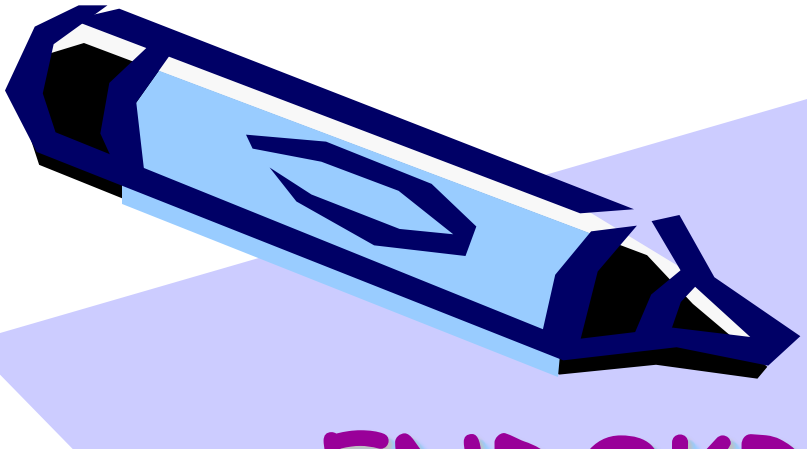


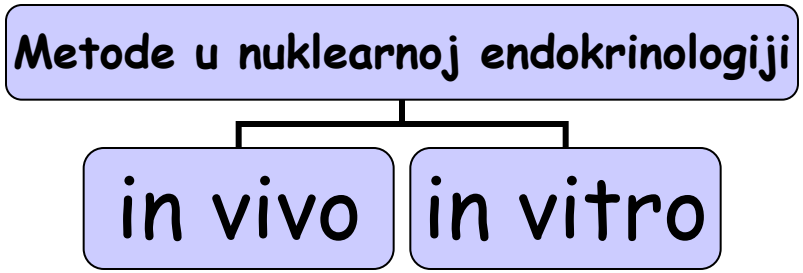
ENDOKRINOLOGIJA

štitasta žlezda
nadbubreg
paraštitasta žlezda



Nuklearna endokrinologija

- najstarija grana nuklearne medicine
- ispitivanje metabolizma joda ovim radioizotopom je prva značajnija primena radionuklida u kliničkoj praksi



štitasta žlezda
radiofarmaci

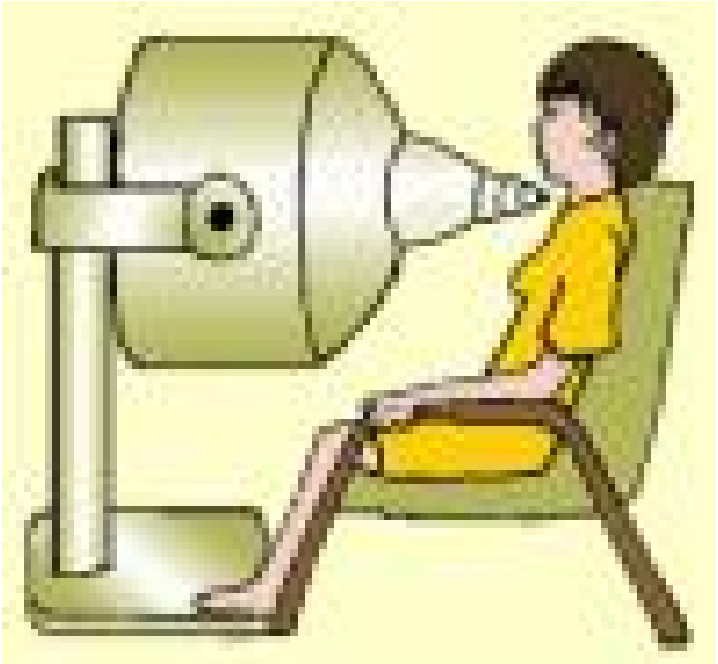
- Tc99m pertehnetat

$$Na^{+}(Tc^{+7}O_4^{-2})^{-1}$$

- NaJ 123
- NaJ 131(retrosternalna struma)

protokol scintigrafije

- 20 do 30 minuta posle i.v aplikacije pertehnetata
- aktivnost doze 37 do 74MBq (1do 2mCi)
- snimanje u anteriornoj projekciji



na scintigramu se procenjuje

- veličina
- položaj
- ravnomernost raspodele radiofarmaka u štitastoj žlezdi

➢ Bolesti su praćene promenama navedenih karakteristika



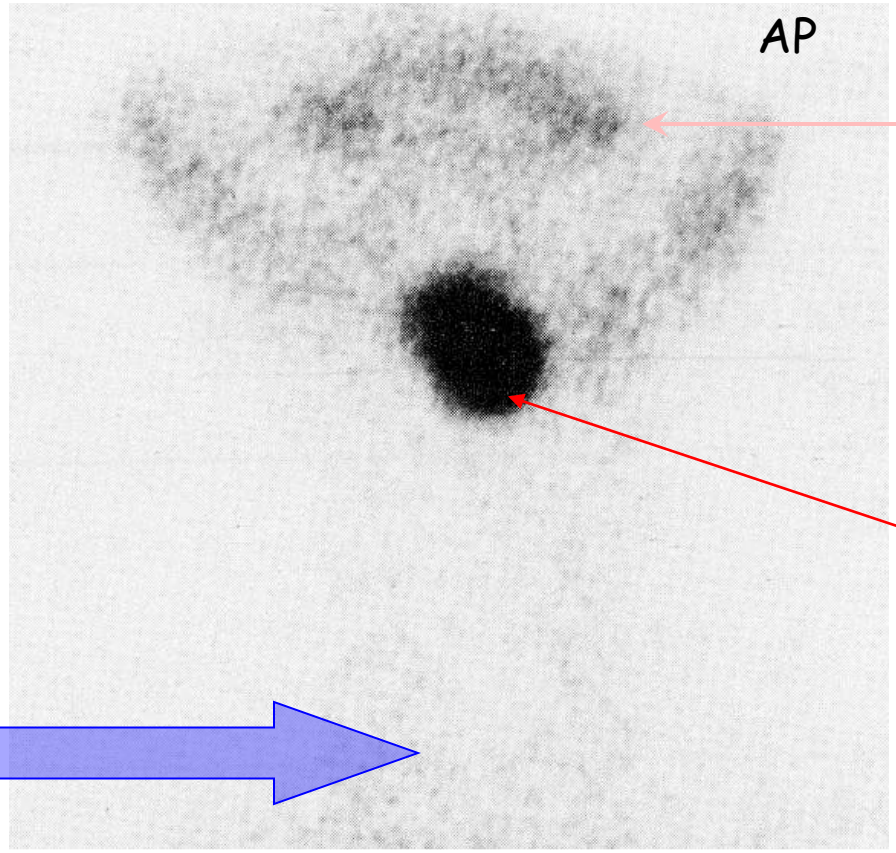
neke od bolesti

- sublingvalno smeštena žlezda (na mestu embriološkog porekla)
- kaudalna ekstenzija u medijastinum
- uvećanje štitaste žlezde (struma)

  difuzno/nodozno



EKTOPIČNA TIREOIDEA
(THYREOIDEA LINGUALIS)

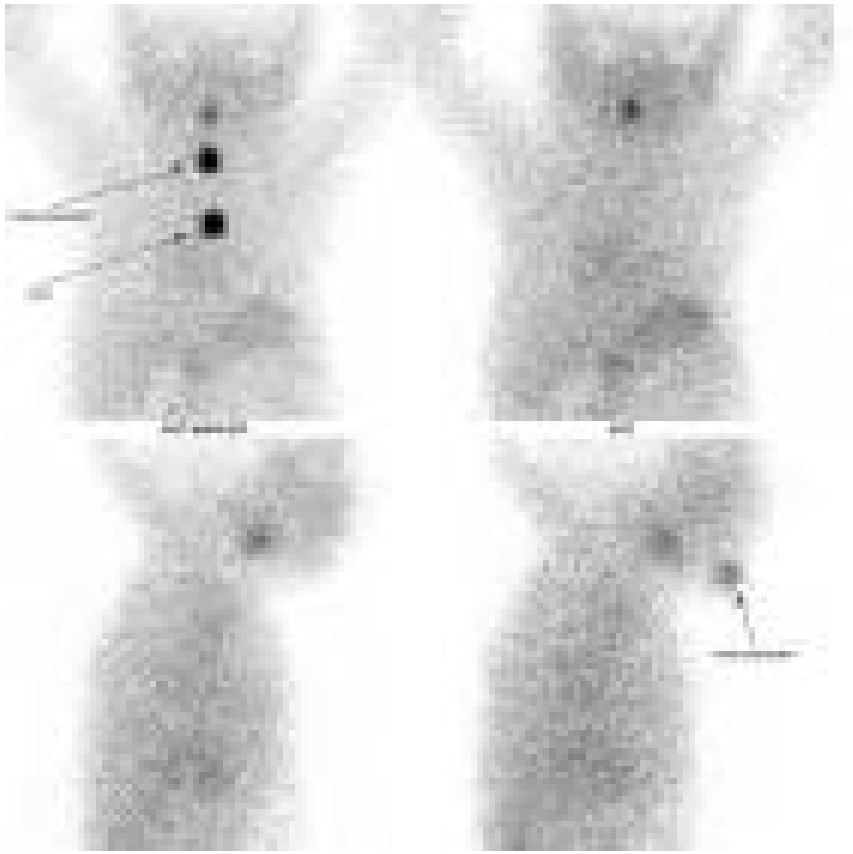


^{99m}Tc u usnoj duplji

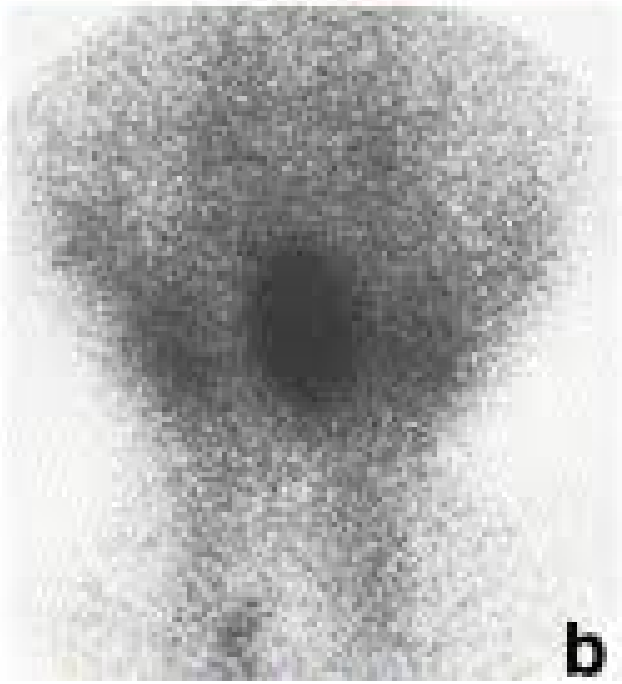
Nakupljanje ^{99m}Tc u predelu baze jezika

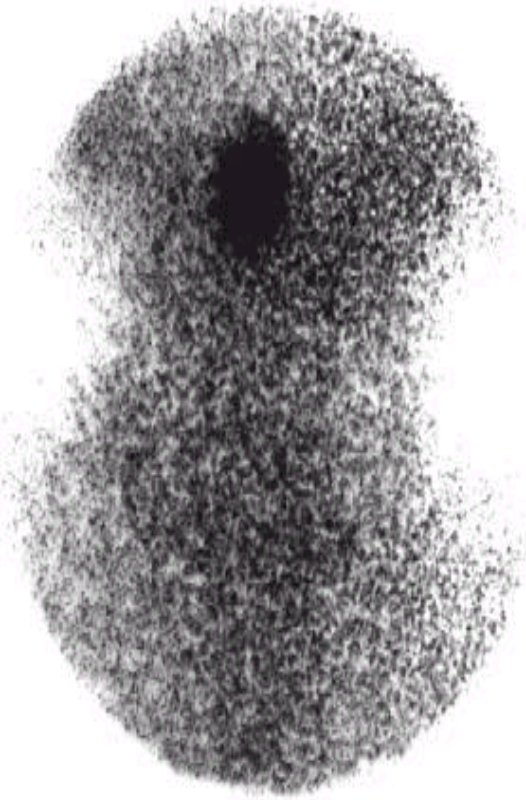
UOBIČAJENA LOKACIJA ŠTITASTE ŽLEZDE

SCINTIGRAM ŠTITASTE ŽLEZDE (^{99m}Tc)




a

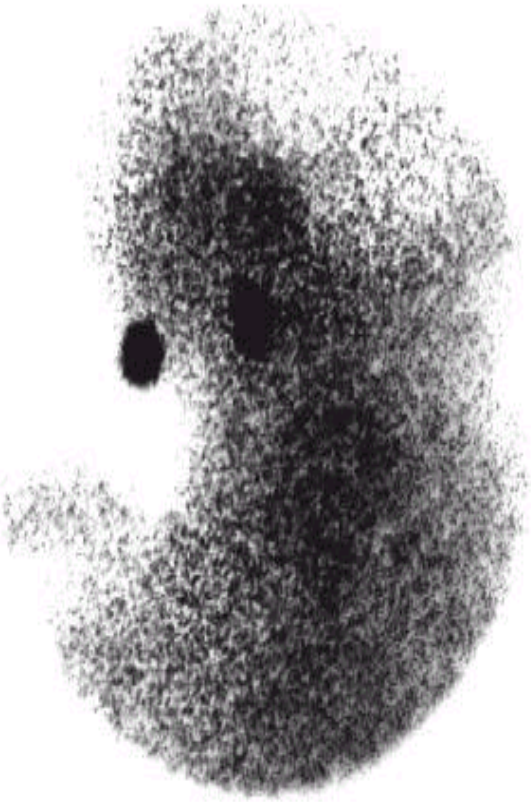

b



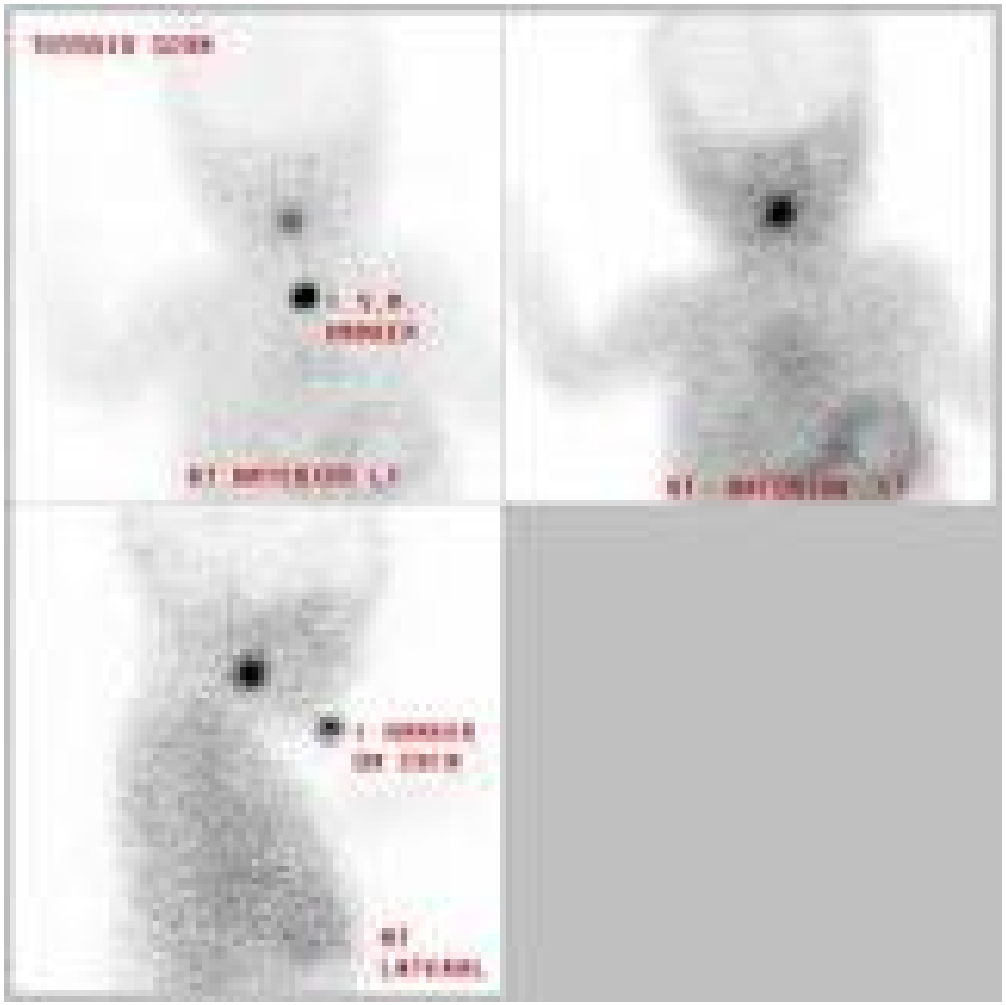
Rt. Ant. Lt.

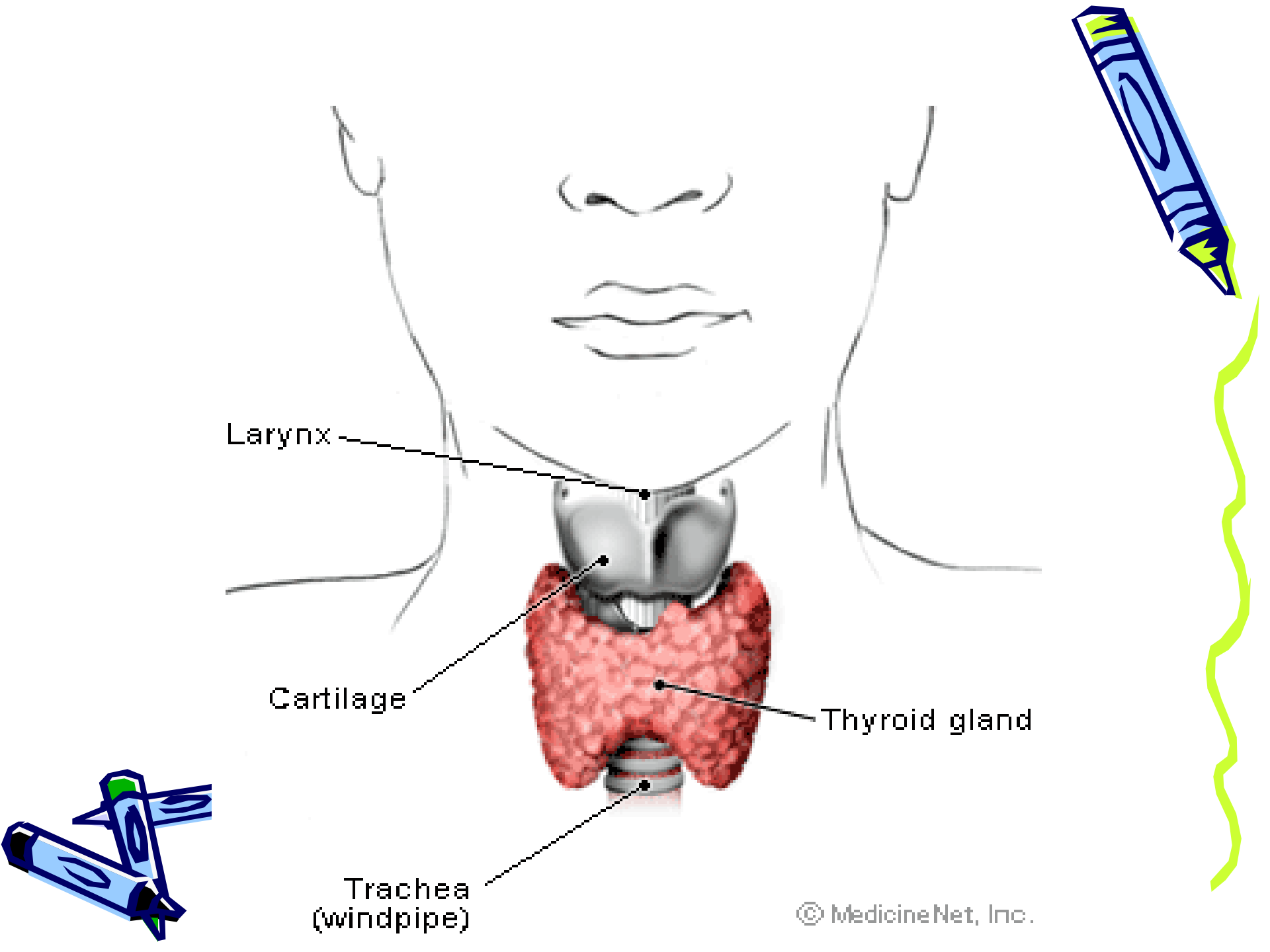


Ant. Lt. Lat. Post.

