on the tracer



The NMT's role



- **Prepare and administer** radioactive compounds, called **radiopharmaceuticals**
- **Perform patient imaging procedures** using sophisticated radiation detecting instrumentation
- **Process data** and enhance digital images and **Provide images, data analysis, and patient information** to the interpreting physician

Equipment and Instrumentation

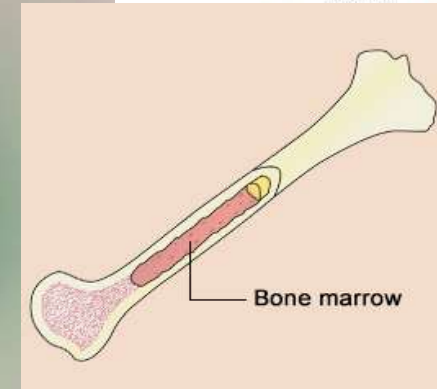
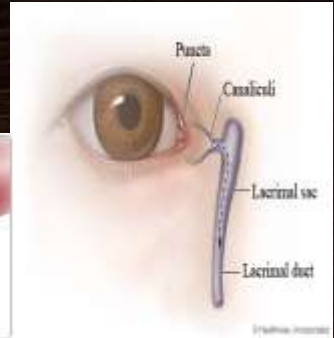
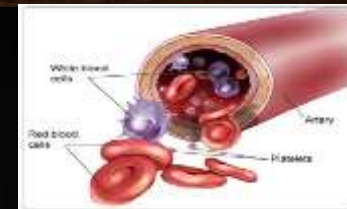
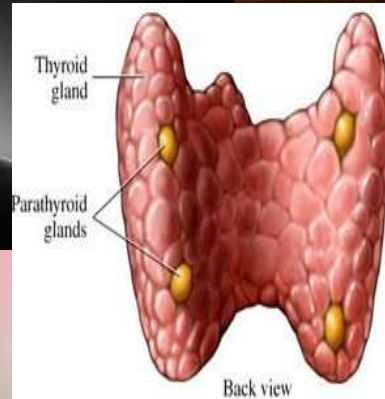
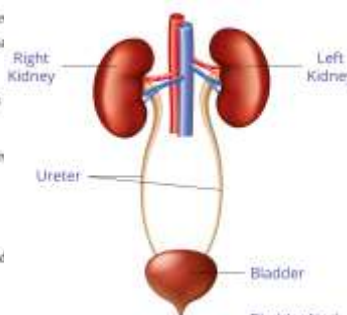
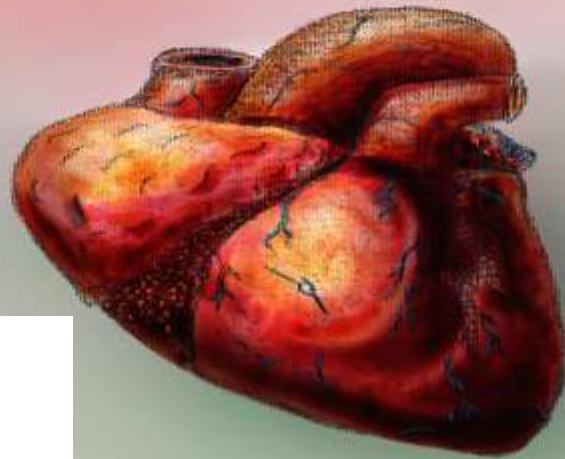
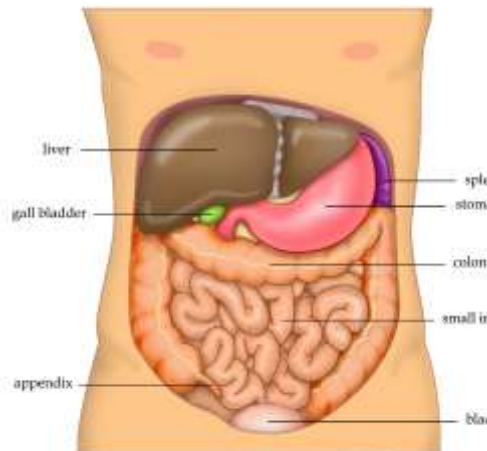
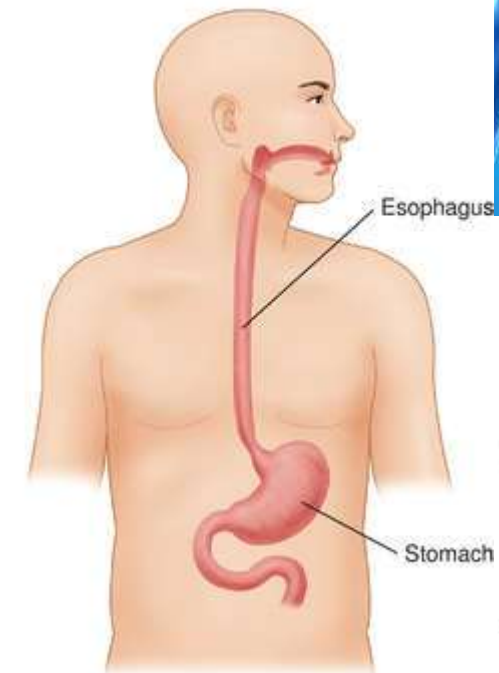
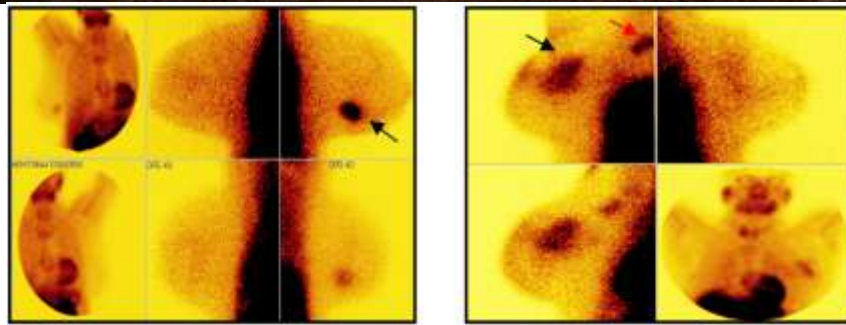