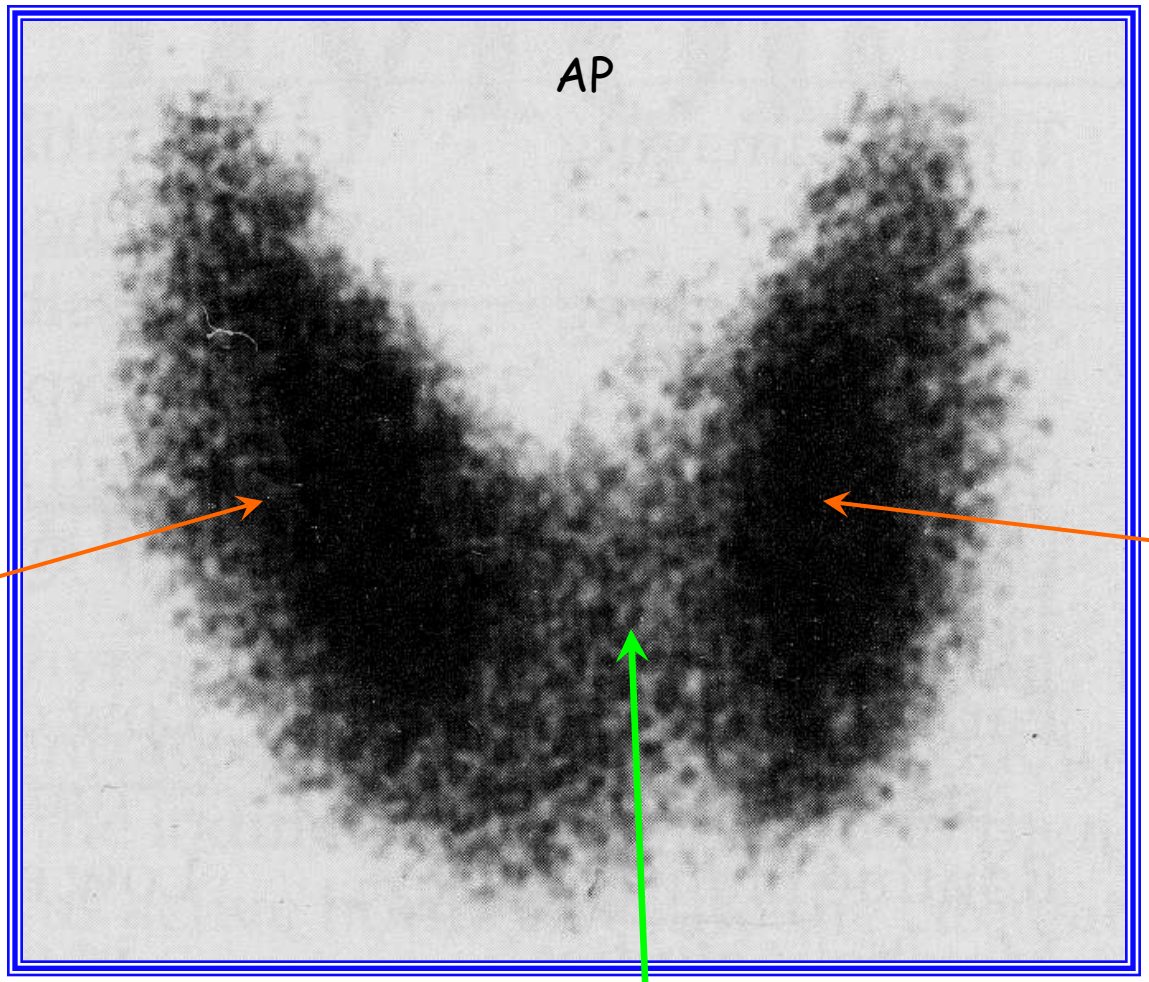


Ant. Lt. Lat. Post.
with chin marker




Larynx
Cartilage
Thyroid gland
Trachea
(windpipe)
© MedicineNet, Inc.

NORMALAN SCINTIGRAM ŠTITASTE ŽLEZDE (^{99m}Tc)

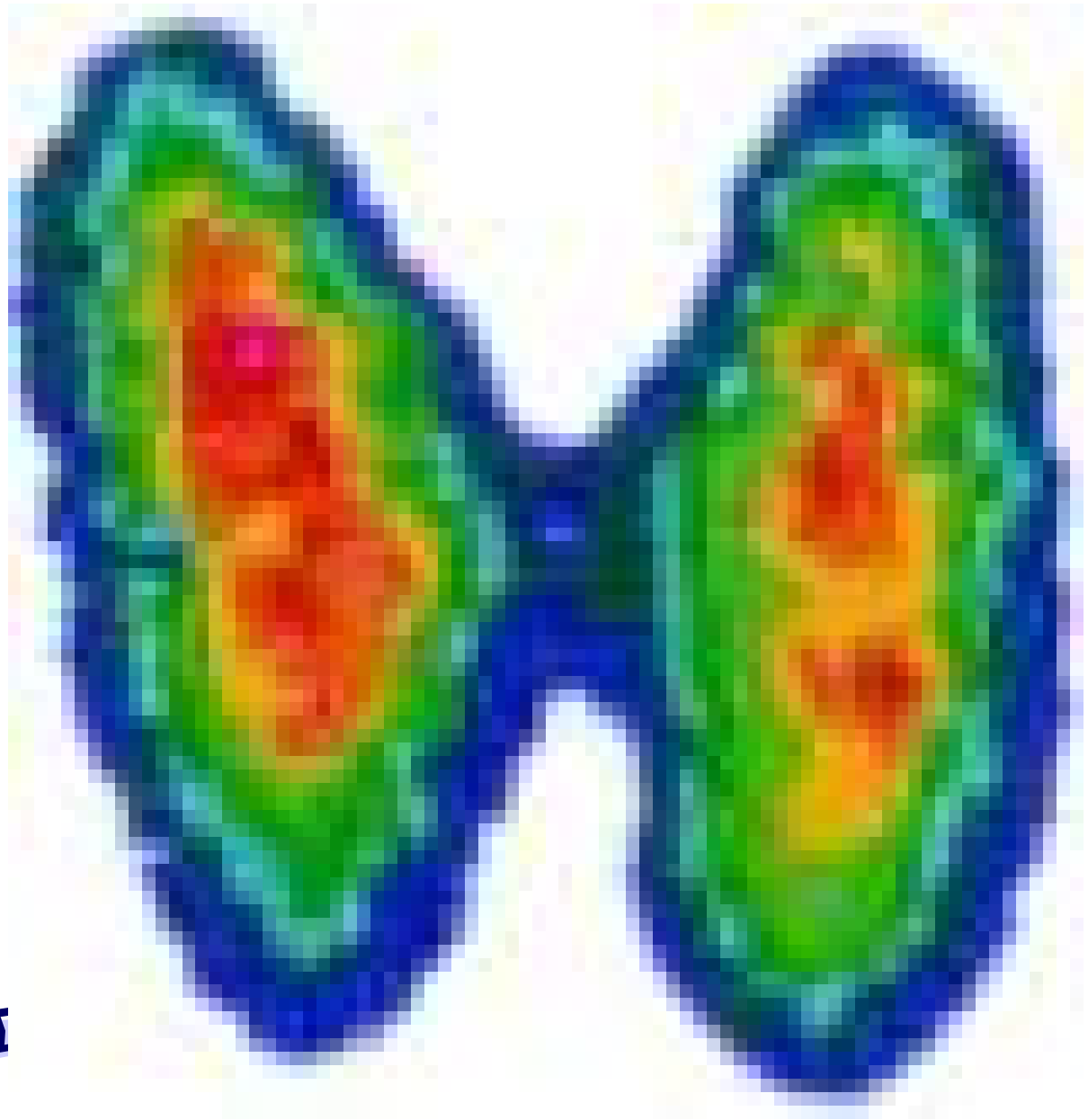


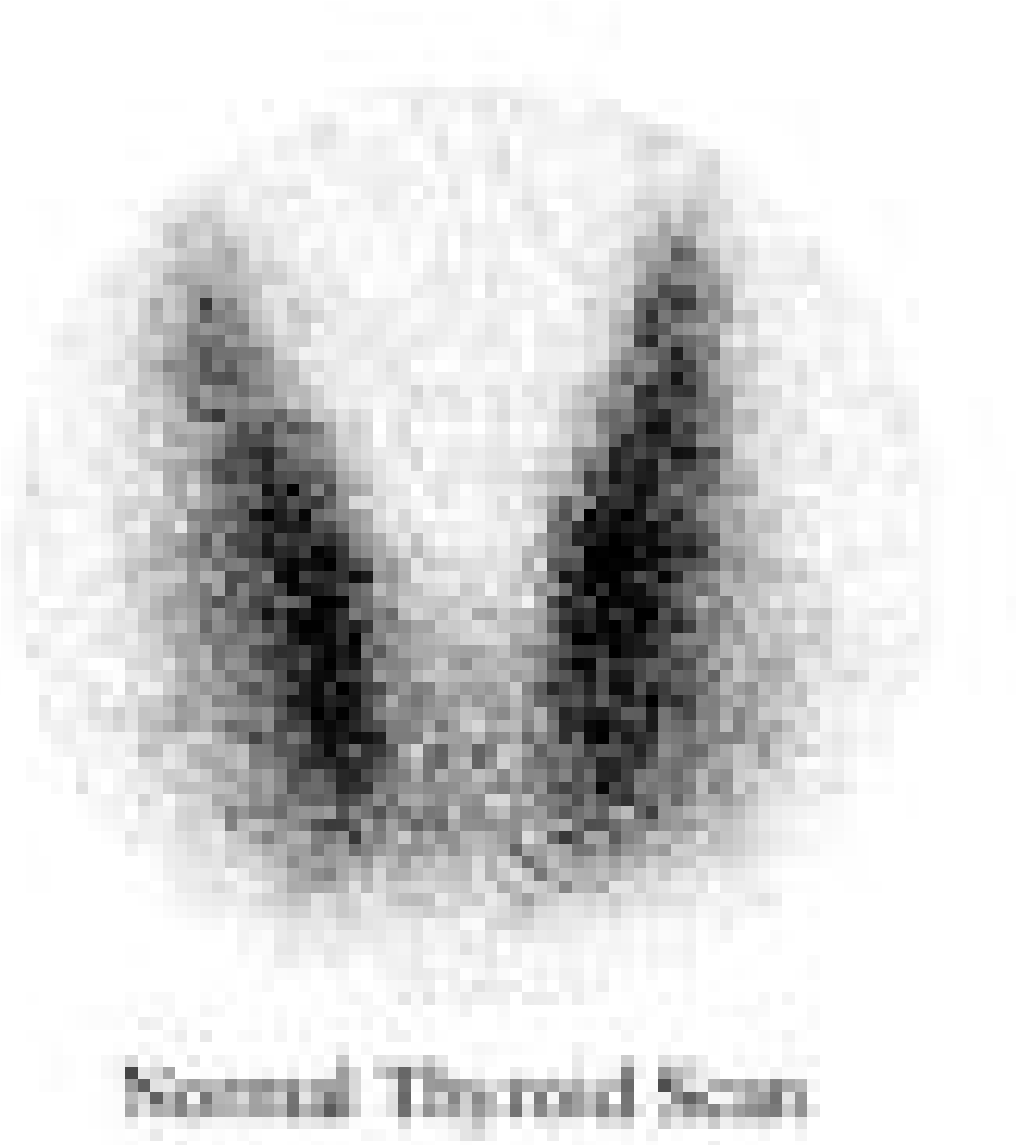
DESNI LOBUS

LEVI LOBUS

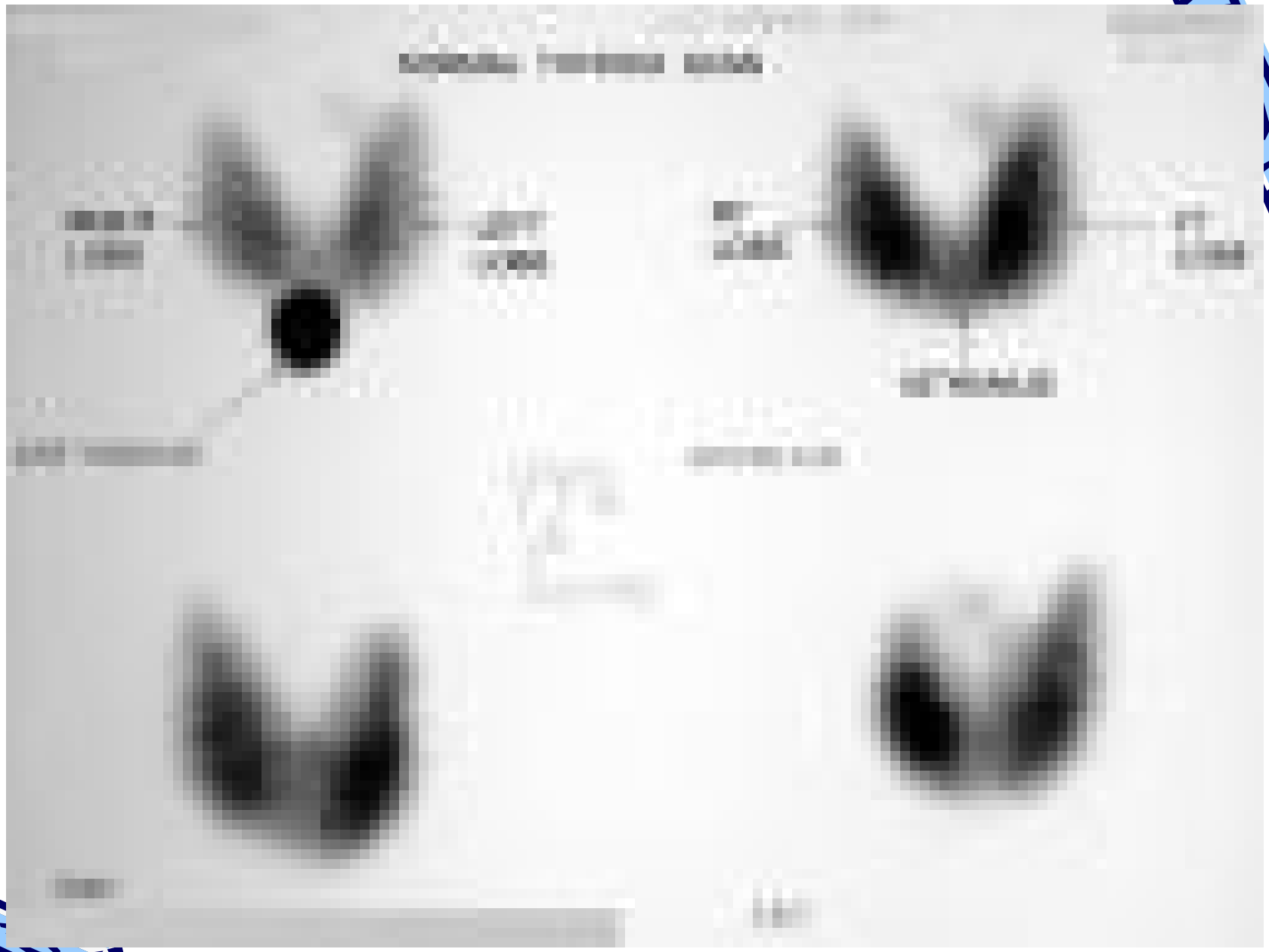
ISTMUS

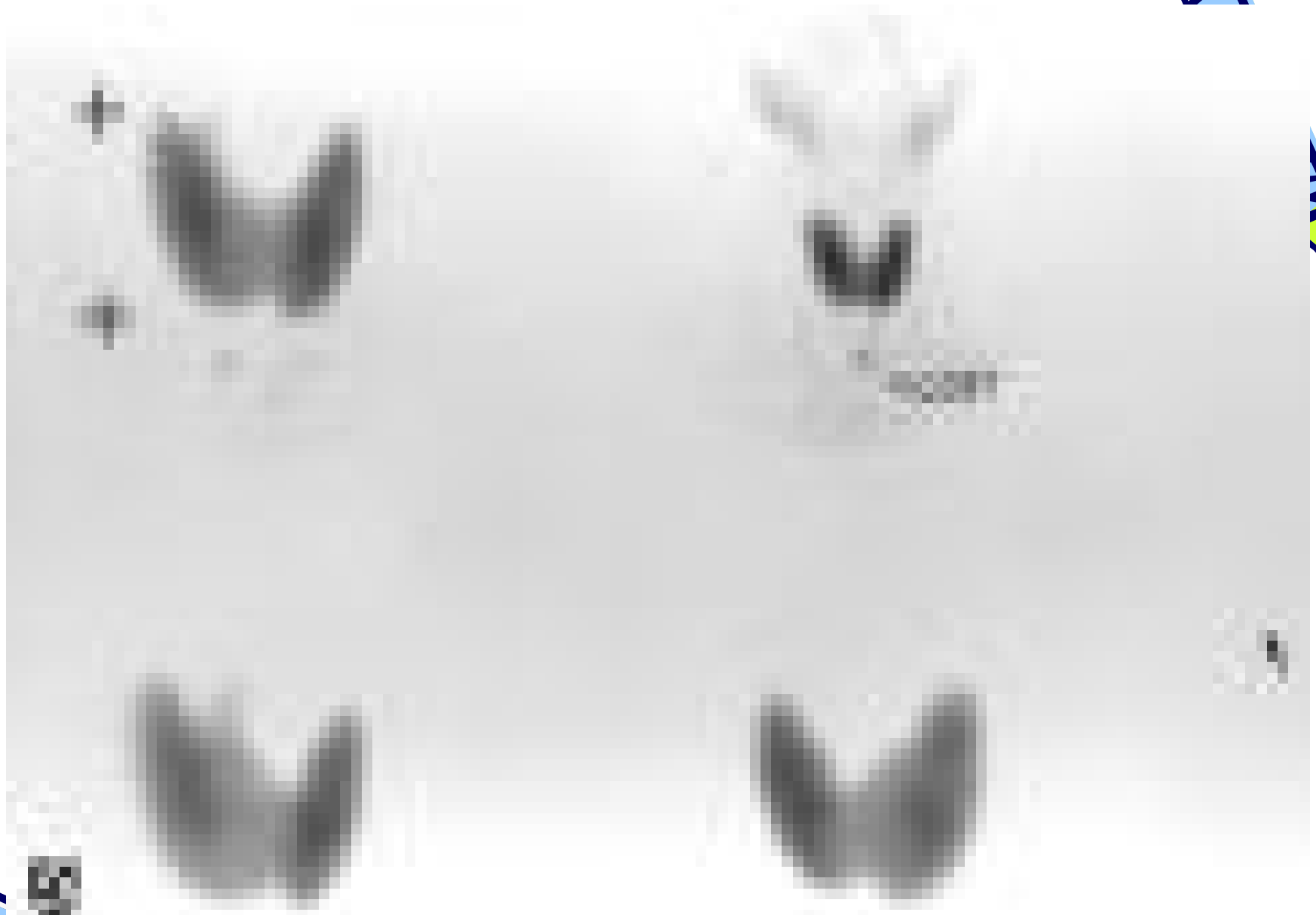

+
ANTERIOR

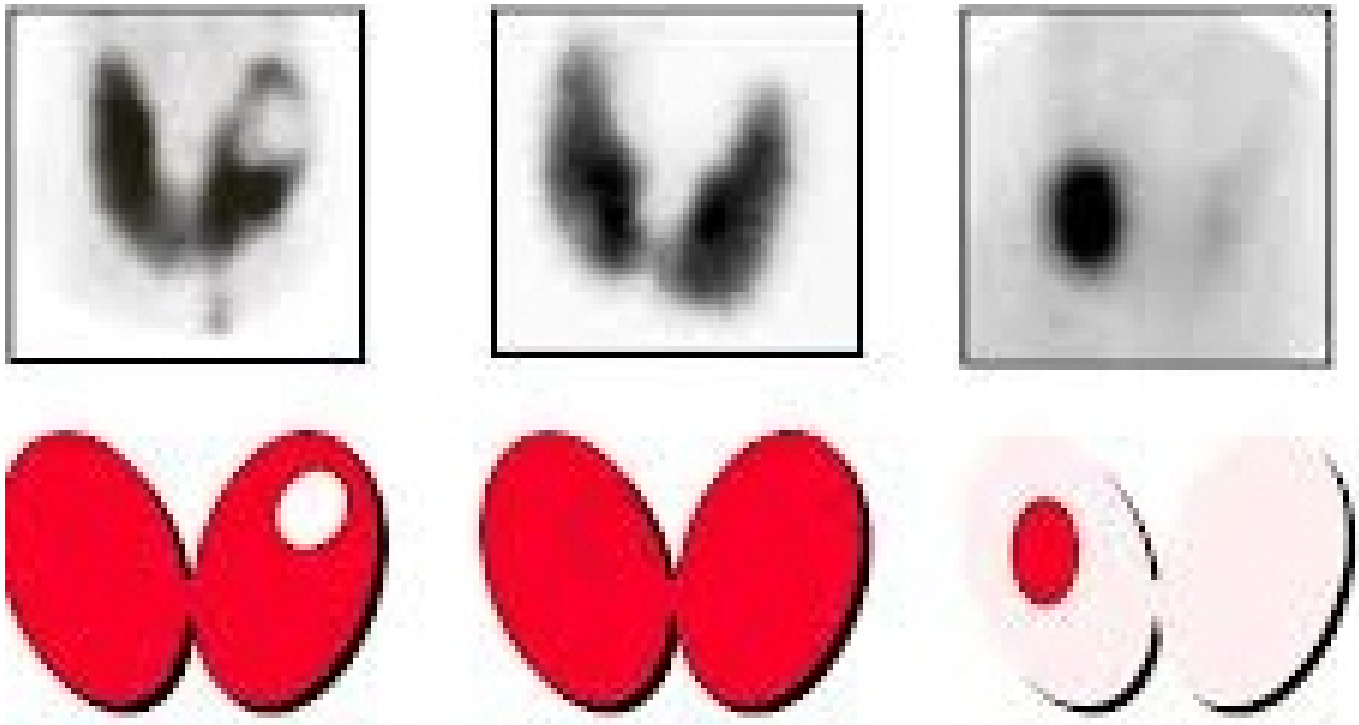


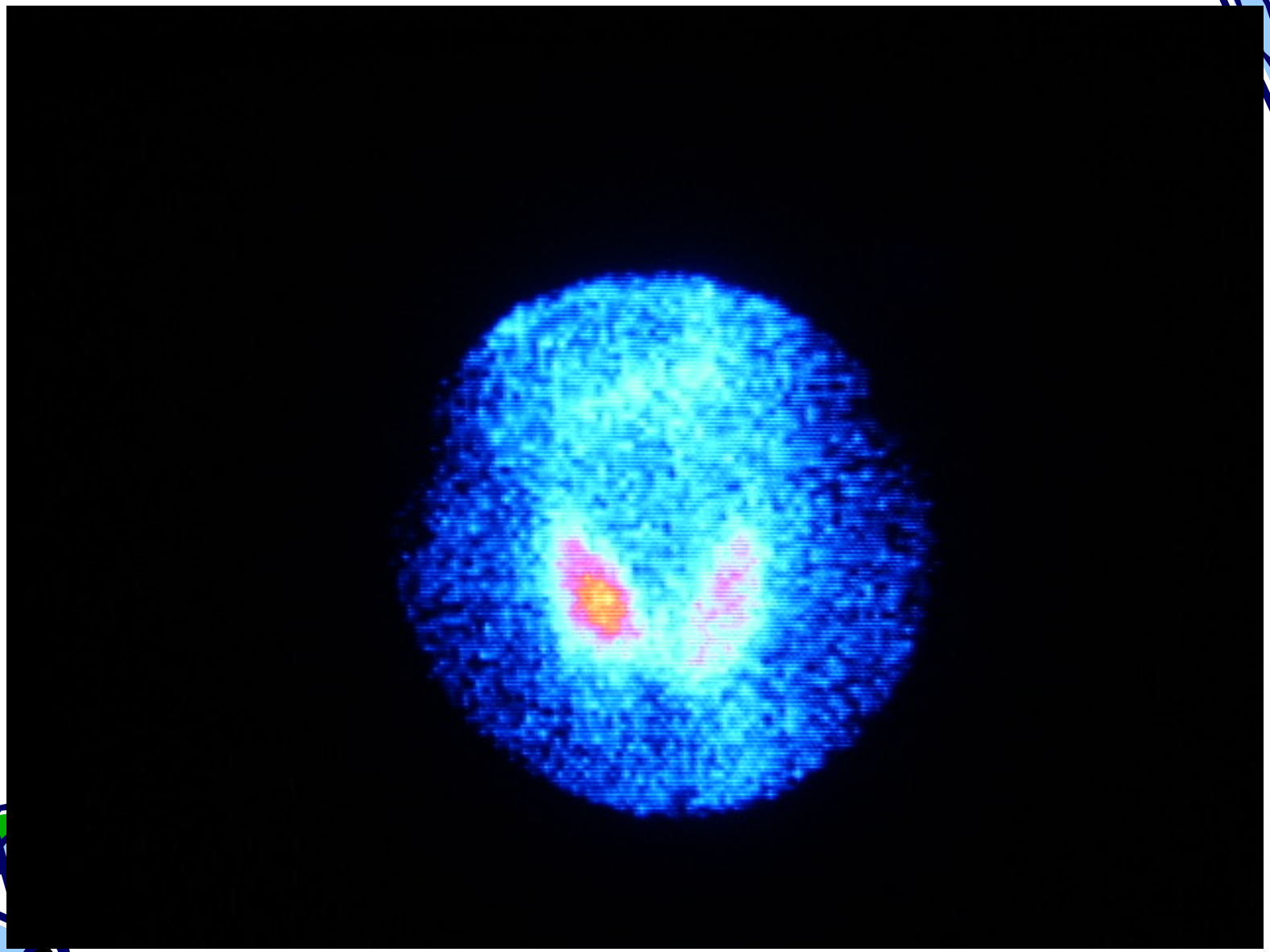


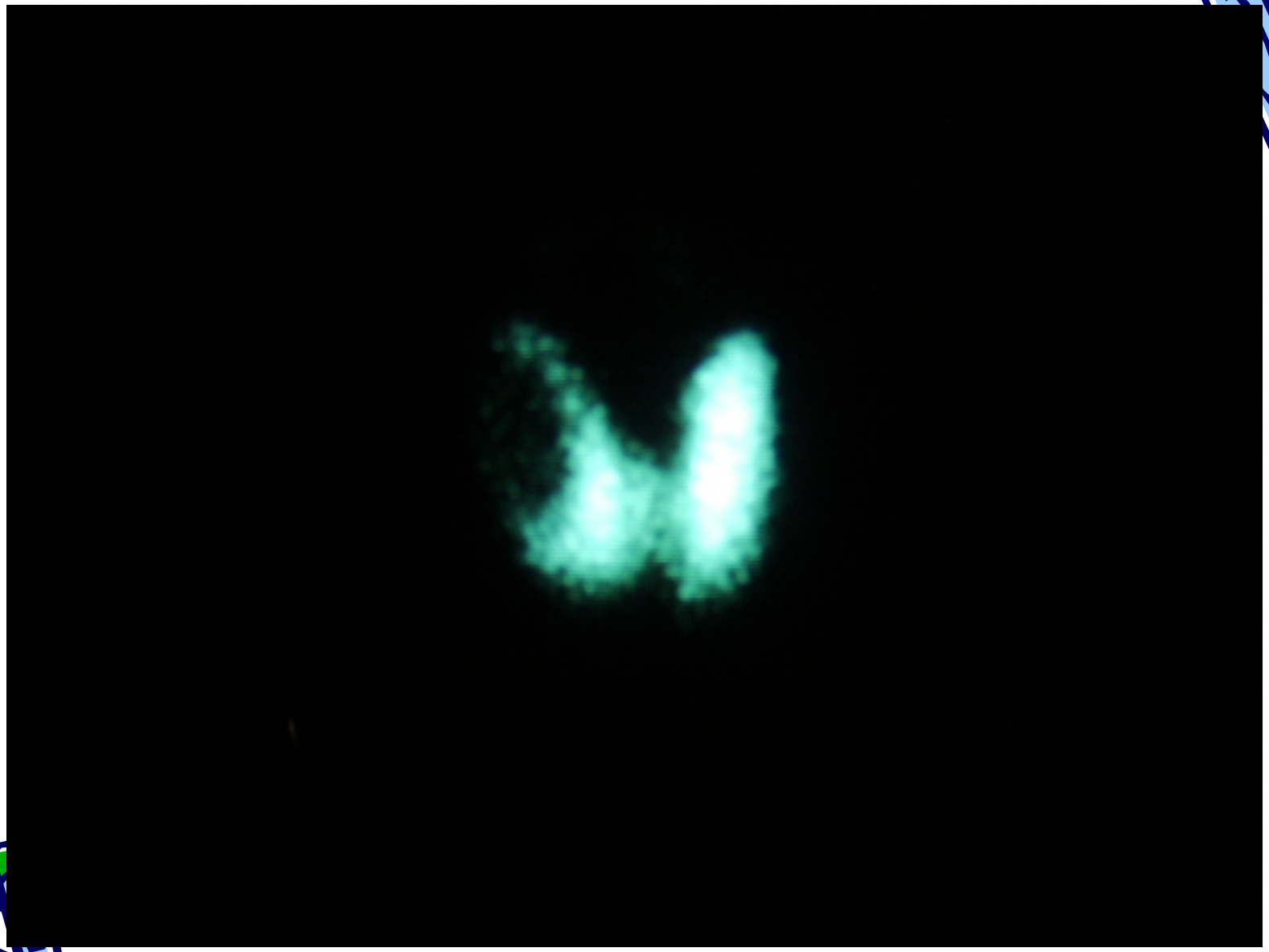
Normal Thyroid Scan

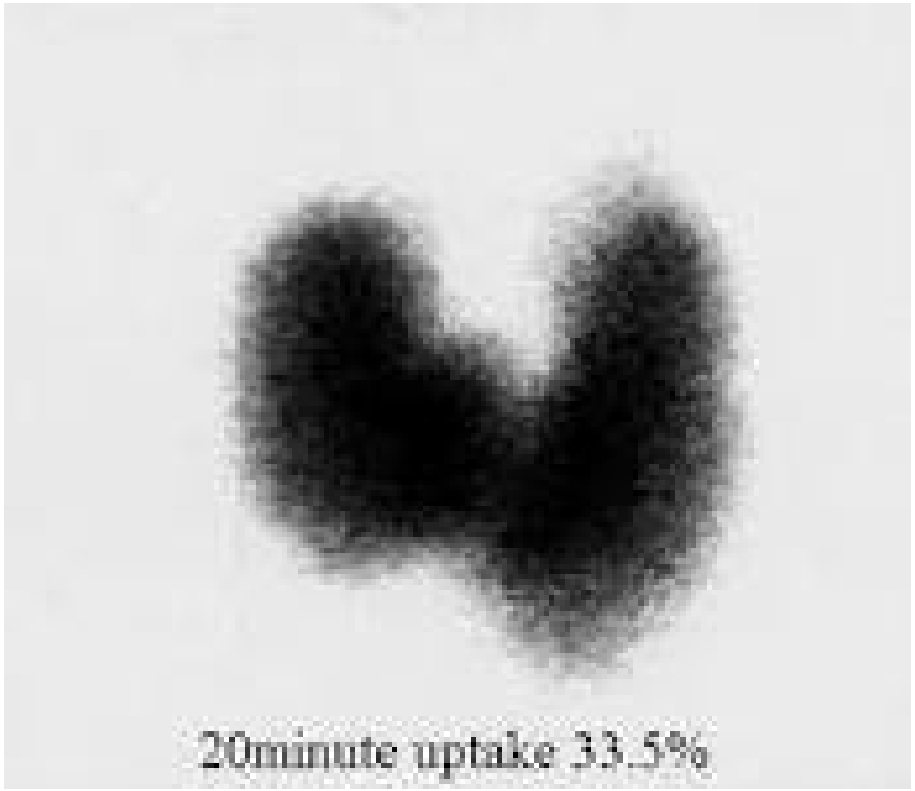