Planar, SPECT, SPECT/CT, PET/CT, PET/MRI

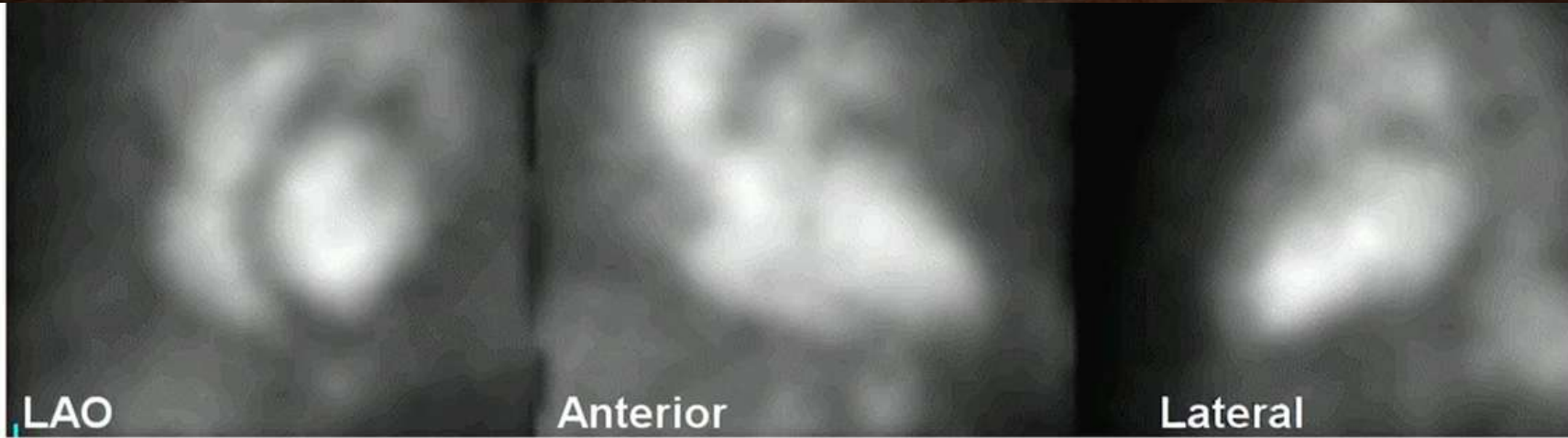


What types of exams are performed?

- Image just about every organ of the body

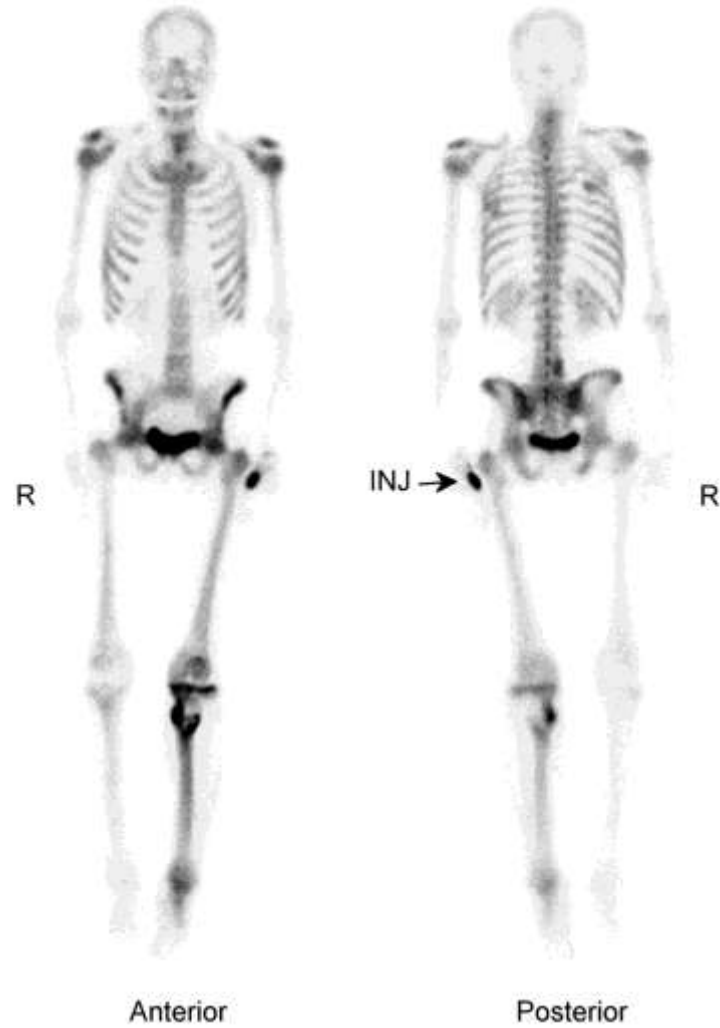


Cardiac Imaging: ERNA or MUGA SCAN



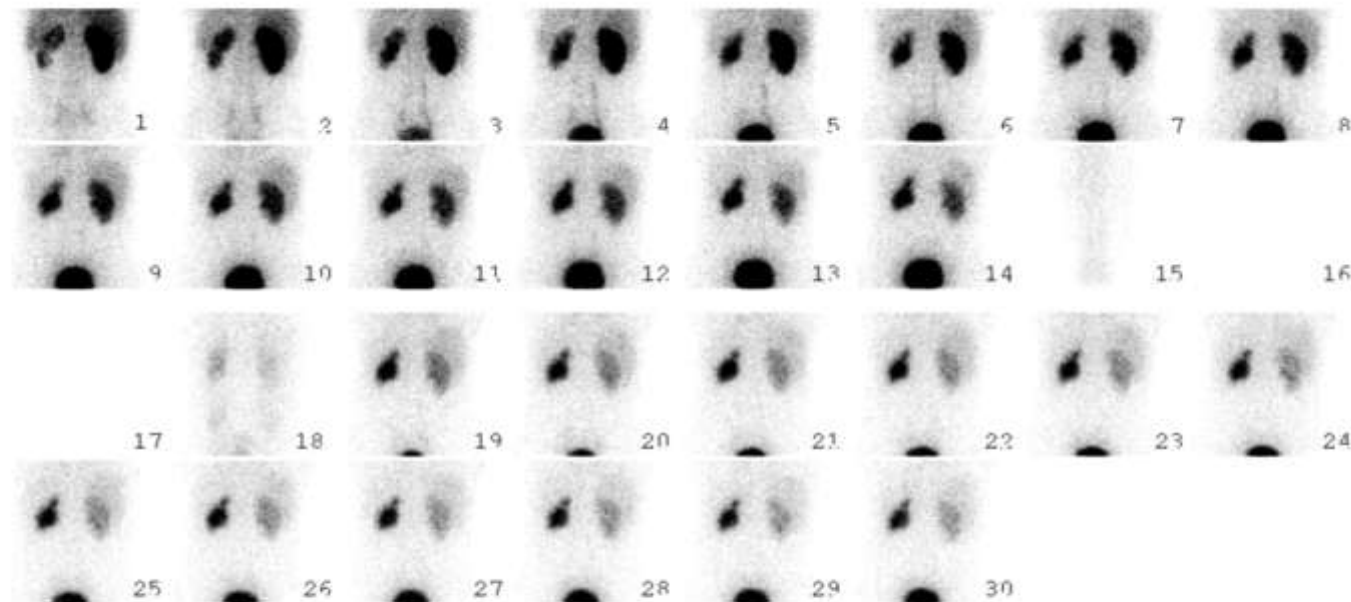
Standard views for ERNA. Mary Beth Farrell et al. J. Nucl. Med. Technol. 2020;48:126-135