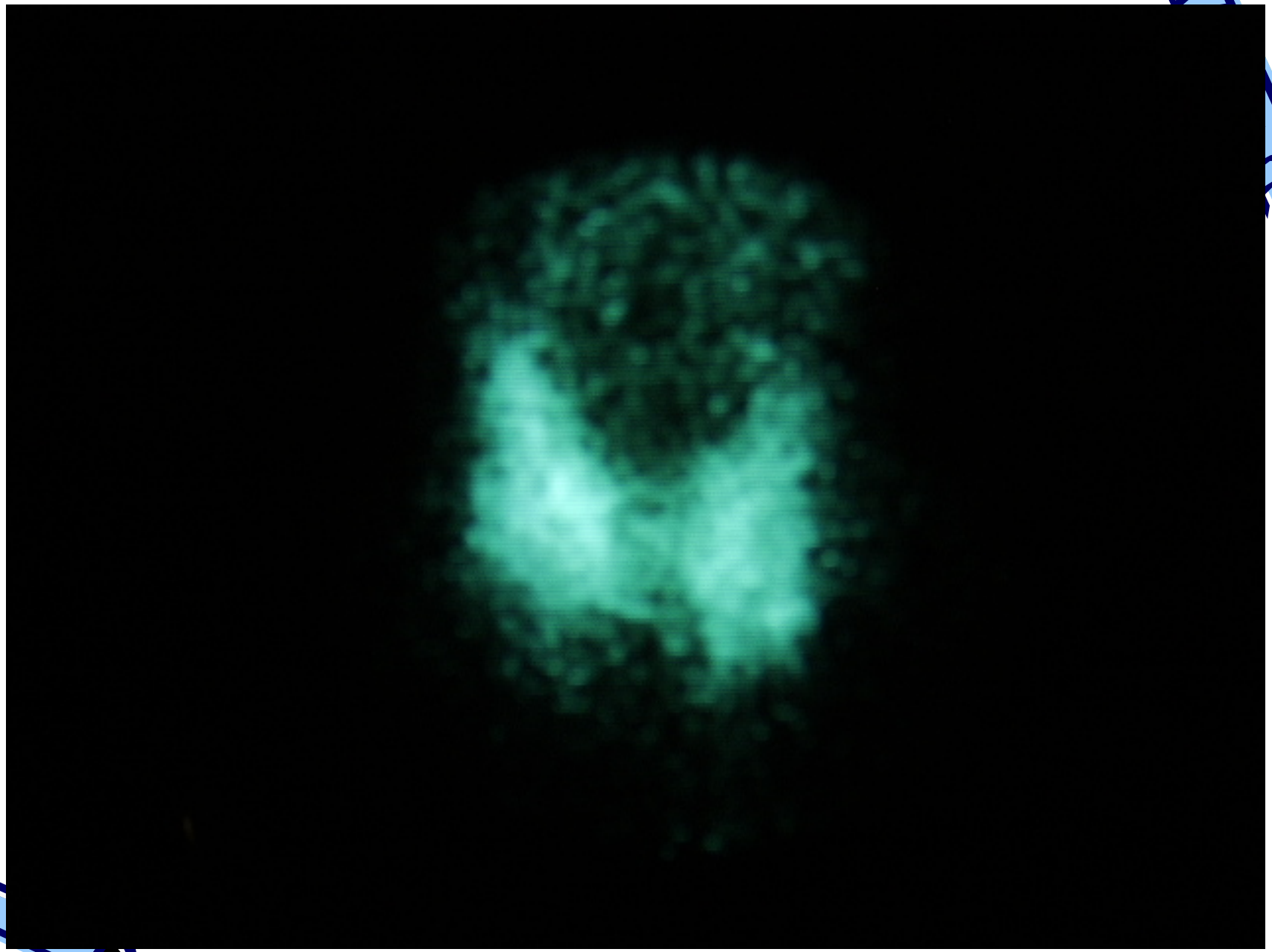


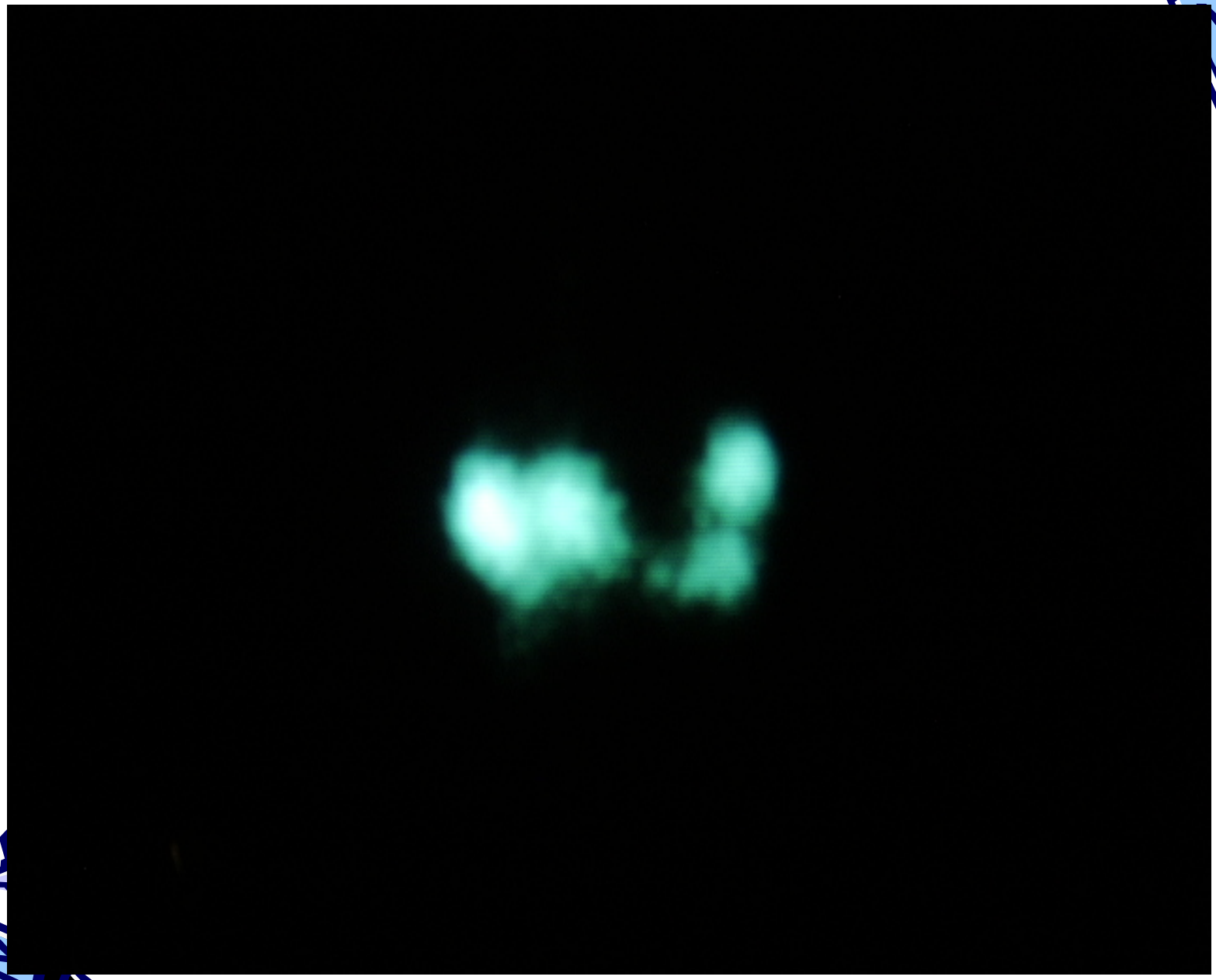


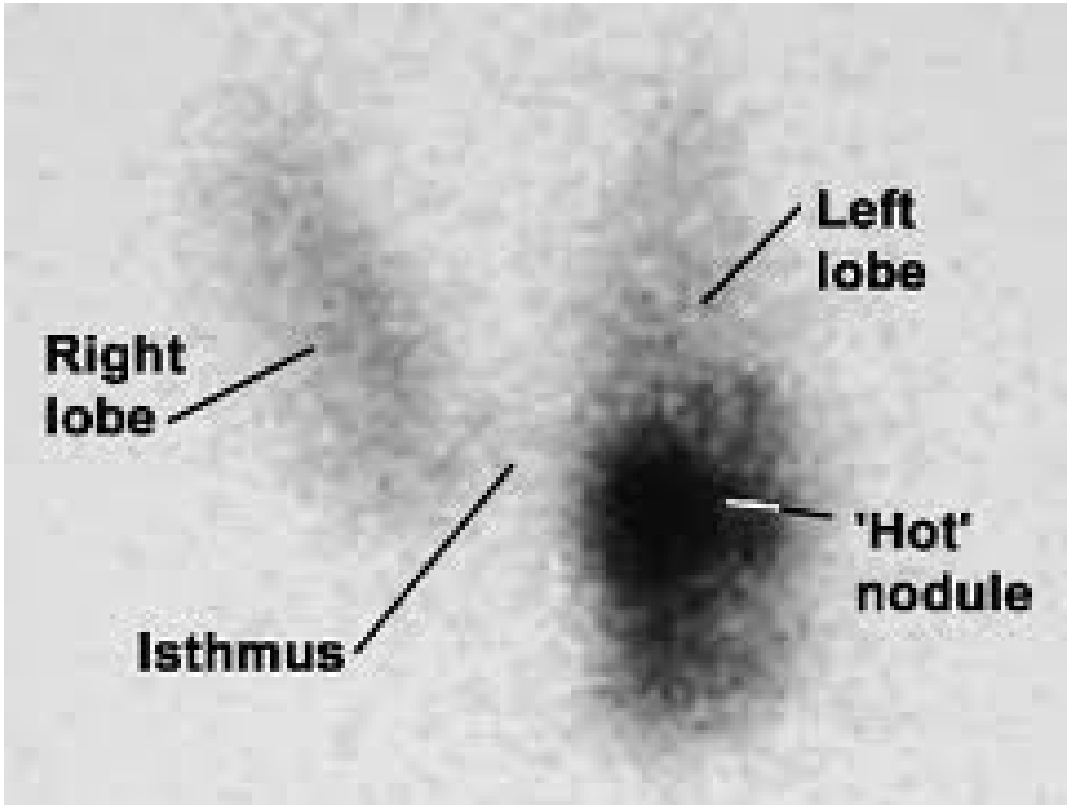


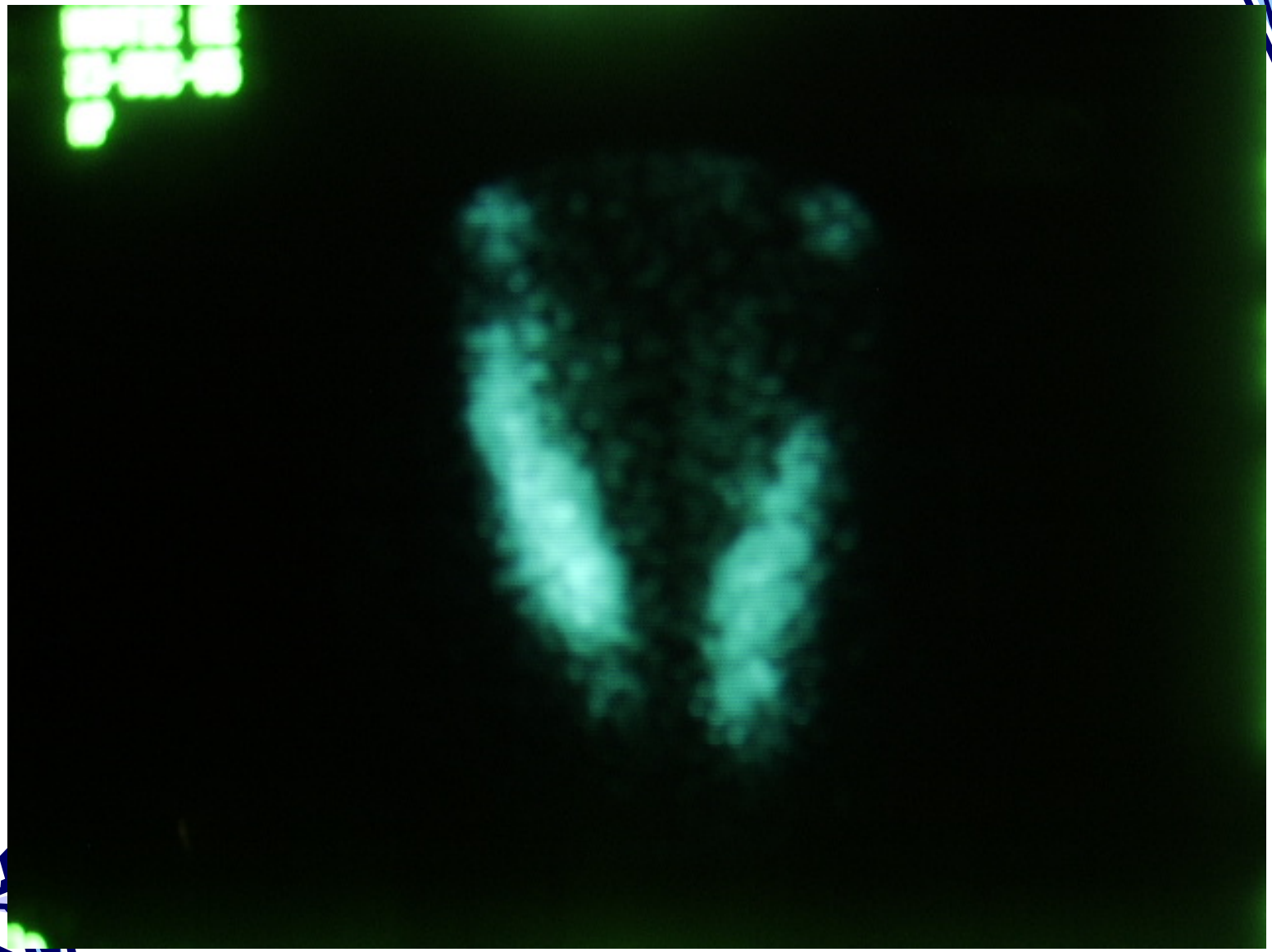


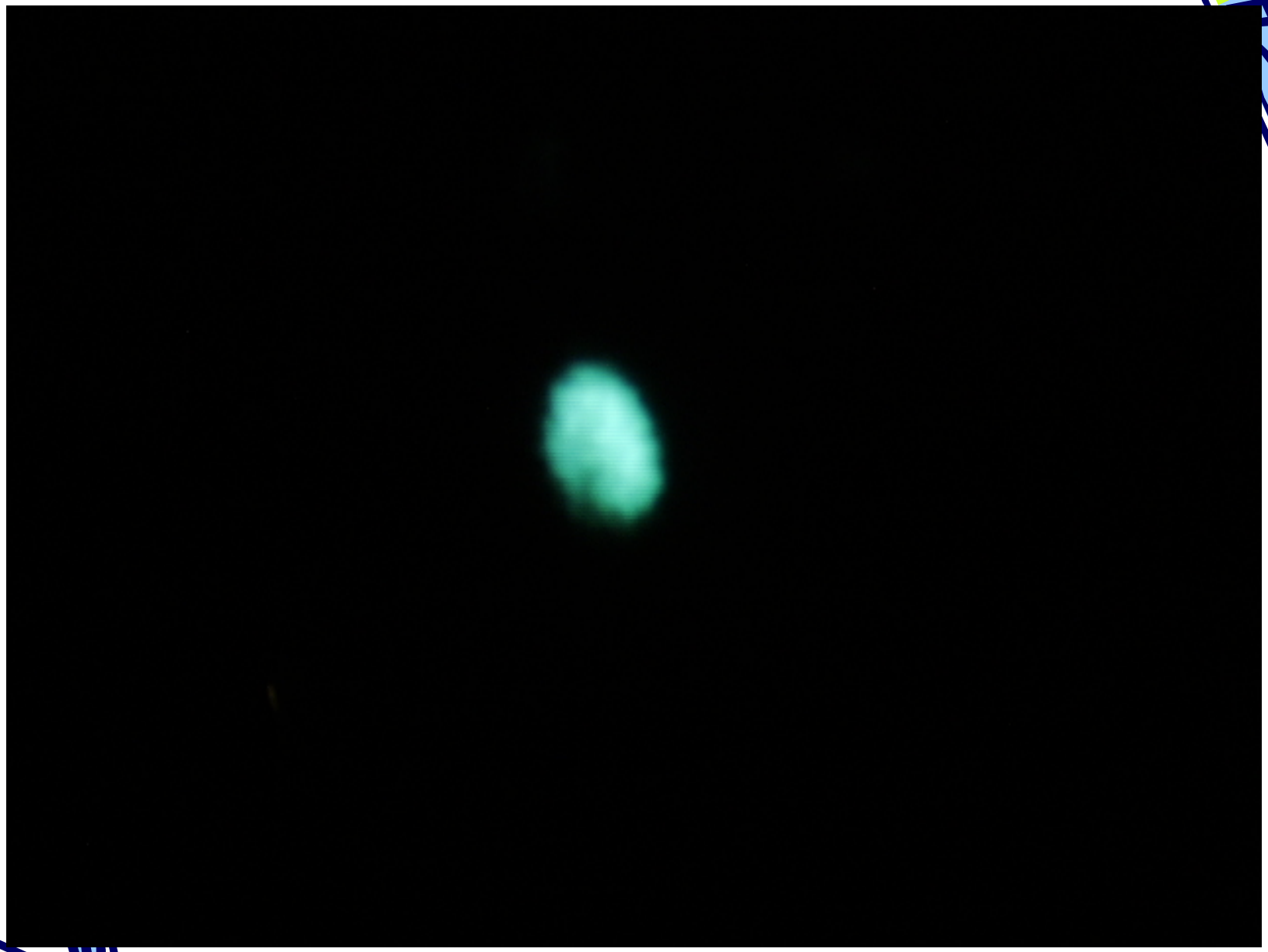
20minute uptake 33.5%

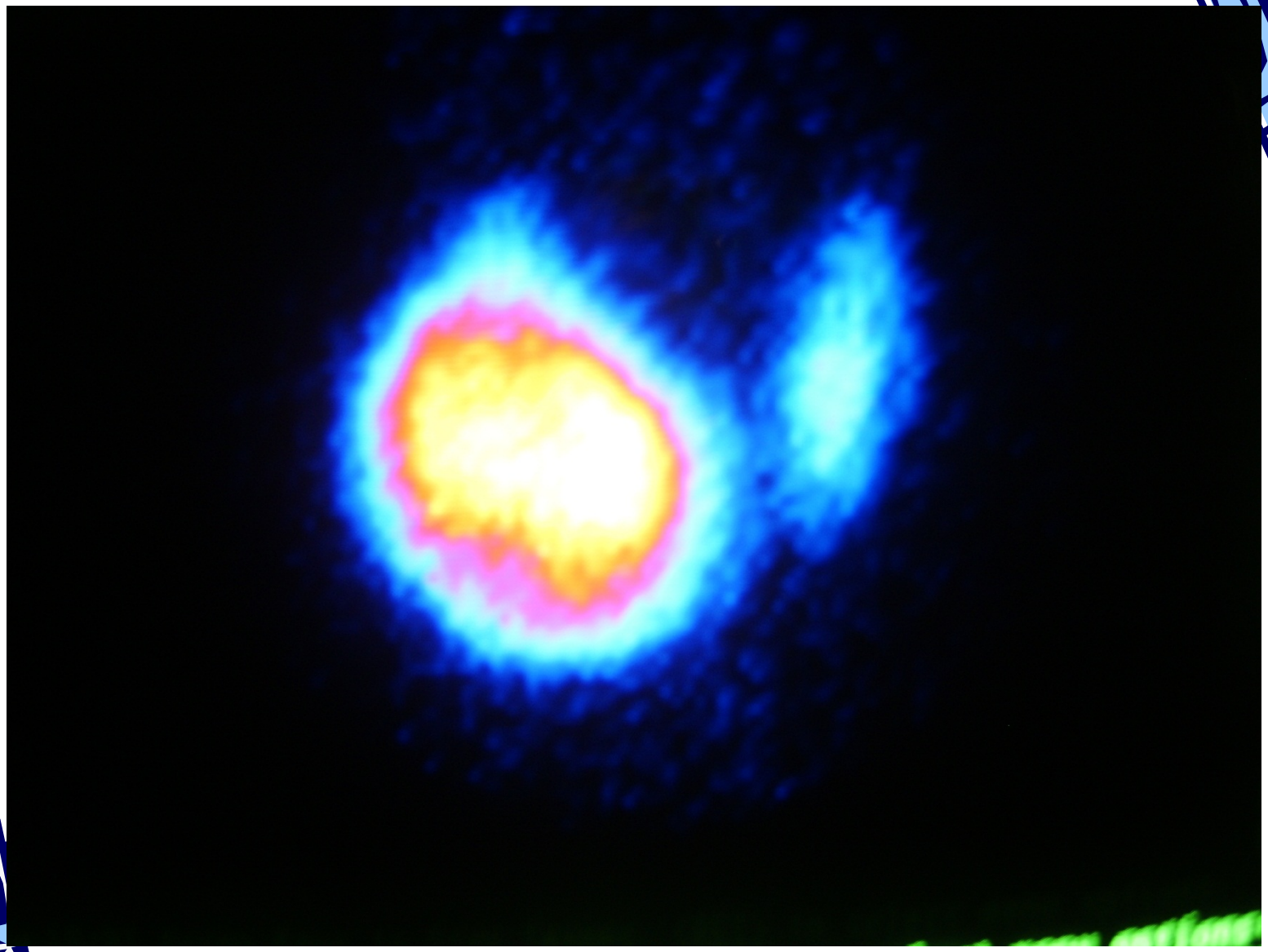


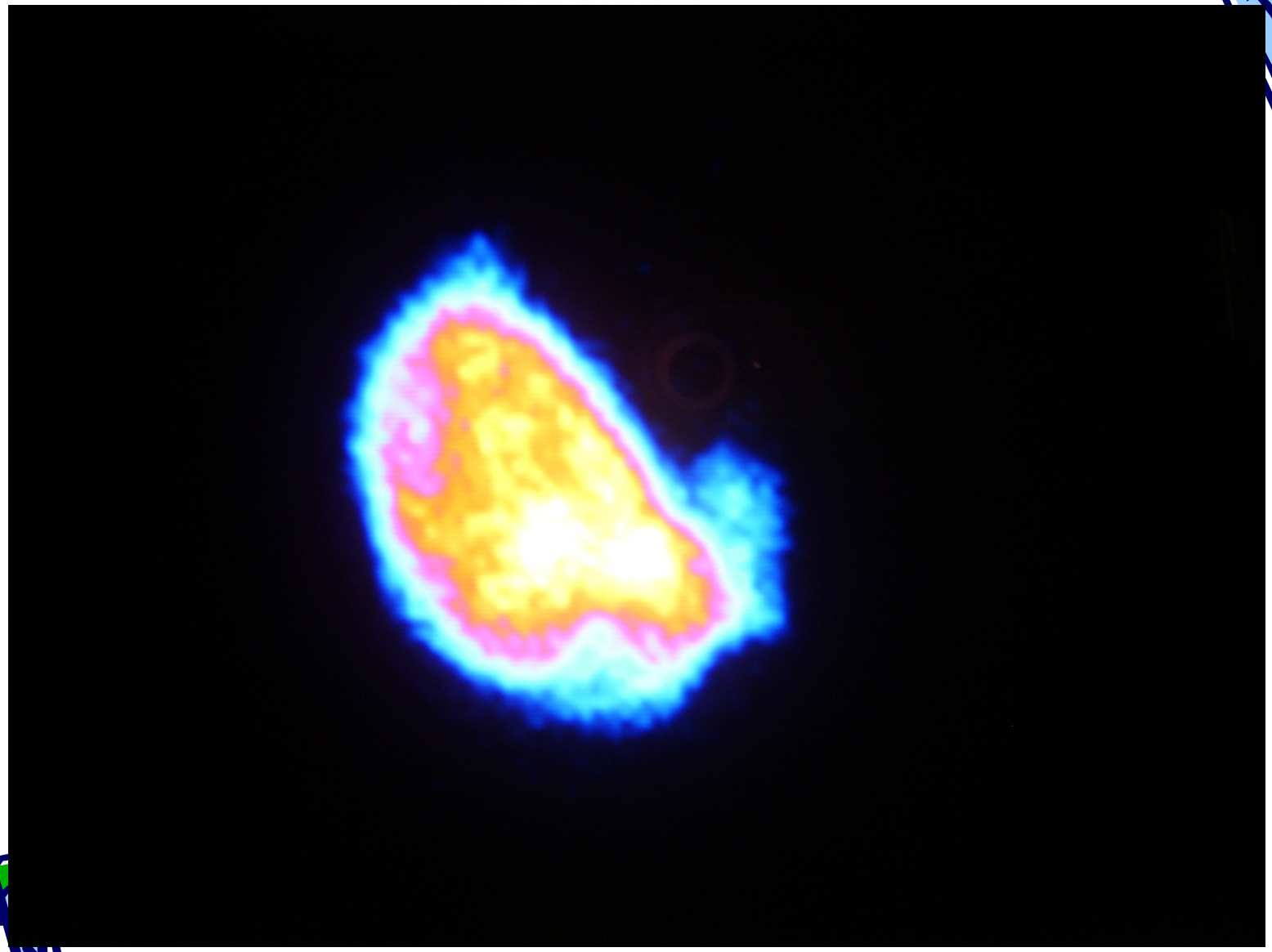


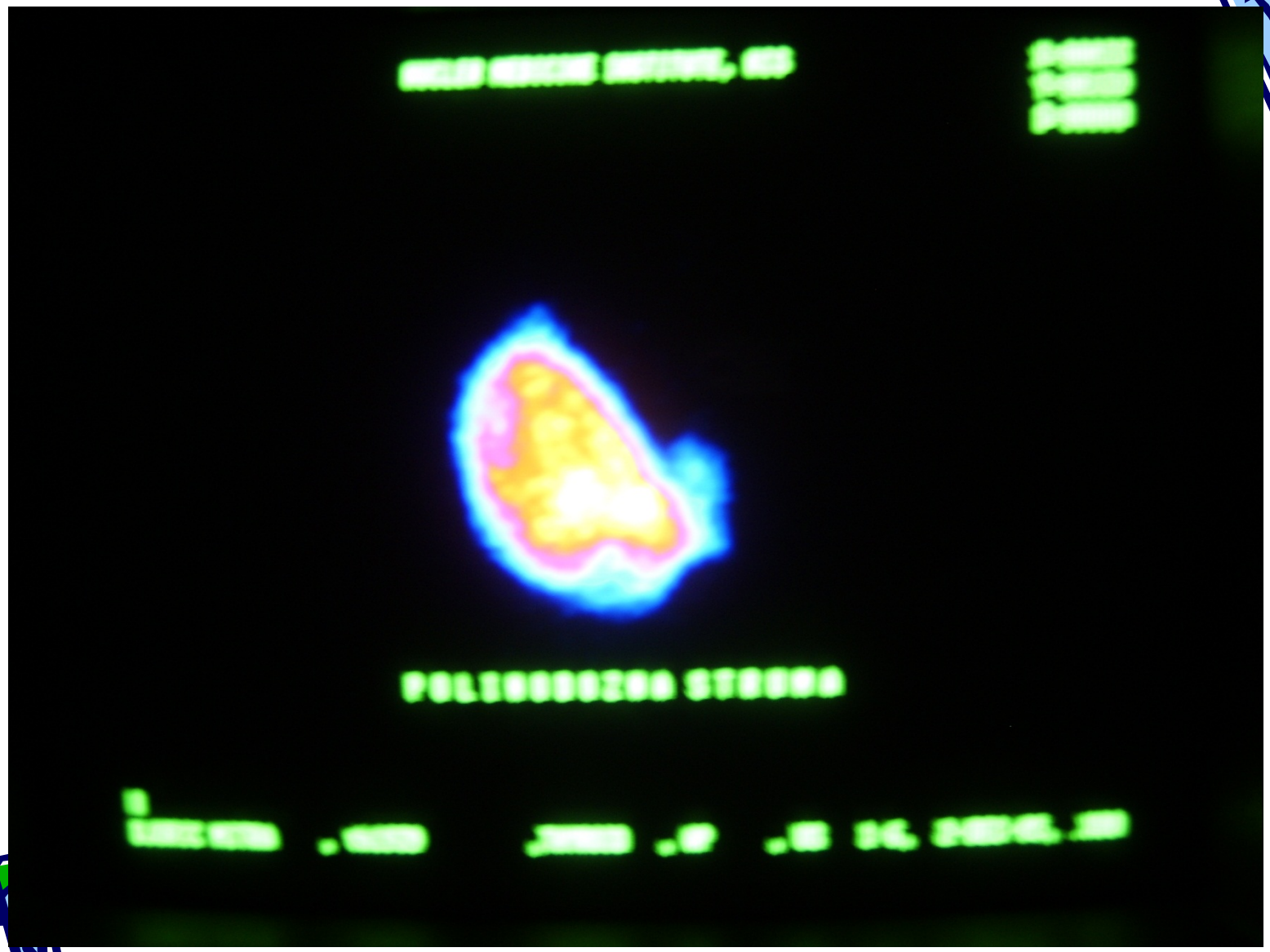

Left
lobe
Right
lobe
'Hot'
nodule
Isthmus

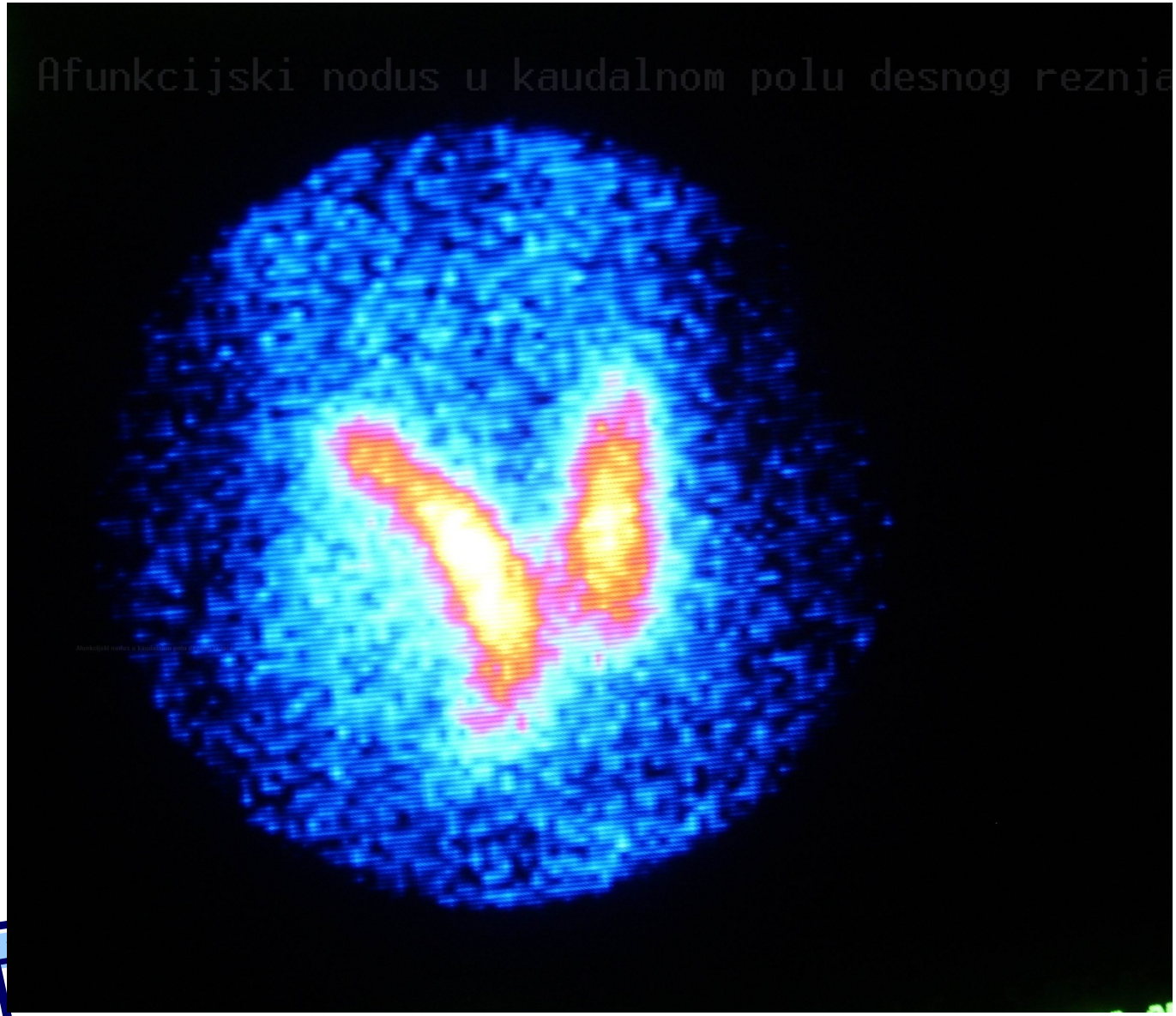


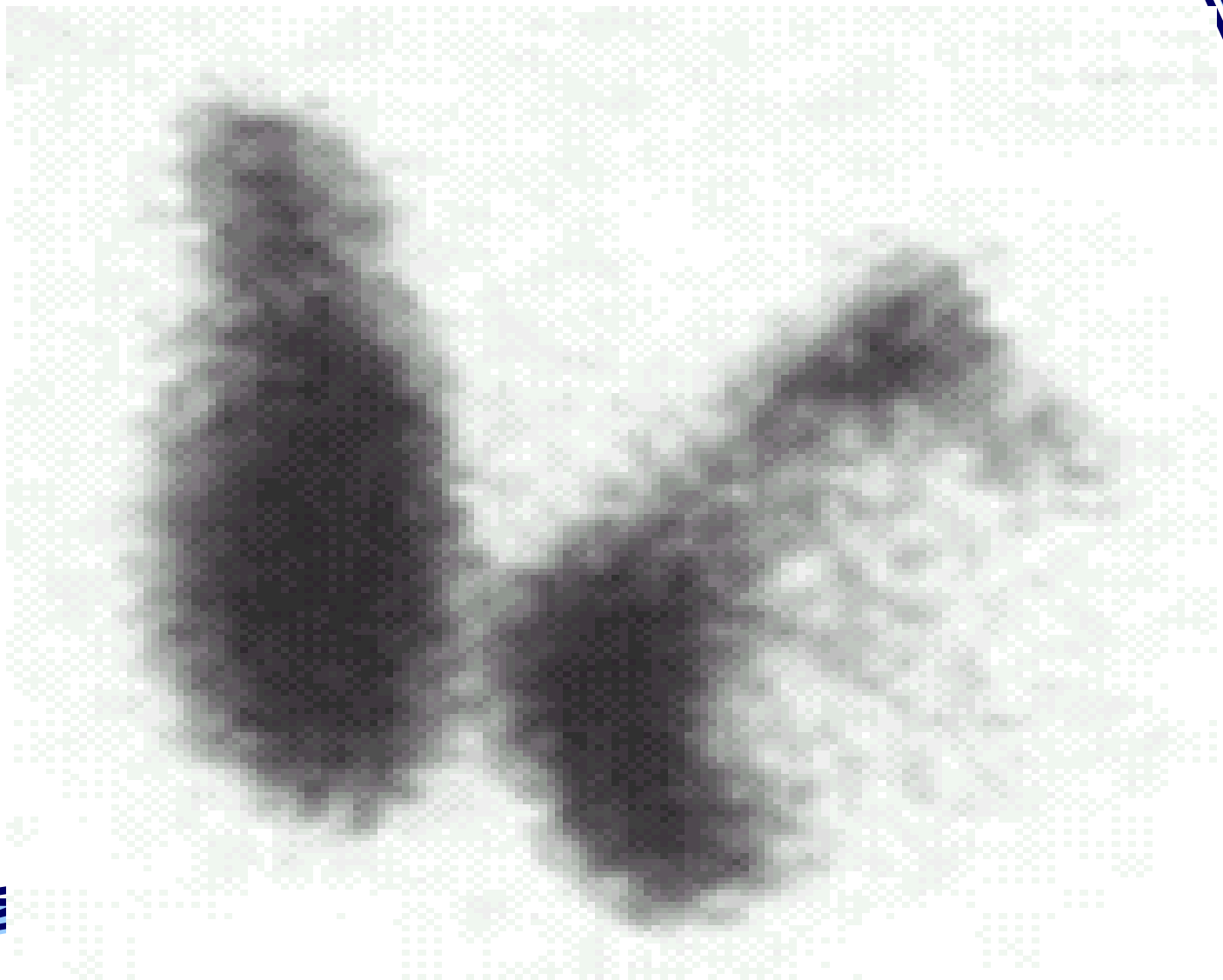




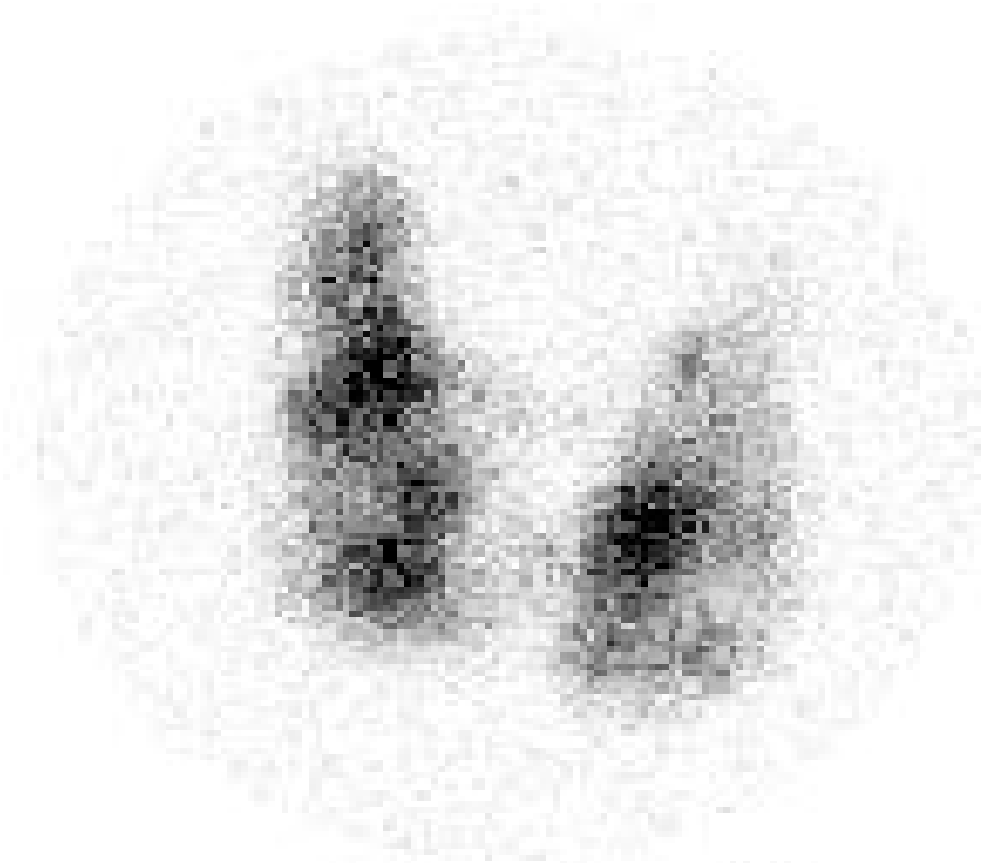




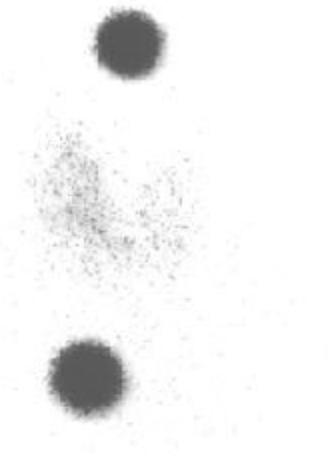

Afunkcijski nodus u kaudalnom polu desnog reznja



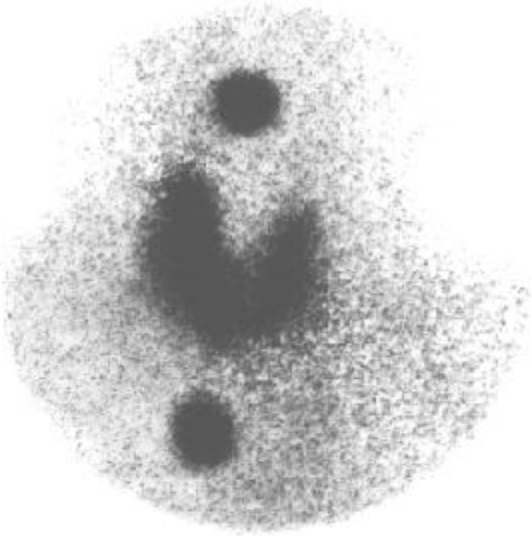

R
L
UPTAKE: 6·6%



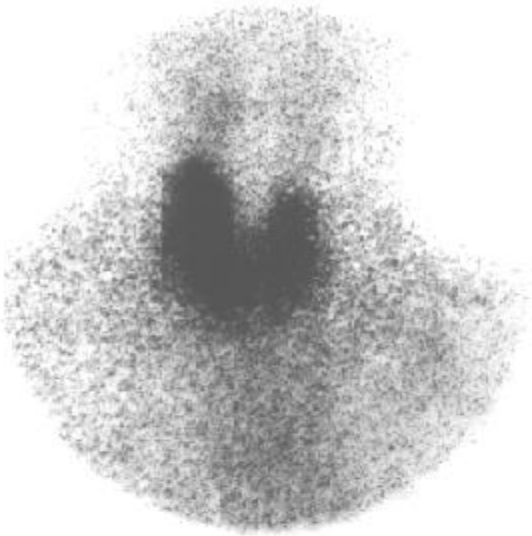
Nodular Thyroid



Rt. Ant. Lt.



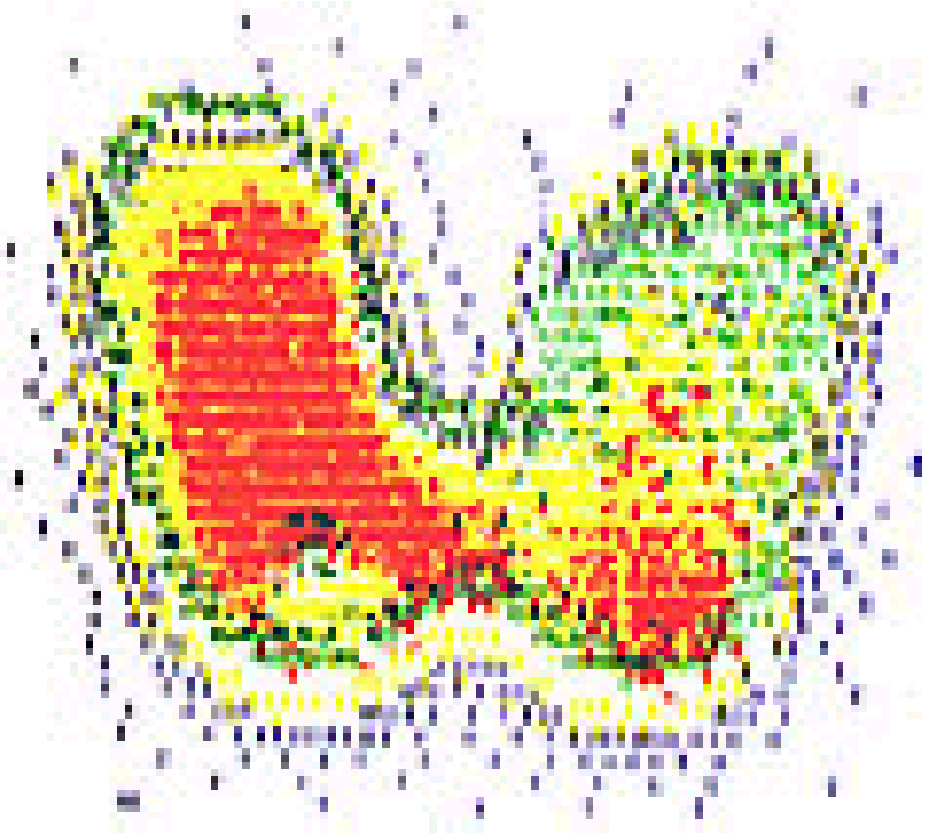
Rt. Ant. Lt.