BONE SCAN



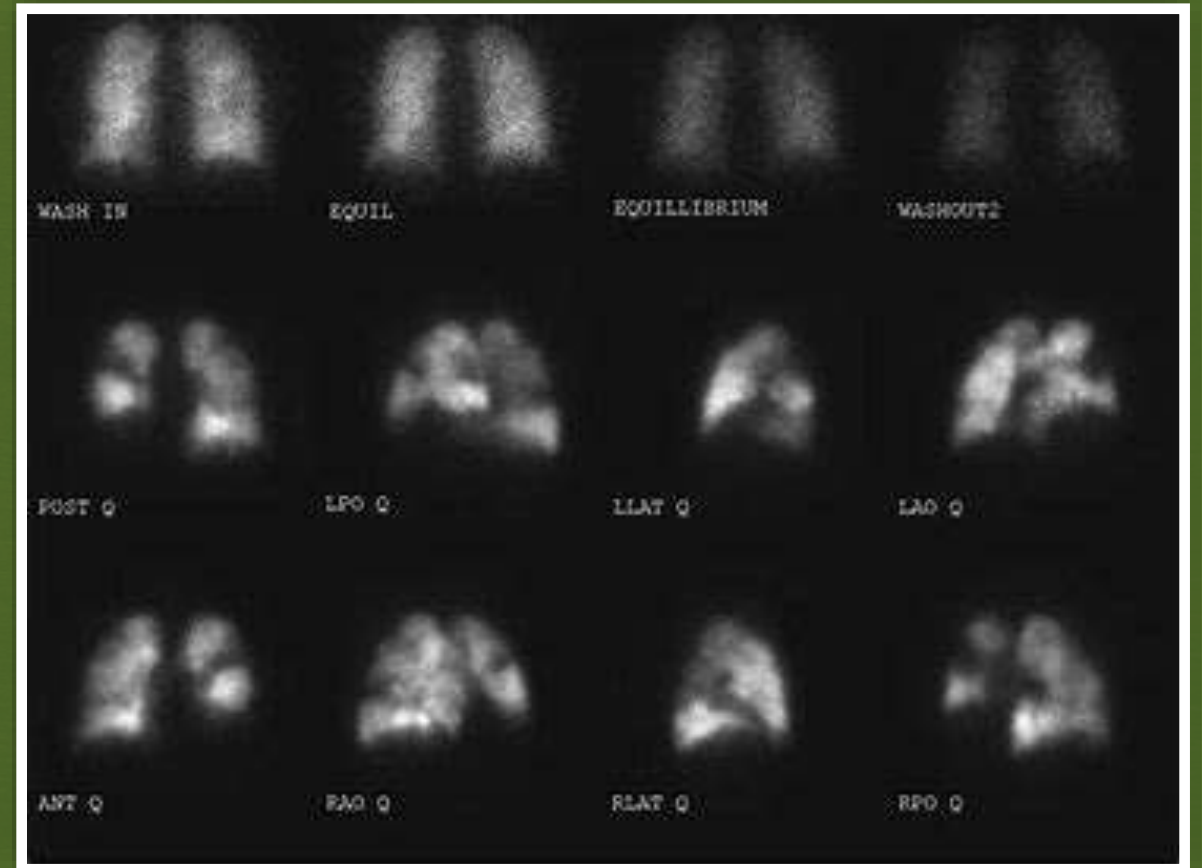
Diffusely increased ^{99m}Tc -MDP uptake of left lower extremity on delayed-phase whole-body bone scan (anterior and posterior projections) as result of increased blood flow due to osteosarcoma in proximal tibia.
Ka Kit Wong, and Morand Piert J Nucl Med 2013;54:590-599

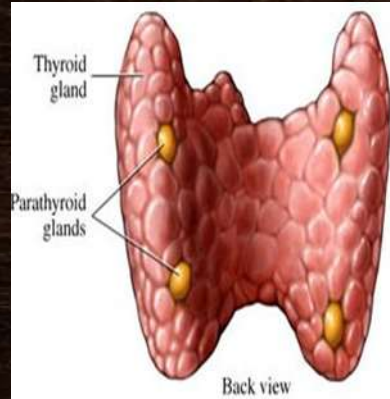
Renal Imaging



F-15 diuretic renography performed on 24-y-old man with left-sided hydronephrosis. Yiyan Liu et al. J Nucl Med 2005;46:1317-1320

STAT VQ Scan





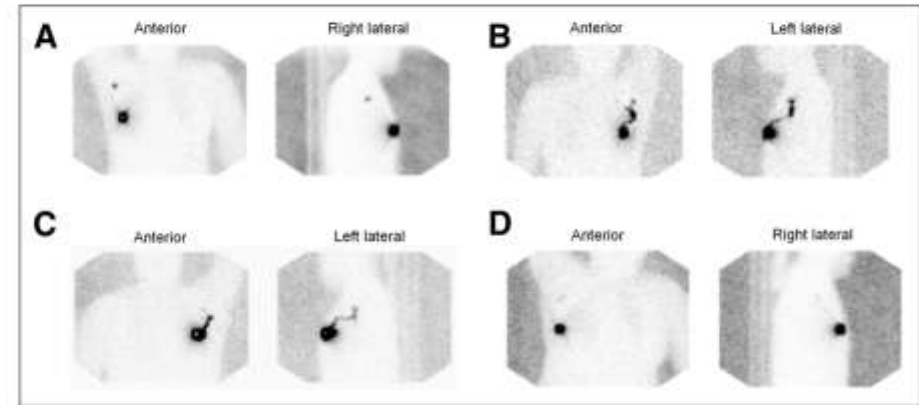
Surgical Cases

Parathyroid Adenoma

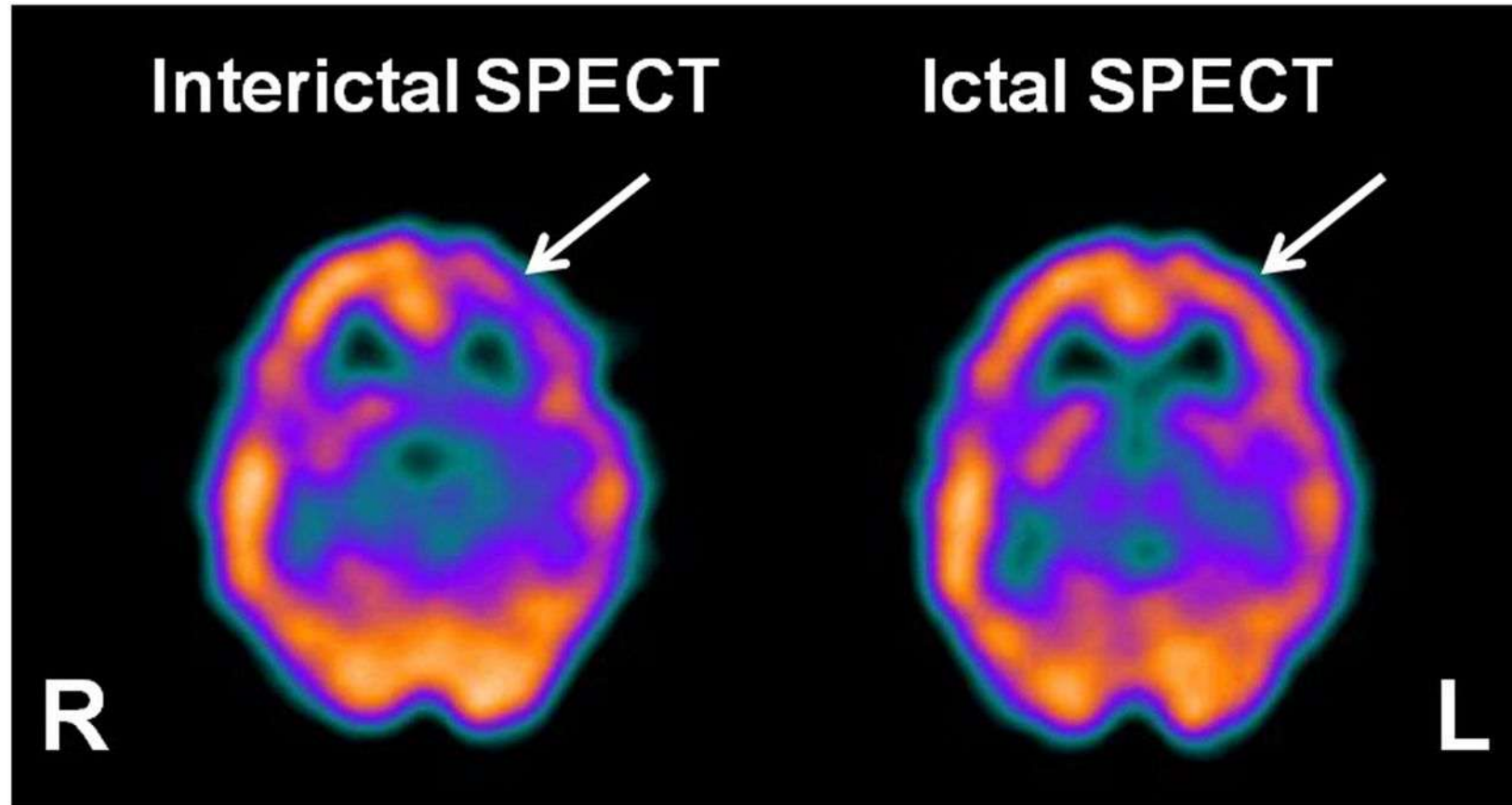
Lymphoscintigraphy

Breast

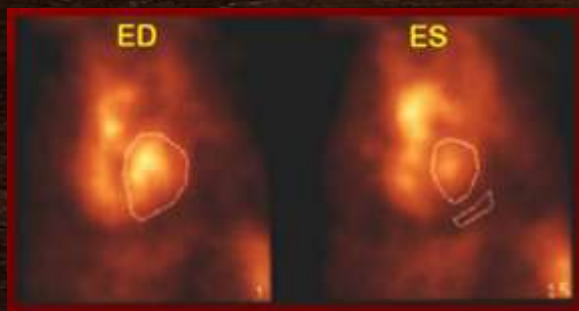
Melanoma



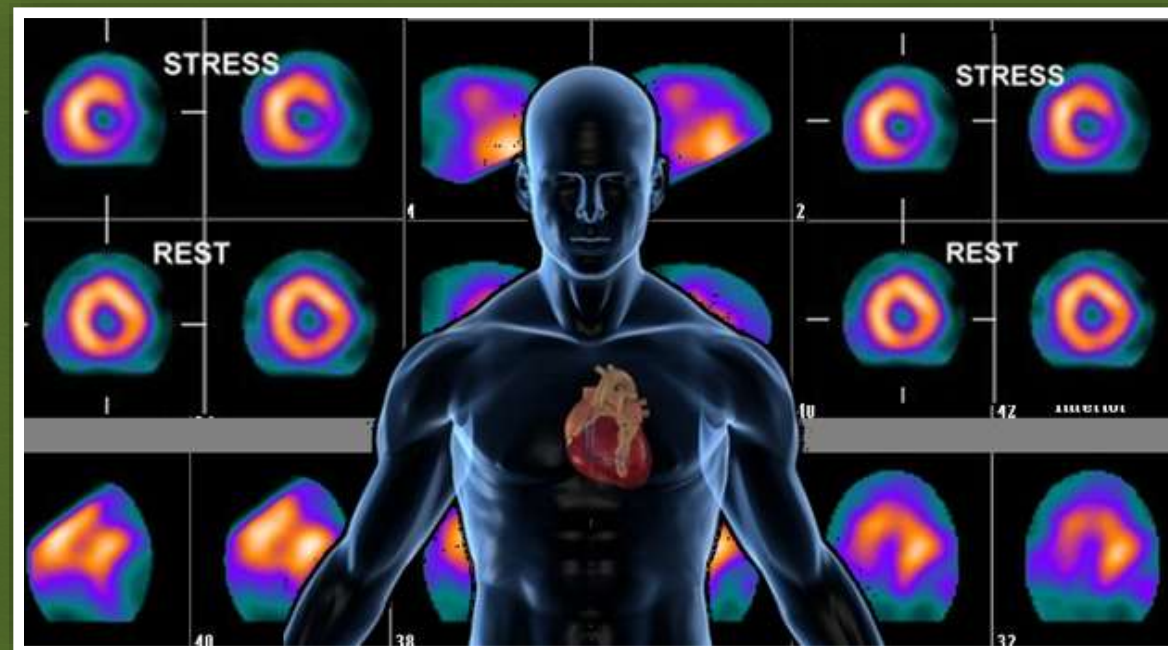
Visual grading system for SLS using ^{99m}Tc -HSA: grade 1 (focal) (A), grade 2 (intermediate) (B), grade 3 (serpentine) (C), and grade 4 (no uptake) (D). Hyo Sang Lee et al. J Nucl Med 2012;53:1693-1700