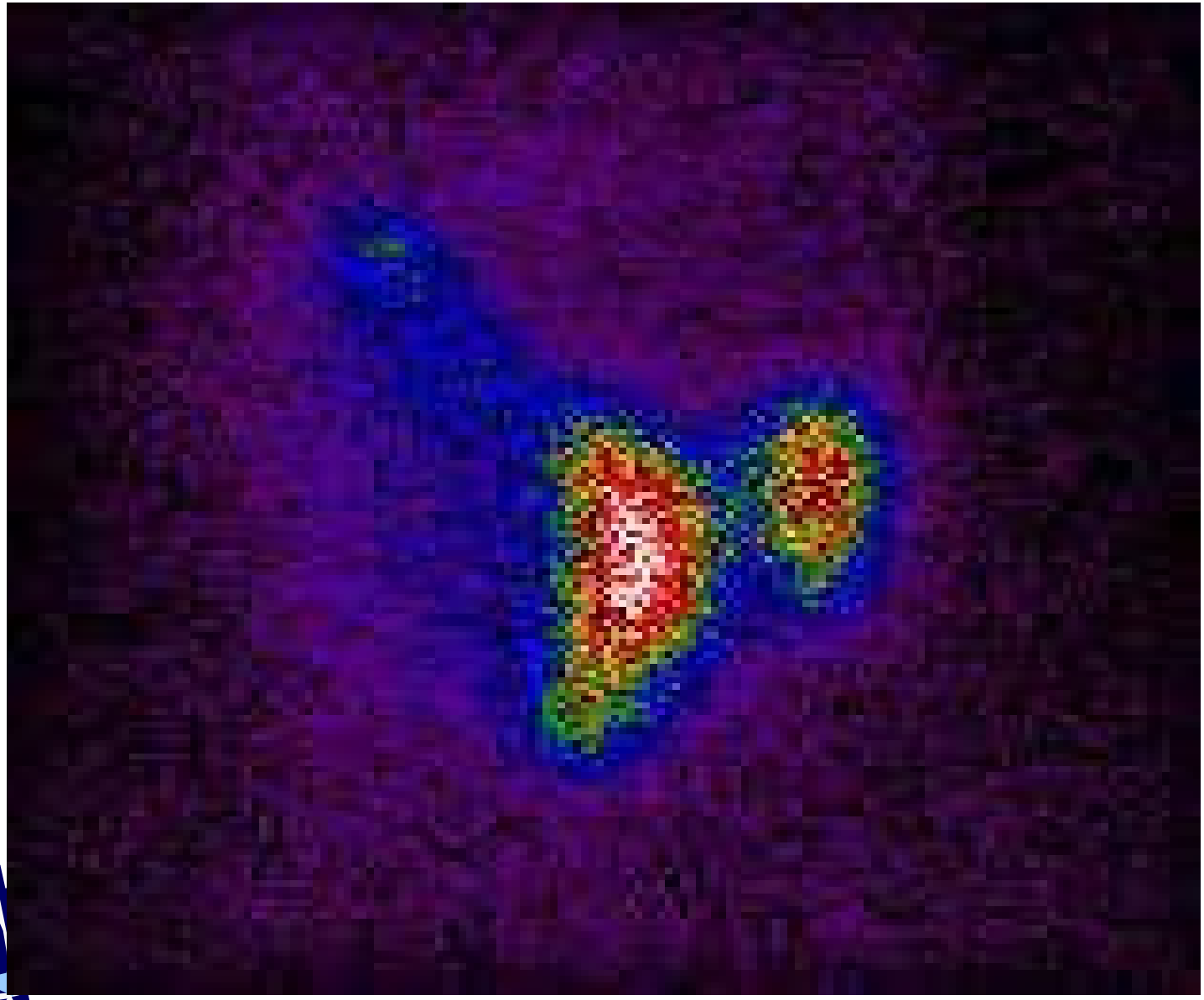


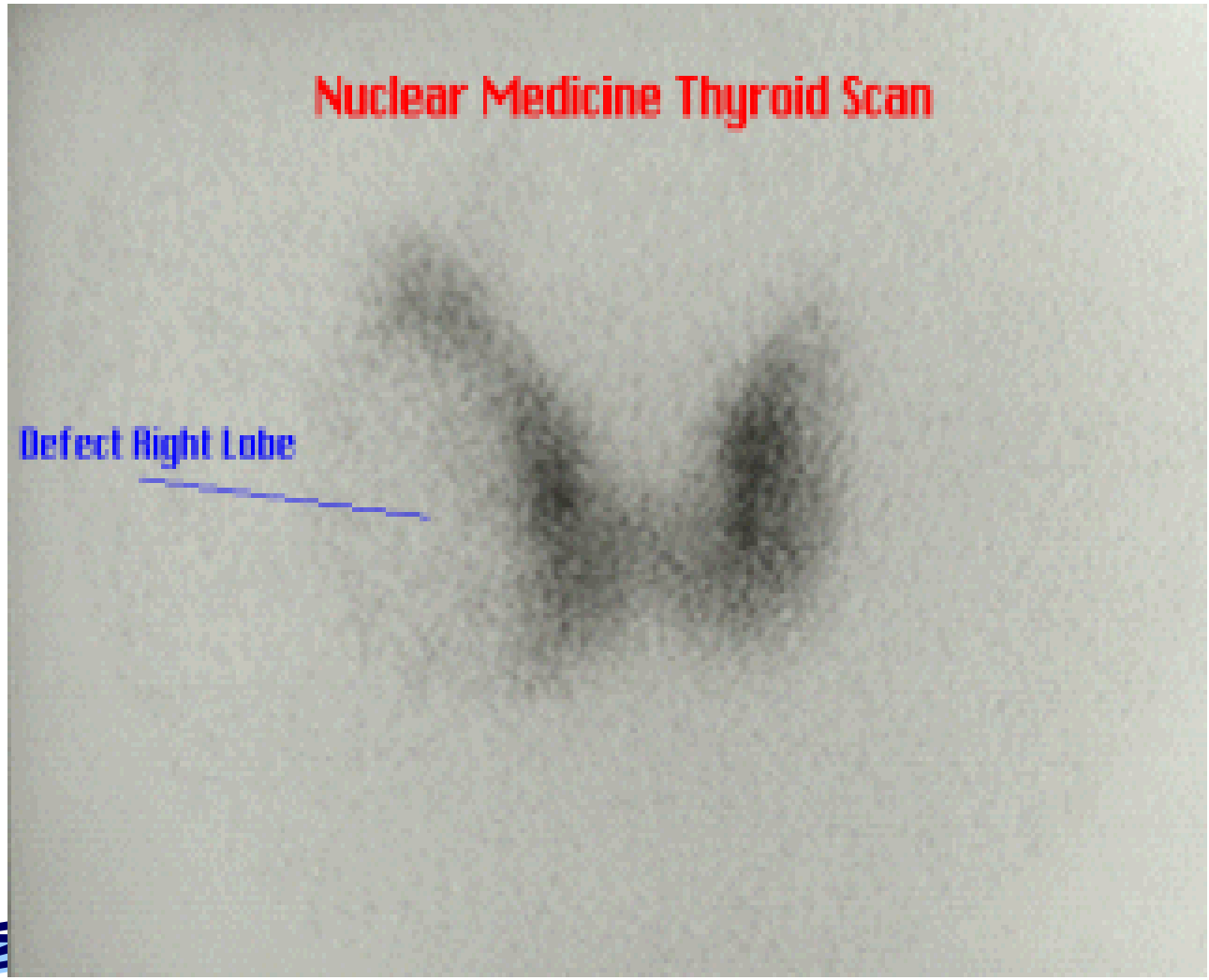
Rt. Ant. Lt.

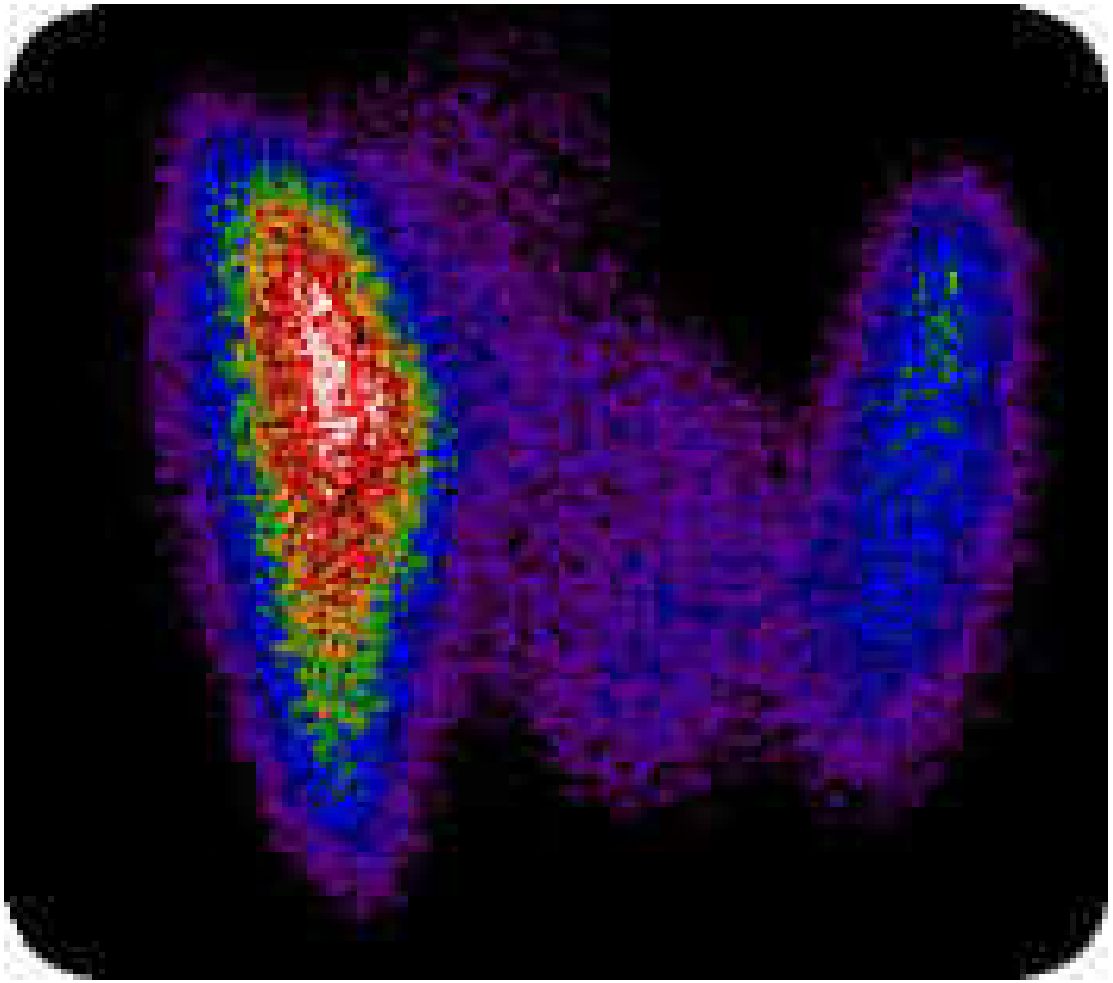


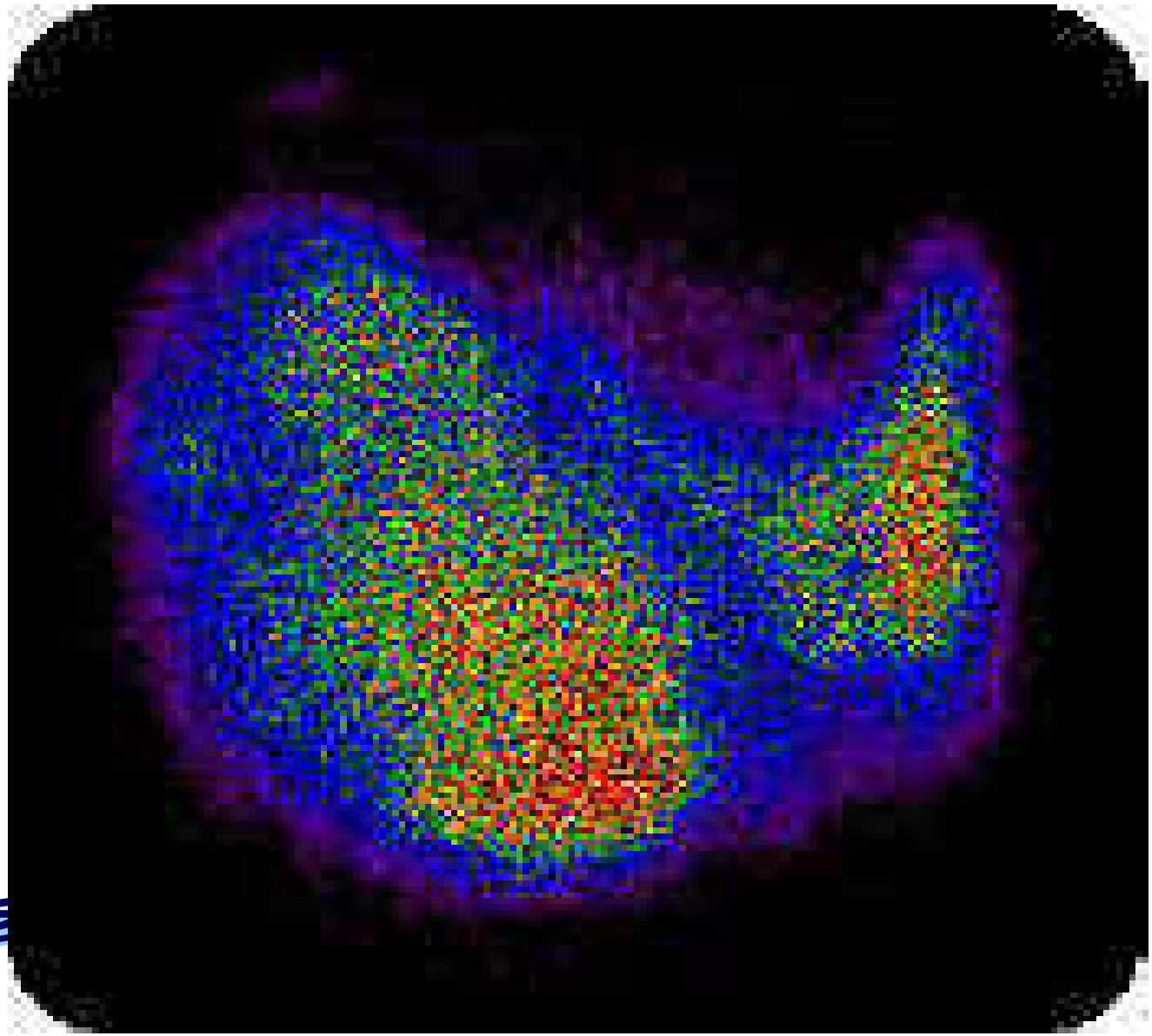
Rt. Ant. Lt.