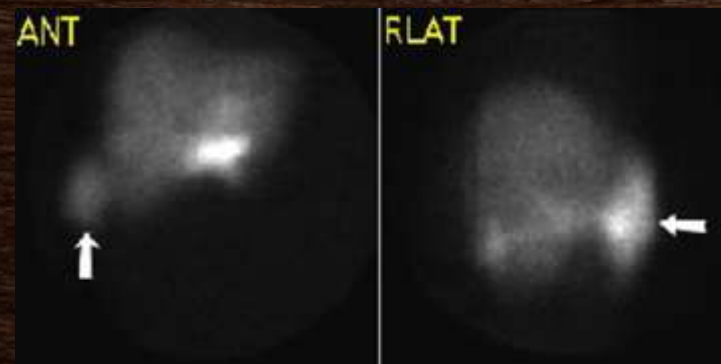
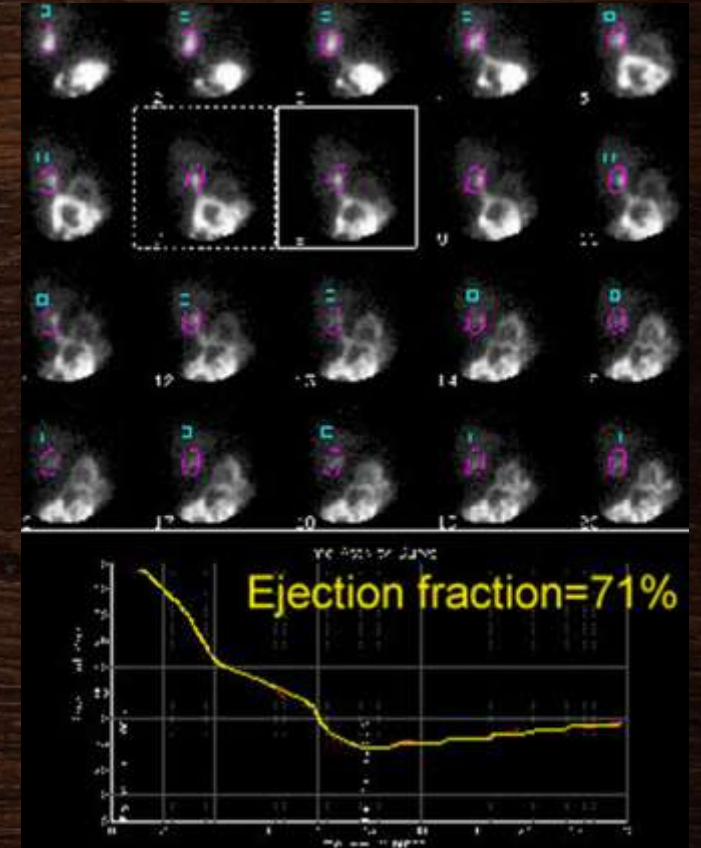
Interictal ^{99m}Tc -ethyl cysteinate dimer SPECT (left image) showing the usual hypoperfusion in presumed epileptogenic focus (arrow) in left frontal cortex region, which becomes hyperperfused during ictal SPECT (right image). Ajay Kumar, and Harry T. Chugani J. Nucl. Med. Technol. 2017;45:14-21



MPI
Normal vs.
Abnormal

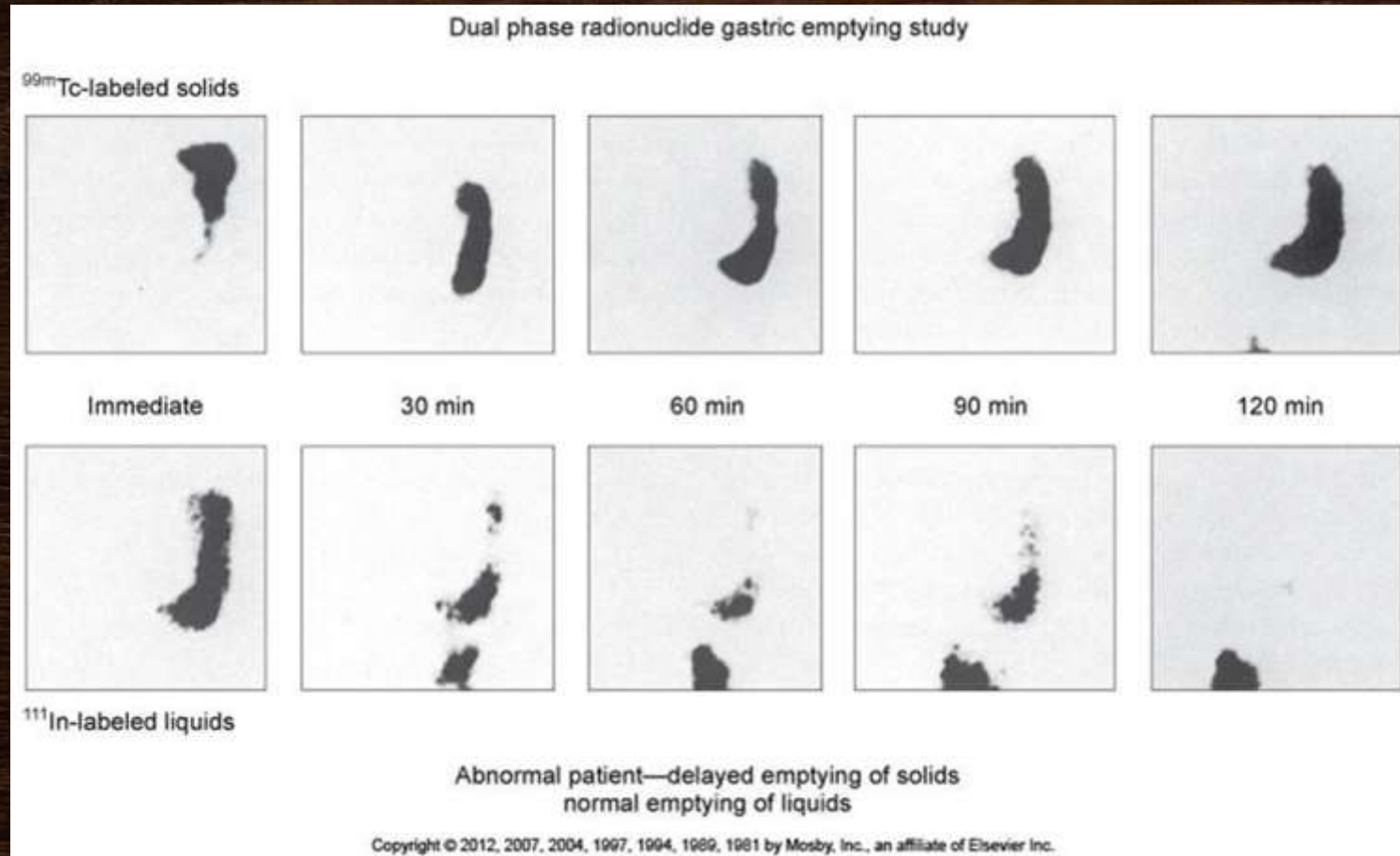


Hepatobiliary Imaging



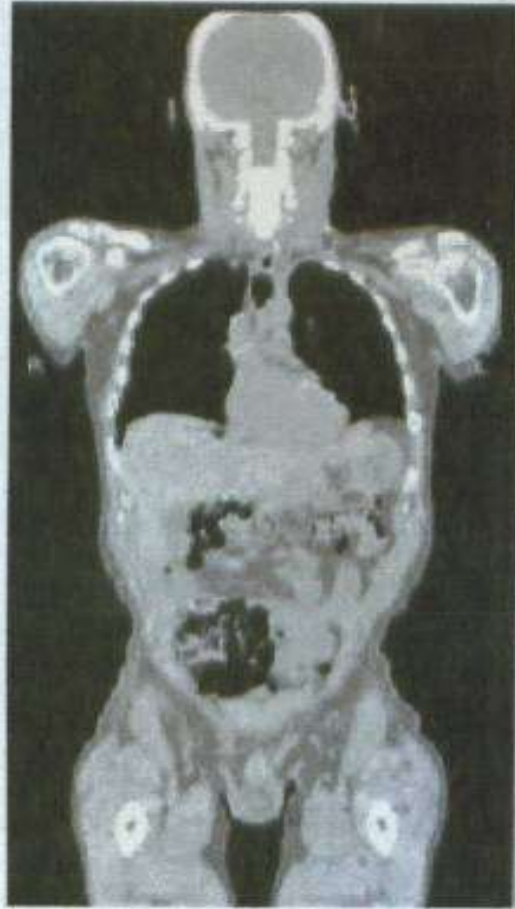
Abnormal Gastric Emptying Study

Delayed Solid Emptying- Visually and by Regional Analysis



Normal Liquid Emptying- Visually and by Regional Analysis

NOW: MARRIAGE OF ANATOMY & PHYSIOLOGY PET/CT



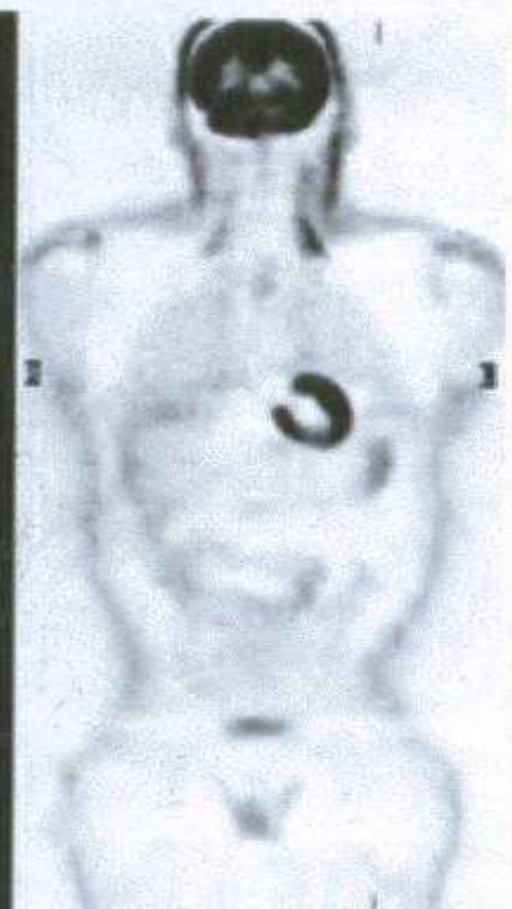
**CT Transmission
Scan**



**Attenuation
Corrected
PET Emission Scan**

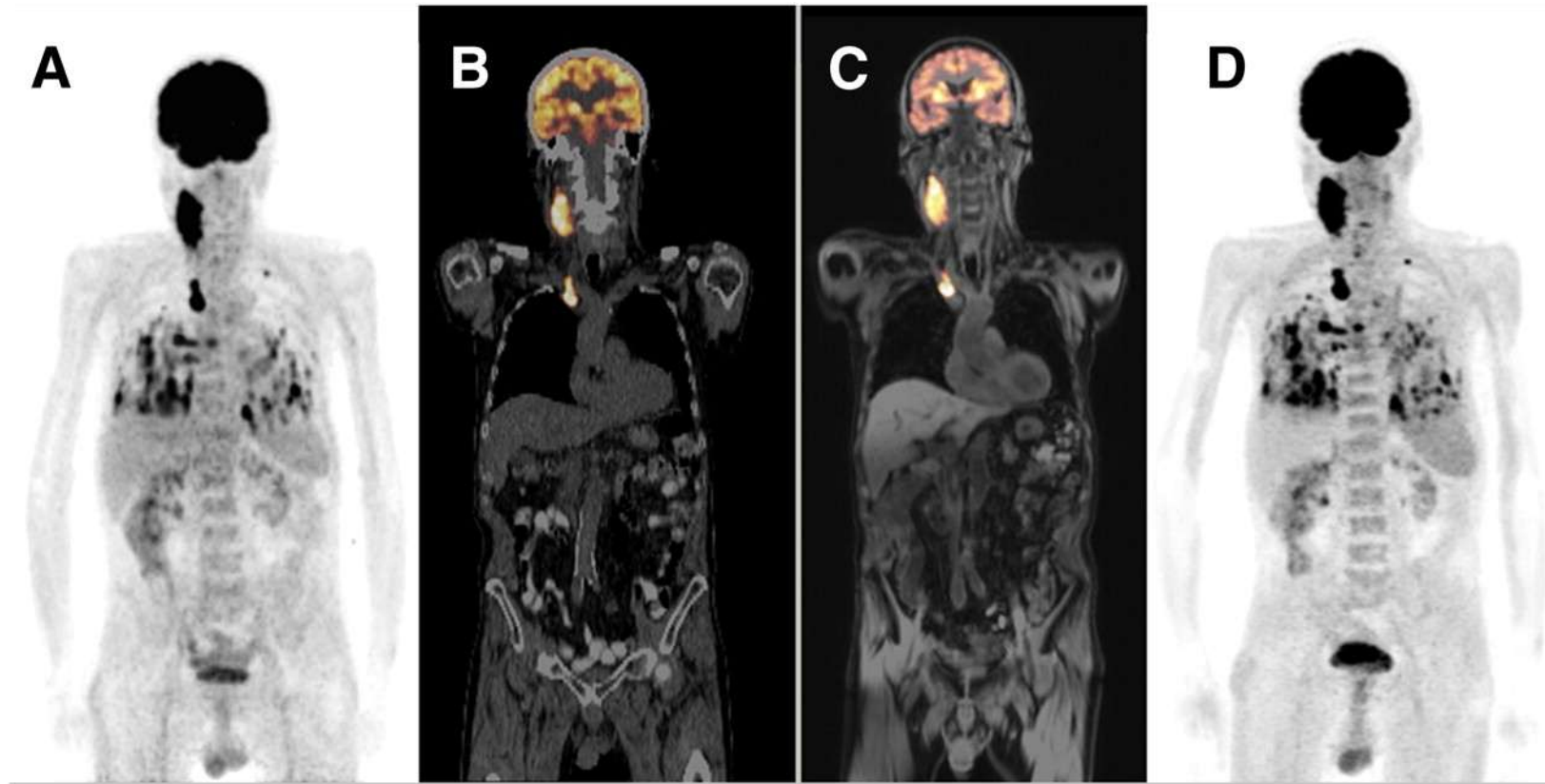


**PET-CT
Fusion Scan**



**Non-Attenuation
Corrected (NAC)
Emission Scan**

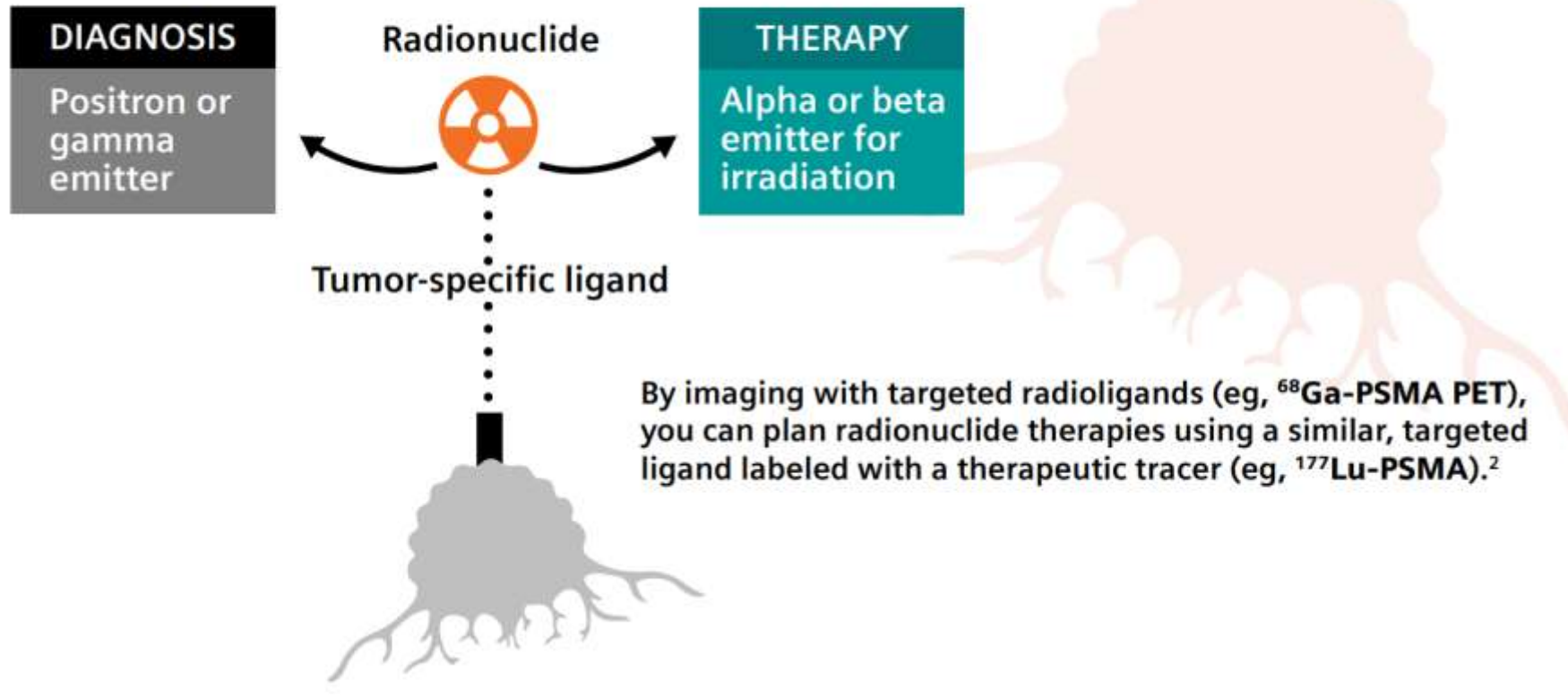
Encouraging Results! PET/CT vs. PET/MRI Images on Thyroid Cancer Patient



Proof of principle: comparison between PET/CT and PET/MR data acquired on same day in same patient with metastasized thyroid carcinoma. Alexander Drzezga et al. J Nucl Med 2012;53:845-855

Therapy + Diagnostics = Theranostics

How theranostics works



<https://www.siemens-healthineers.com/en-us/clinical-specialities/theranostics/what-is-it>

SNMMITS Code of Ethics

- Technologists qualified to perform NM procedures are members of the health care profession and must strive as individuals and as a group to maintain the highest ethical standards by adhering to the NMT Code of Ethics approved by the Society of Nuclear Medicine and Molecular Imaging Technologist Section (SNMMITS).
- Are not laws, but standards of conduct to be used as ethical guidelines by NMTs.

NMT Qualified to Perform NM Procedures

- Education
- Licensure
- Certification
- Continuing Education

SNMMI Code of Ethics: The NMT will...

- Principle 1: Provide services with compassion and respect for the dignity of the individual and with the intent to provide the highest quality of patient care.