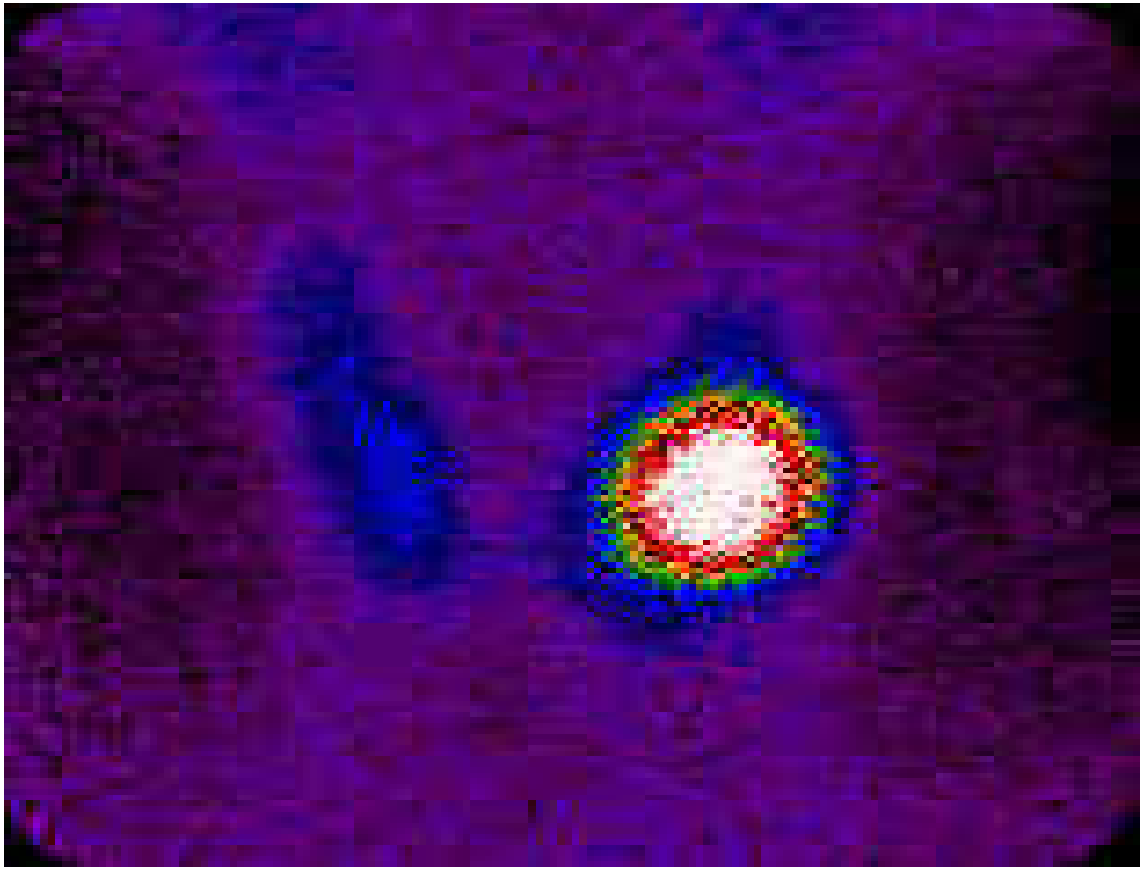


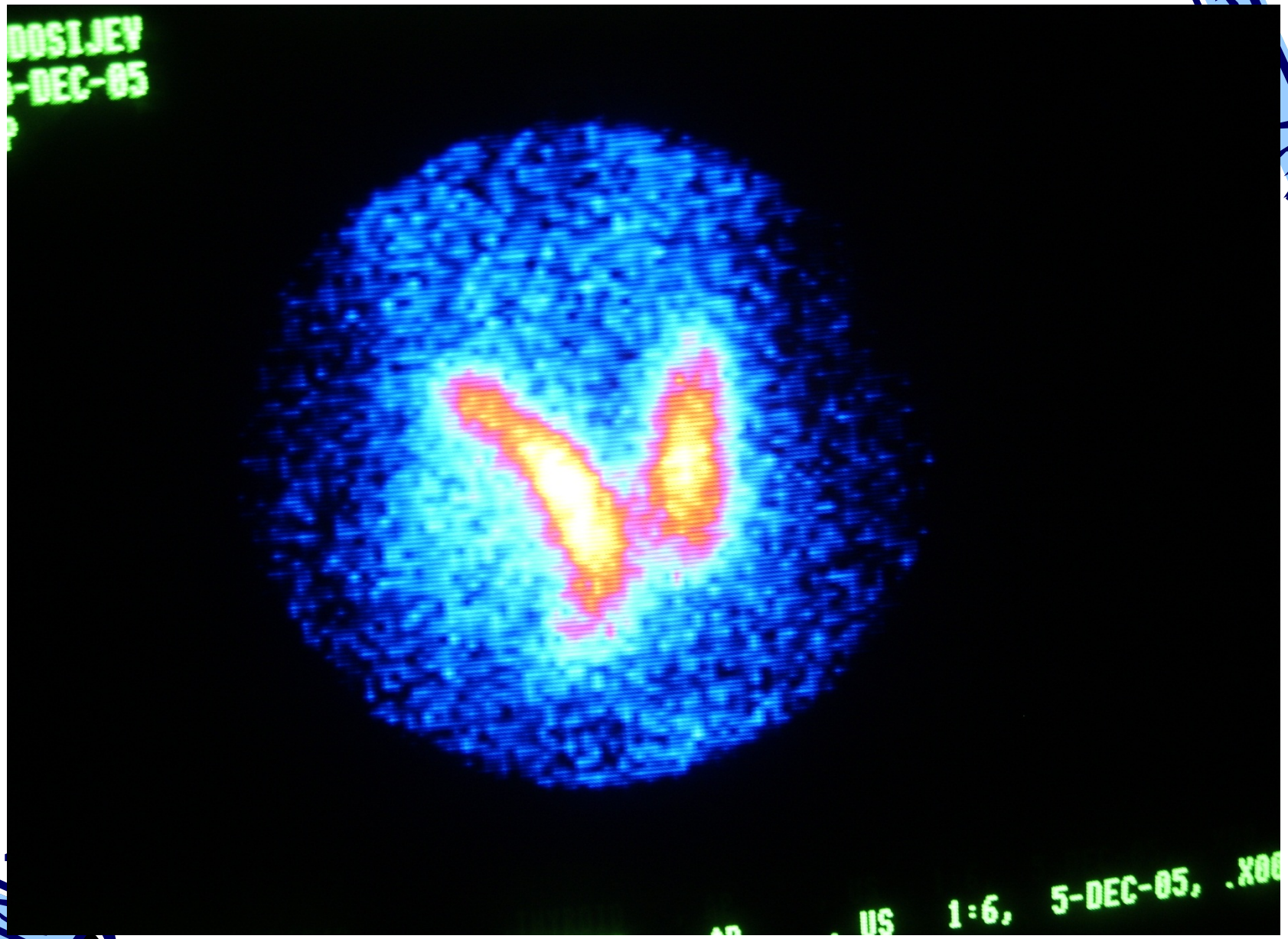


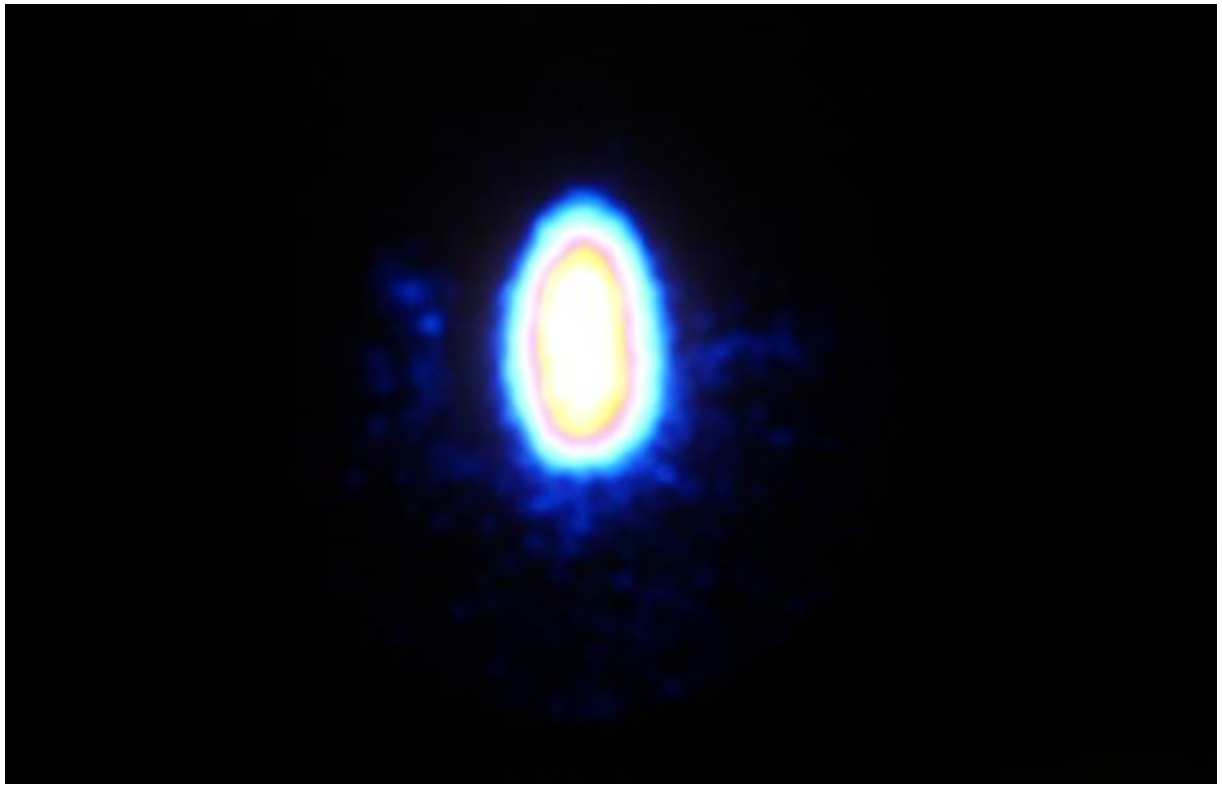

Nuclear Medicine Thyroid Scan
Defect Right Lobe



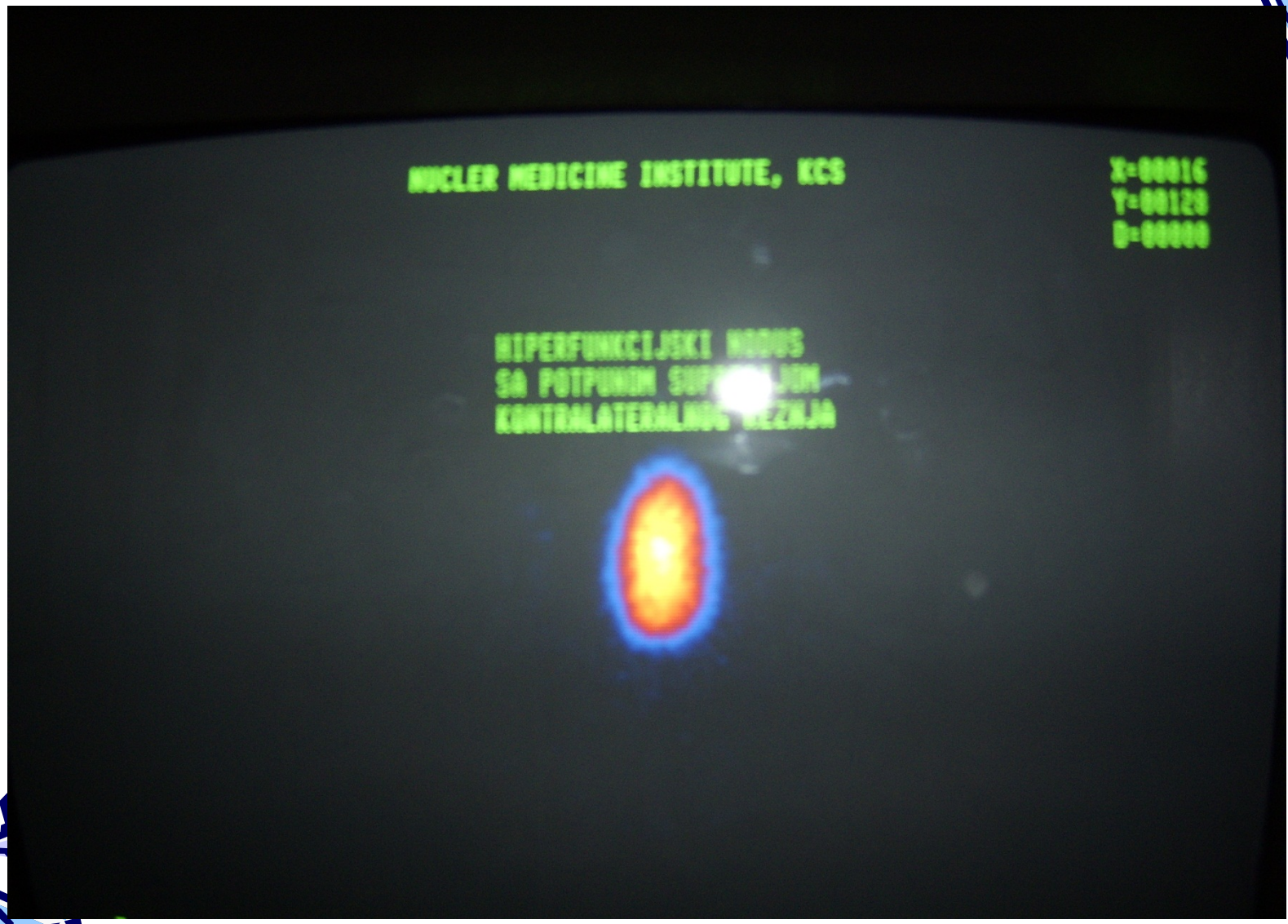





DOSIJEV
-DEC-05
US 1:6, 5-DEC-05,




FUNKCIJSKI
MODUS


NUCLER MEDICINE INSTITUTE, KCS
X=00016
Y=00128
D=00000
HIPERFUNKCIJSKI NODUS
SA POTPUNIM SUP
KONTRALATERALNOG


FUNKCIJSKI
MODUS

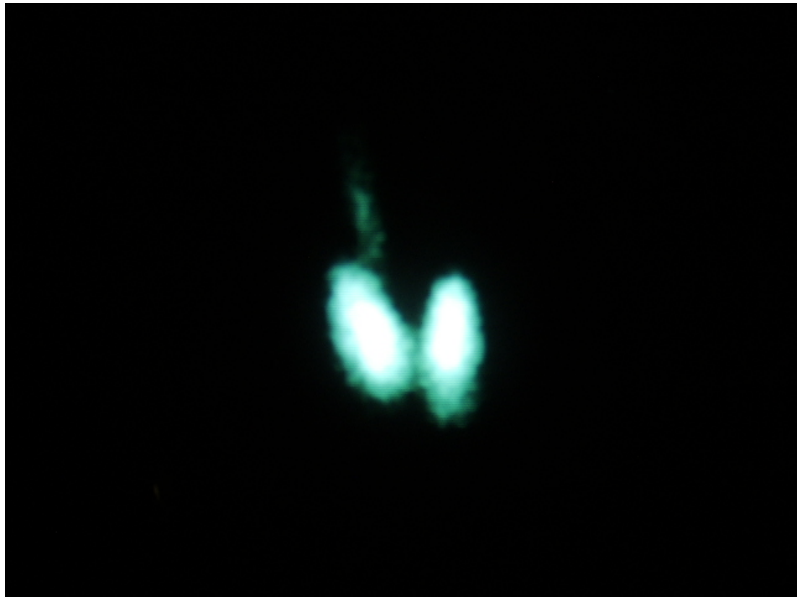

OCT-05
AFUNKCIJSKI



stepen fiksacije radiofarmaka

nodus

- afunkcijski
- hipofunkcijski
- funkcijski
- hiperfunkcijski



ispitivanje fikasacije radioaktivnog J u štitastoj žlezdi

% radioaktivnog joda vezan u stitastoj zlezdi u odnosu na ukupnu aktivnost unetu u organizam





protokol testa fiksacije

- NaJ ^{131} per os 1.85-3.7 MBq (0.05-0.1mCi)
- prvo snimanje "sondom" posle 3h
- drugo snimanje "sondom" posle 24h
- normalne vrednosti

3h 8-20%

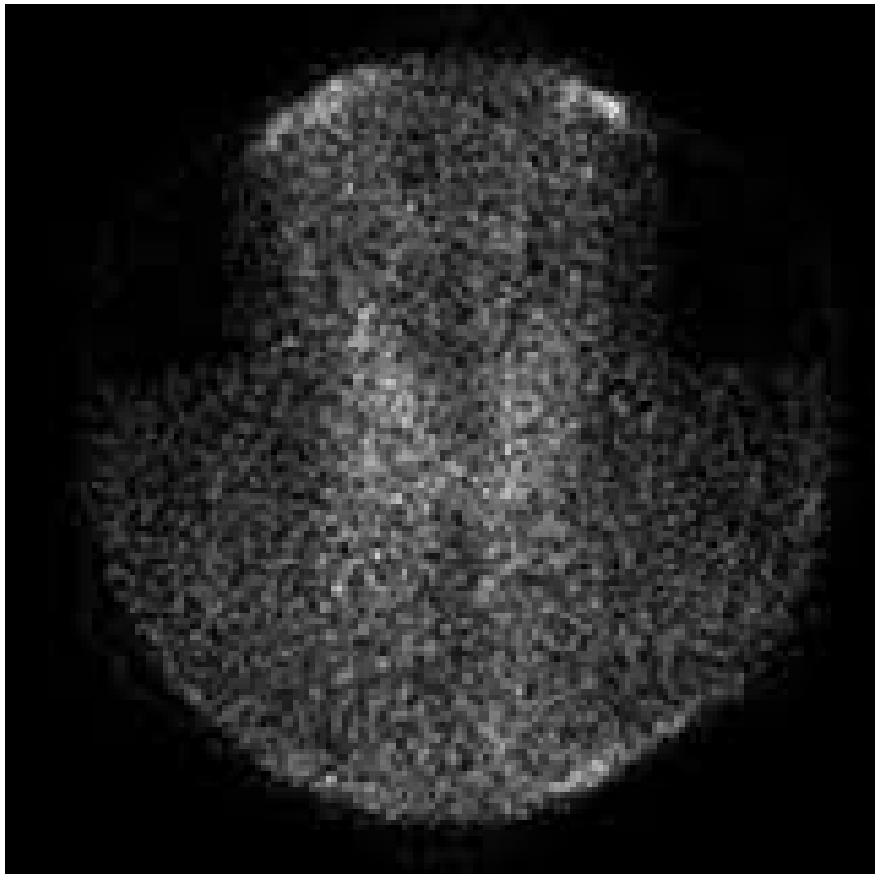
24h 20-45%



indikacije

- procena terapijske doze J ^{131}
- subakutni tireoiditis
- tireoiditis druge etiologije





Paraštitaste žlezde

- uzrok povećane koncentracije pth u krvi
- diferenciranje cervikalnih tumora
- dg ektopičnih adenoma



Protokol metode

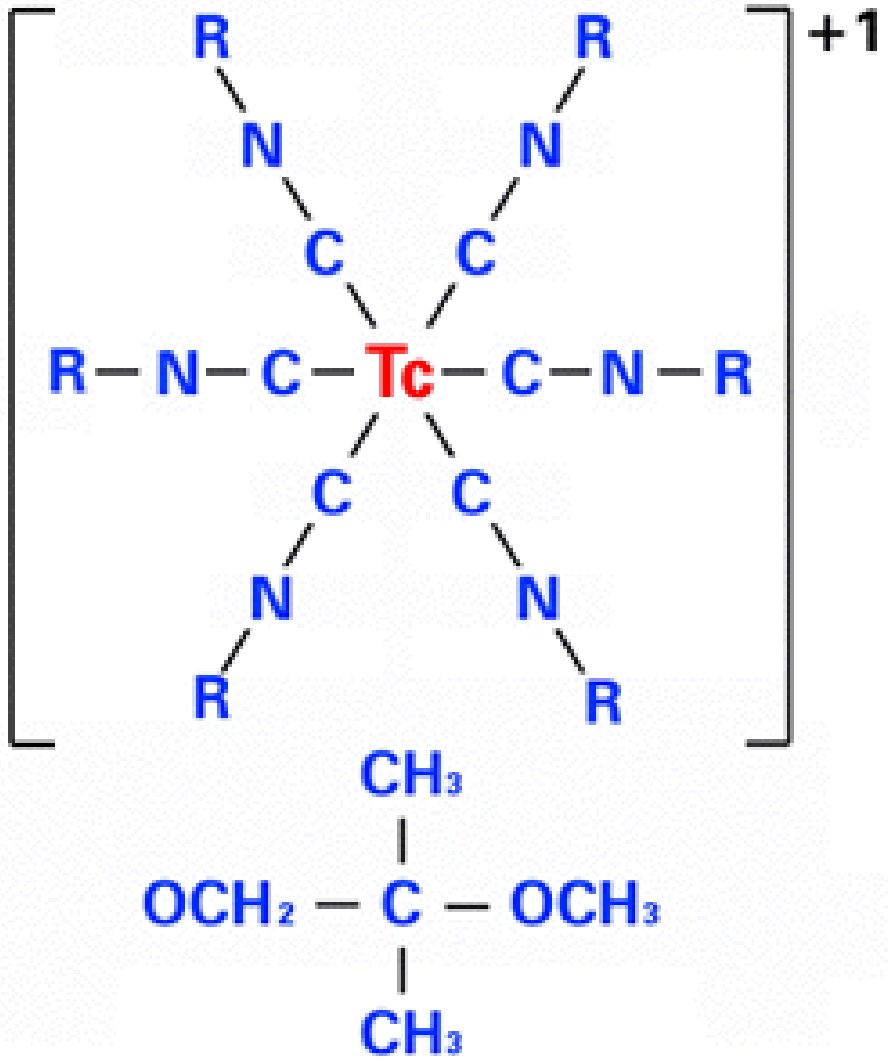
- ^{201} TlCl i.v u dozi od 74 MBq
- AP projekcija regiona glave i vrata
- Suptrakcija scintigrama štitastze žlezde koja se takođe odslikava

- ^{99m} Tc MIBI i.v. u dozi od 740 MBq
- AP projekcija glave i vrata
- Dinamska studija od 20 min koju prati statička scintigrafija posle 2 h od ubrizgavanja radiofarmaka