- Principle 2: Provide care without discrimination regarding the nature of the illness or disease, gender, race, religion, sexual preference, or socioeconomic status of the patient.
- Principle 3: Maintain strict patient confidentiality in accordance with state and federal regulations.
- Principle 4: Comply with the laws, regulations, and policies governing the practice of nuclear medicine to ensure the safest delivery of care.
- Principle 5: Continually strive to improve his or her knowledge and technical skills.
- Principle 6: Not engage in fraud, deception, or criminal activities.
- Principle 7: Be an advocate for his or her profession.

NMT Scope of Practice and Performance Standards

- Acknowledges the spectrum of responsibilities for a NMT varies widely across the US.
- Practice components presented include what is taught in NM programs, tested by accrediting organizations, and practiced in the field.
- This NMT Scope of Practice and Performance Standards provides a basis for establishing the areas of knowledge and performance for NMTs.
- The NMT follows all federal, state, and institutional guidelines including proper documentation of initial and continued competency in those practices and activities.
- Continuing education is a necessary component in maintaining the skills required to perform all duties and tasks of the NMT in this ever-evolving field.

(Society of Nuclear Medicine and Molecular Imaging [SNMMI], 2024)

Current State of the field

- Real-time data shows Demand!
- Employers offering:
 - high salaries
 - hiring bonuses
 - tuition reimbursement
 - and creative incentives due to lack of workforce supply



Why Nuclear Medicine?

- High Demand
- High Pay
- Great working environment
- Flexibility PT, FT, Registry, On-call, No call, Travel Tech, anywhere in US
- Career Advancement Opportunities Multi-modality Certified (CT, MRI, etc), Advanced Associate, RSO, Health Physics, Management, Directing, RRX equipment, RRX sales
- Stay for entire career or use as steppingstone



Augusta University's NMT Program

Accreditation

Format

Successes

Prerequisites for Nuclear Medicine Technology

Institution: Institutional Priority (4)

- INQR 1000 - Fundamentals of Academic Inquiry (1)
- COMM 1110 - Public Speaking (2)QR
- COMM 1109 - Fund of Human Communications (1)

Mathematics: Mathematics & Quantitative Skills (3)

- MATH 1111/1113 - College Algebra/Precalculus (3)

Citizenship: Political Science & US History (6)

- POLS 1101 - American Government (3)
- (Choose One) HIST 2111/2112 - US History to 1877 / since 1877 (3)

Humanities: Arts, Humanities & Ethics (6)

Select Courses from two different disciplines (6)

ENGL 2121/2230, FILM 1390, THEA 1100, ART 2010, HUMN 2016, MUSI 2320, PHIL 2010/2030, FREN 1001/2, 2005/2, GRMN 1001/2, 2001/2, SPAN 1001/2, 2001/2, ARAB 1001/2, 2001/2, CHNS 1100/2, 2005/2

Writing: Communication in Writing (6)

- ENGL 1104 - College Composition I (3)
- ENGL 1102 - College Composition II (3)

STEM/ Technology, Mathematics & Science (11)

(If Physics or Chem taken in this area, then it will not be needed in area F (major requirement). Will be used as an elective

- BIOL 1101/1103 - Fund of Biology/ Prin of Biology I
- BIOL 1102/1104 - Environ. Biology/ Prin of Biology II (Will need PHYS and CHEM)

QR

- CHEM 1151/1215 - Survey of/ Principles of Chemistry I
- CHEM 1152 / 1212 - Survey of/ Principles of Chemistry II (Will need PHYS)

QR

- PHYS 1111 - Introductory Physics I
- PHYS 1112 - Introductory Physics II (Will need CHEM)

- Elective (3)

Social Sciences: Social Sciences (6)

- (Choose One) ANTH 2001 - Cultural Anthropology, ECON 1810 - Introduction to Economics, PSYC 1101 - Introduction to Psychology, SOCI 1101 - Introduction to Sociology

— (Choose One) ANTH 1102/2003, ECON 1810/2105/2106, GEOG 1111, HIST 1111/1112/2111/2112, POLS 2401, PSYC 1101/2150, SOCI 1101/1100/2241, SOWK 1101

Area F - MAJOR REQUIREMENTS (22)

- BIOL 2231 - Human Anatomy & Physiology I (4)
- BIOL 2232 - Human Anatomy & Physiology II (4)
- PHYS 1111 - Introductory Physics I (4) (not required if used in STEM, choose elective)
- CHEM 1151 - Survey of Chemistry I (4) (not required if used in STEM, choose elective)
- ENHS 2300 - Medical Terminology (3)
- Elective (3)

Electives: PHYS, PHS, CHEM or BIOL not including "Topics" or "Research". Any computer science and/or any math course. Other courses are evaluated on a course-by-course basis.

Wellness Requirements

- WELL 1000 (2)
- Wellness Activity Elective (1)
- Wellness Activity Elective (1)

Contact Us

<https://www.augusta.edu/health/edu/med/ndkx.php>

Jan Rame

Program Coordinator

j.rame@augusta.edu

706-721-4176

For Your Information:

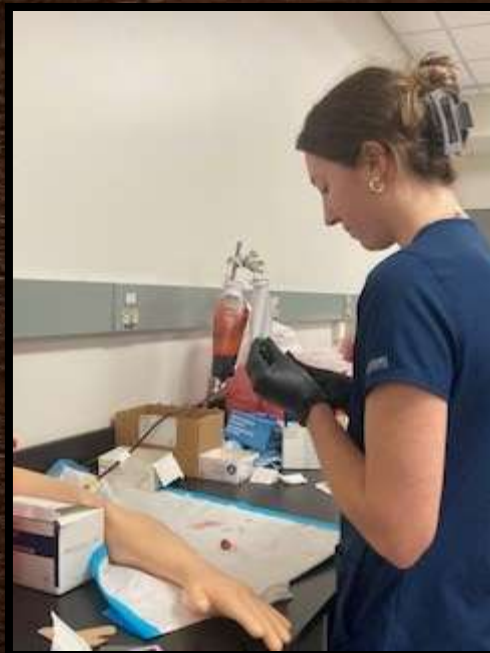
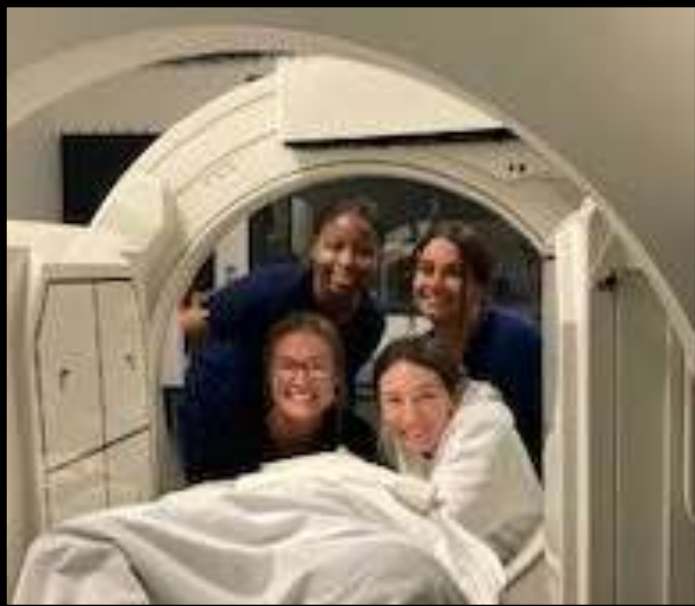
Extra fees associated with the program include:
CPB and First Aid Certification
Criminal Background and Drug Screen Check
Transportation to and from Clinical Site
ACLS Certification
Supplies and Lab Costs

Revised August 2024

Augusta University
College of Allied Health Sciences
Nuclear Medicine Technology Program



- Best of Both Worlds!**
Degree And Specialty
- ▶ **Bachelor of Science Degree**
 - ▶ **Eligible for National Certification Exam NMTCB and/or ARRT Certification as Nuclear Medicine Technologist**
 - ▶ **Work anywhere in the United States as Nuclear Medicine Technologist**



Grow your Career!

Join the
Nuclear
Family at
Augusta
University!

Thank You!

- Choosing Nuclear Medicine was one of the best decisions of my life!
- Interested in exploring the field or program further? Reach out to me at:
ayarshen@augusta.edu
- Questions?