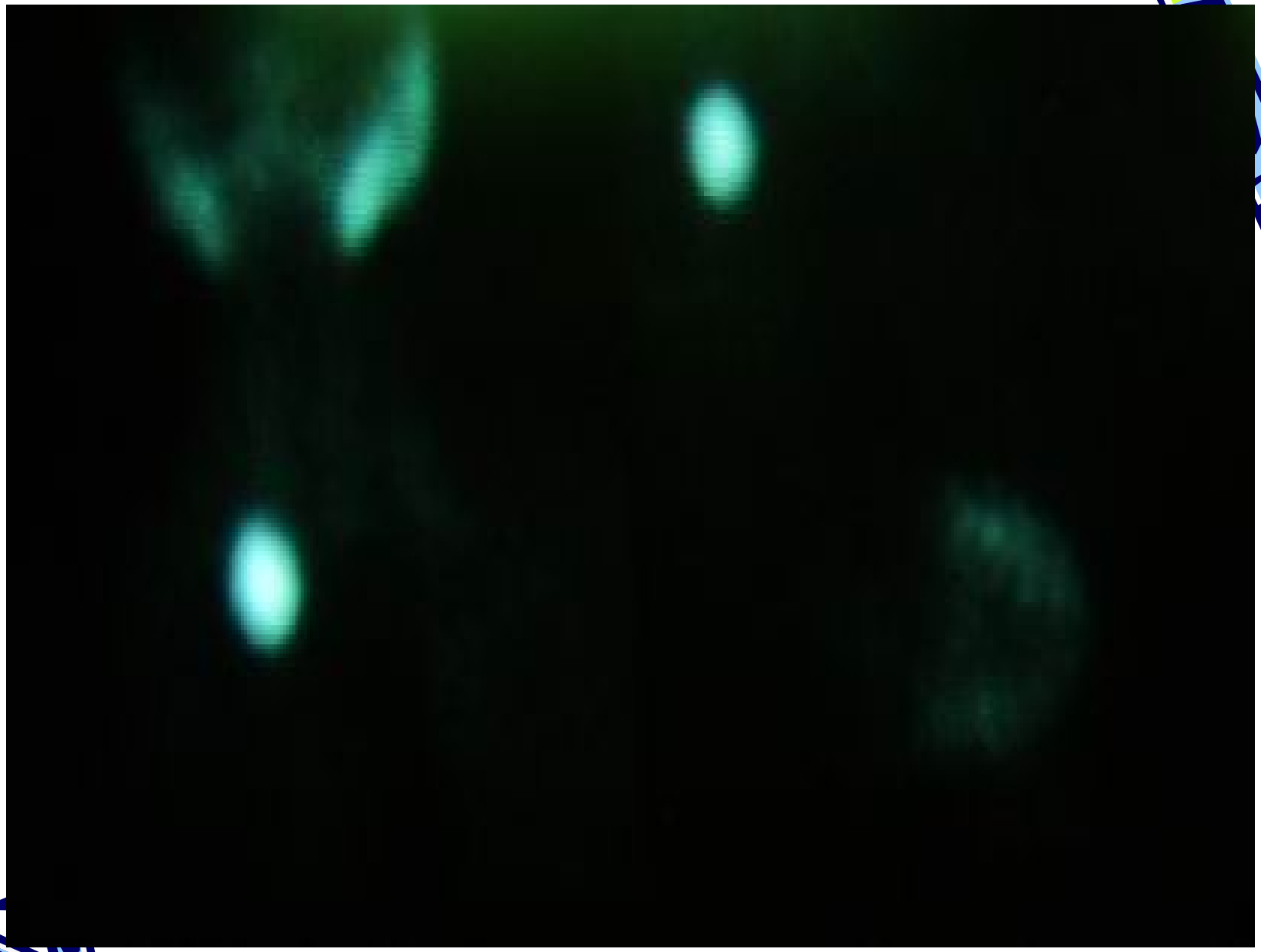


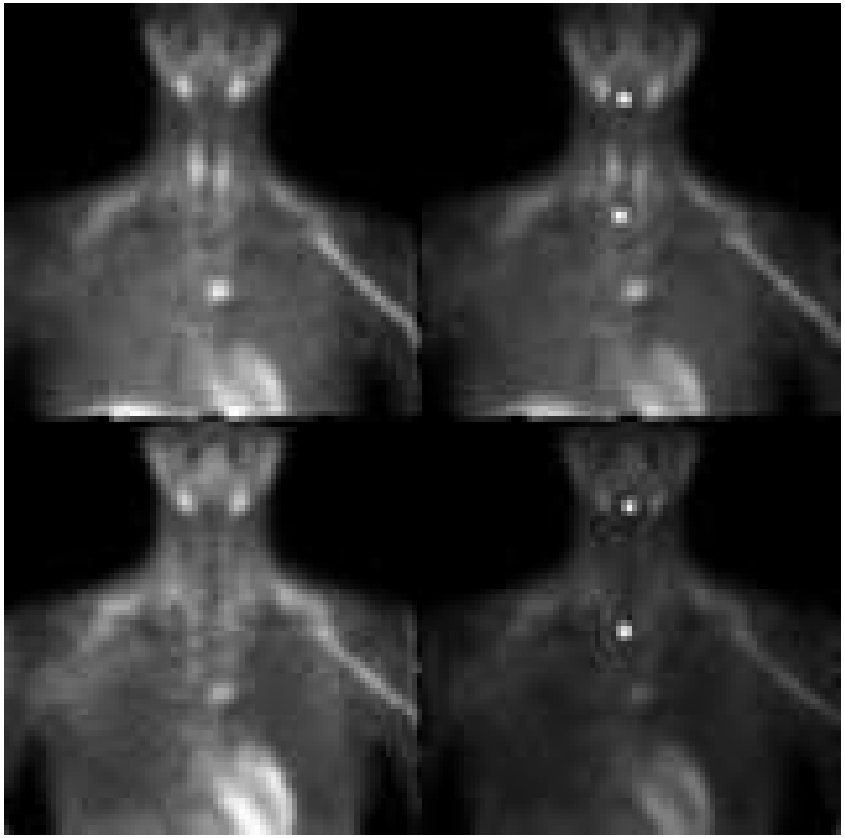
nalaz scintigrafije

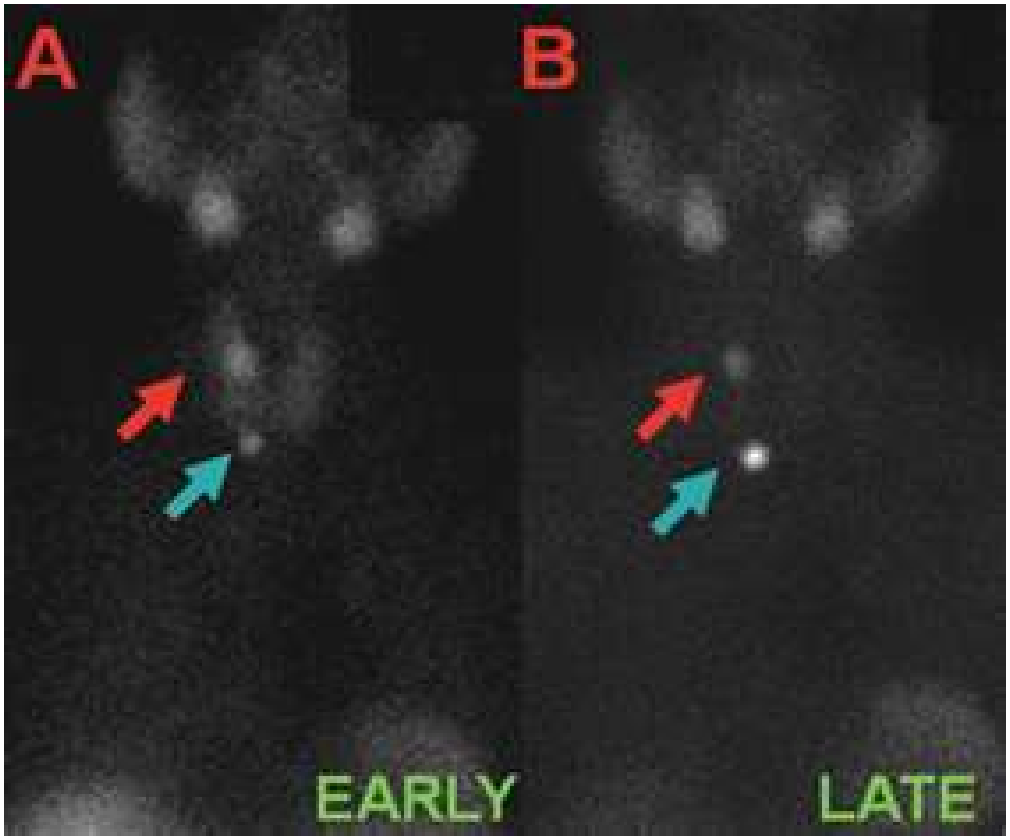
- u zdravih osoba se paratireoidne žlezde ne prikazuju
- Prikaz jedne uvećane žlezde je adenom
- Prikaz više prth žlezda je hiperplazija
- Prikaz u medijastinumu je ektopija

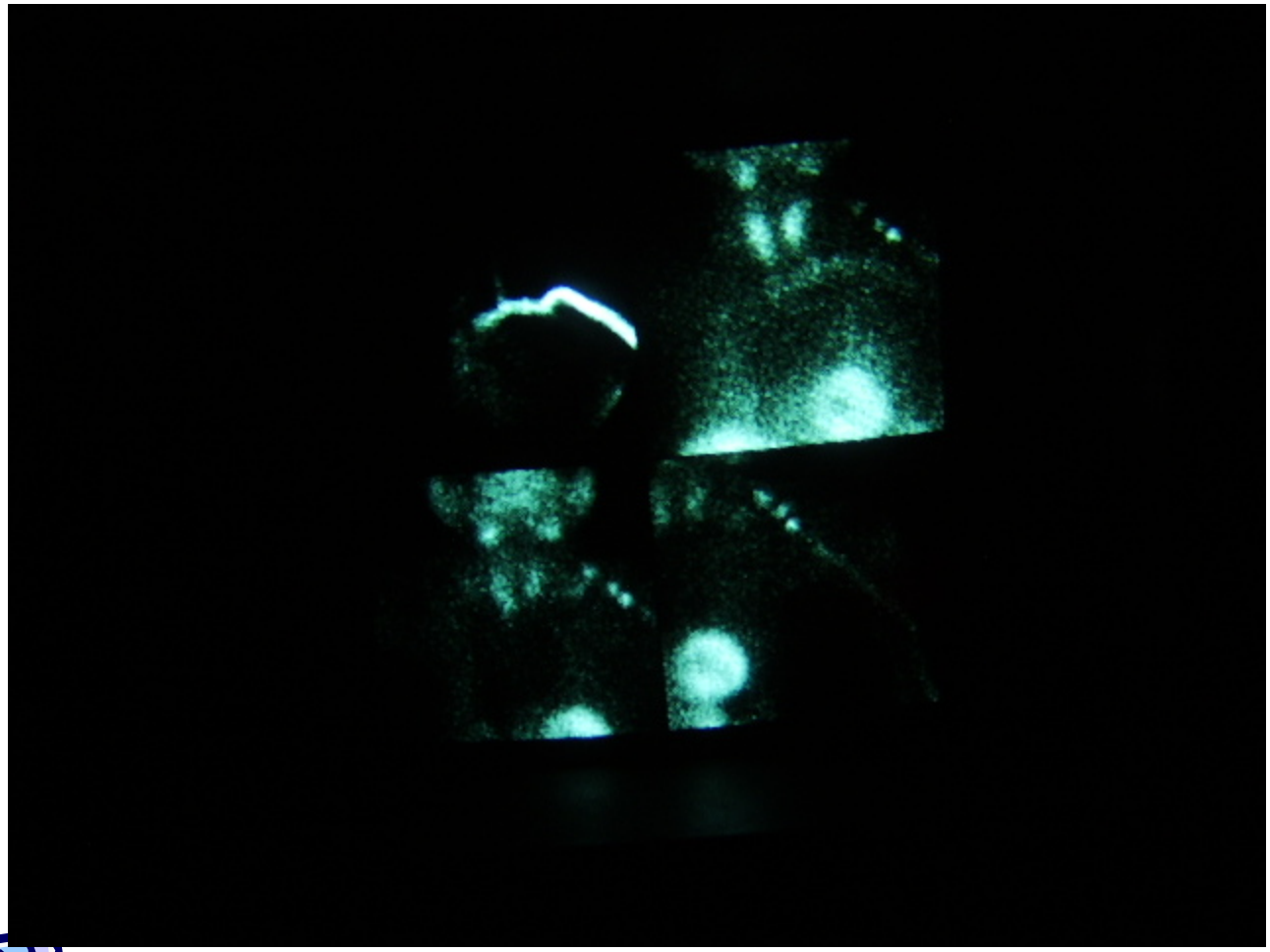


Technetium - MIBI

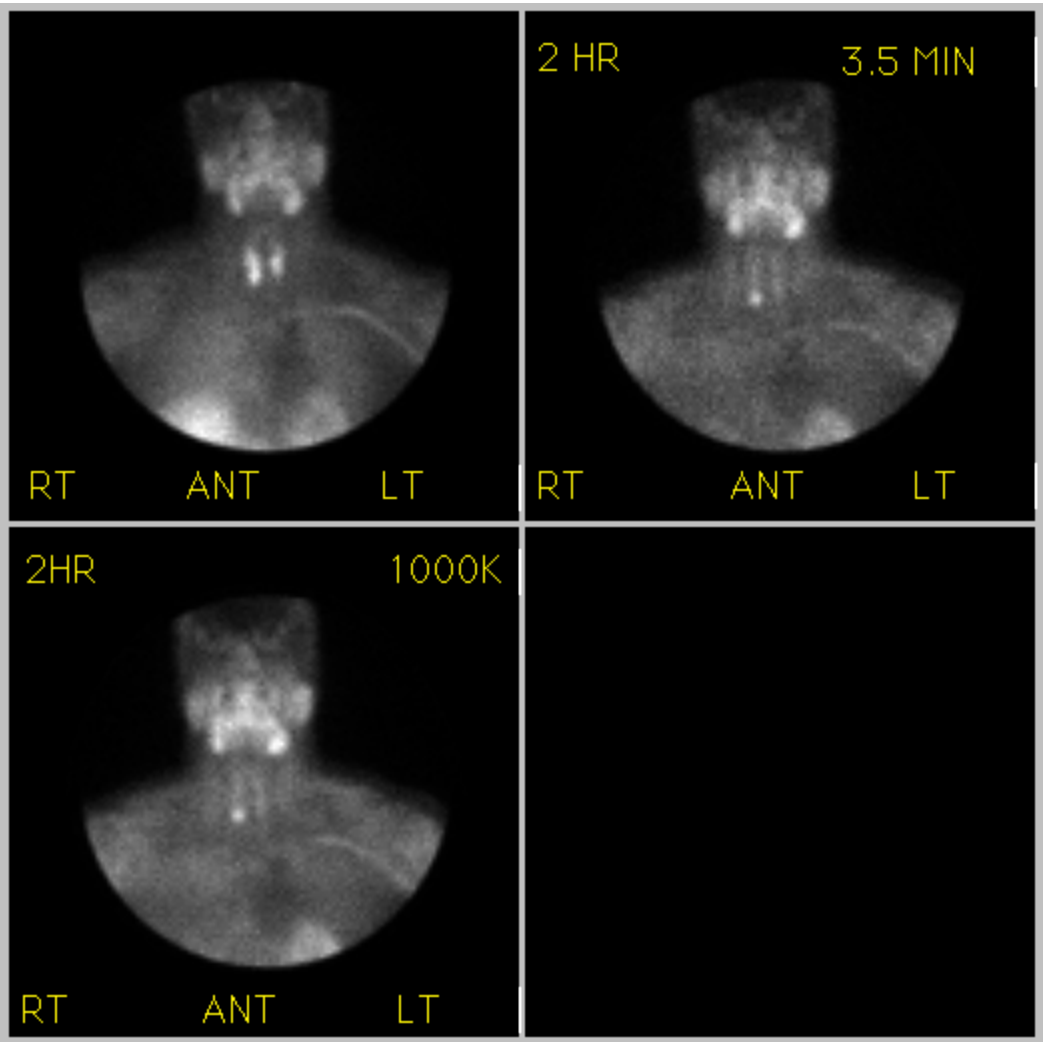




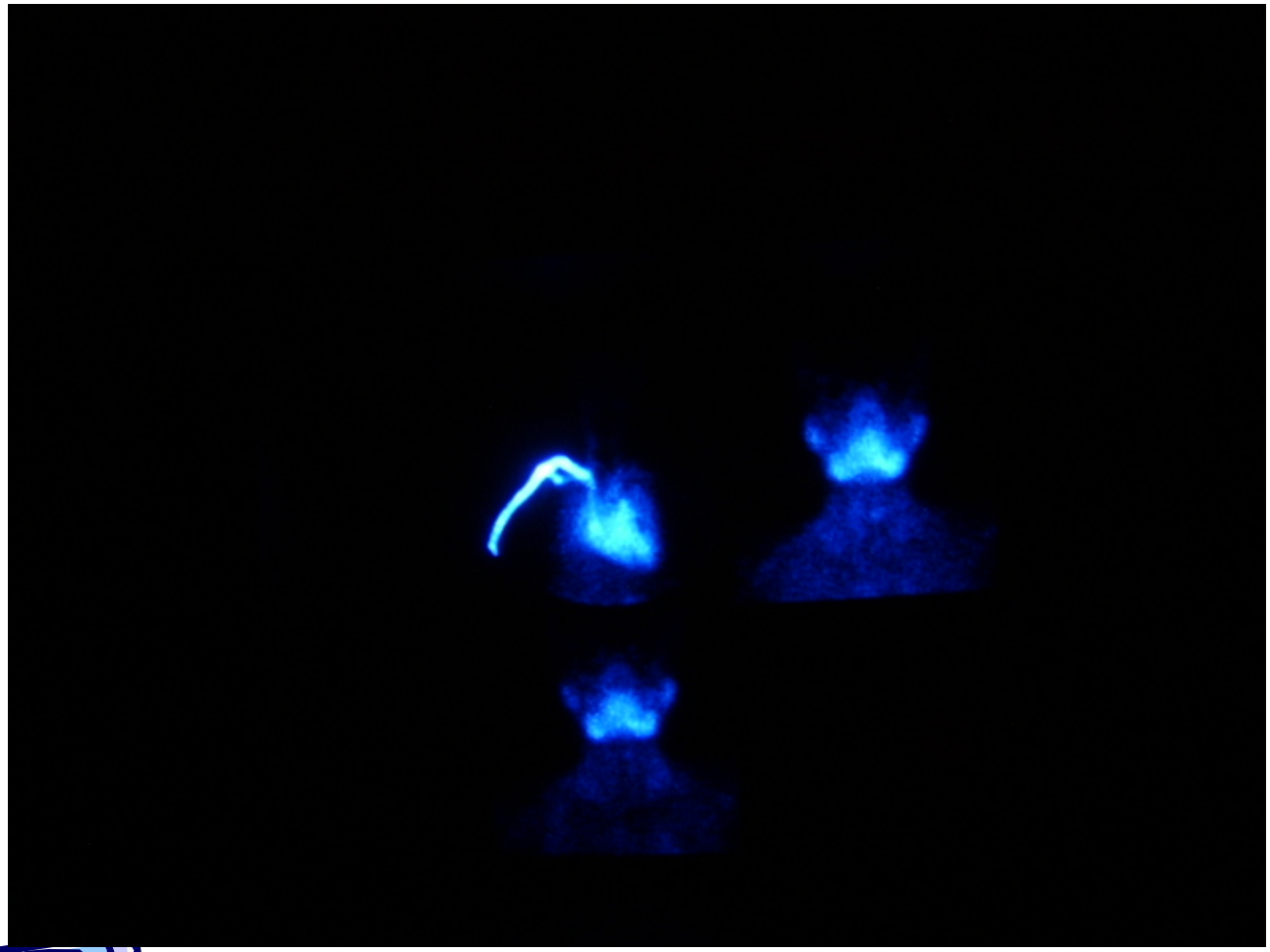

A
B
EARLY
LATE

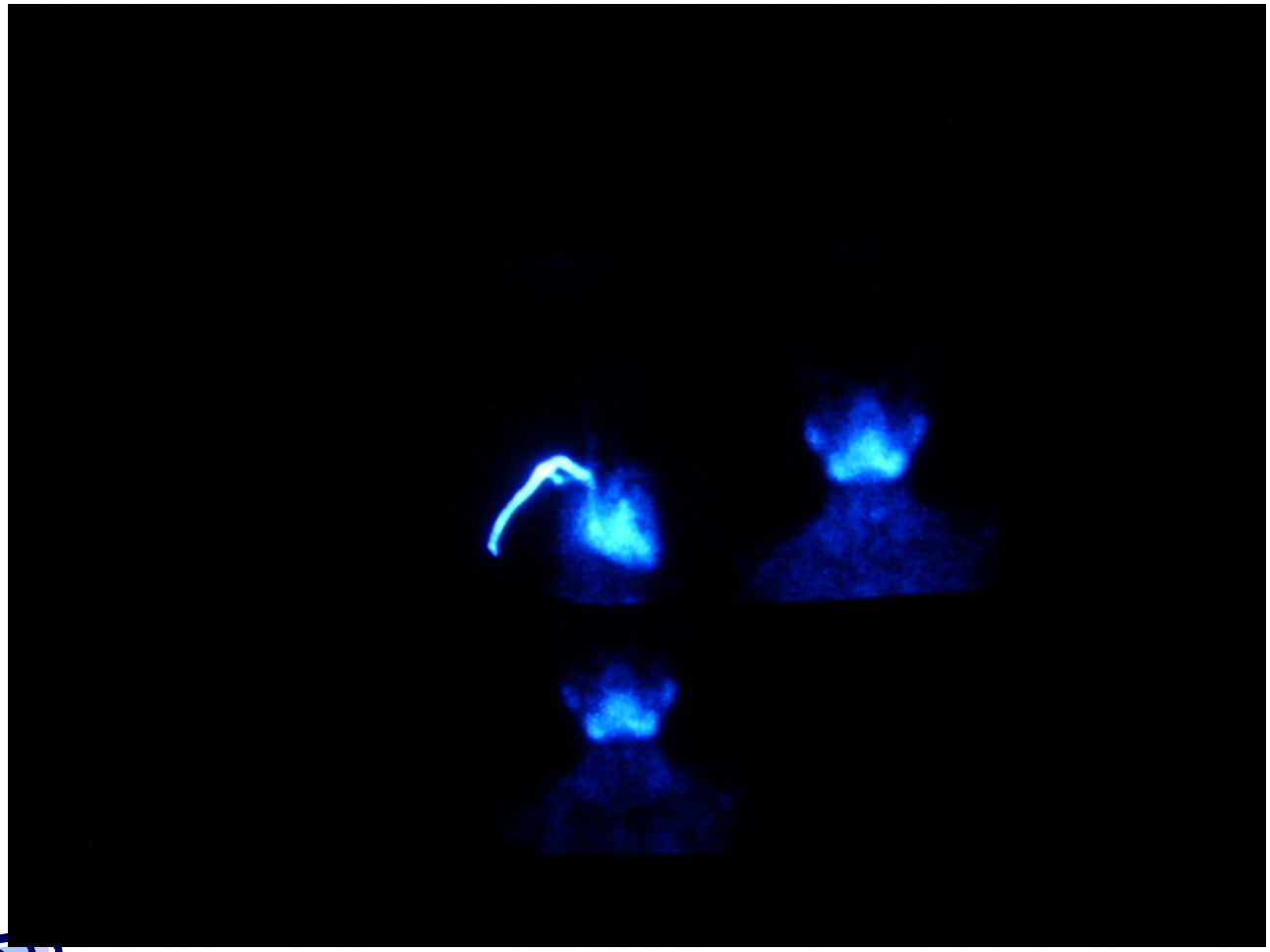


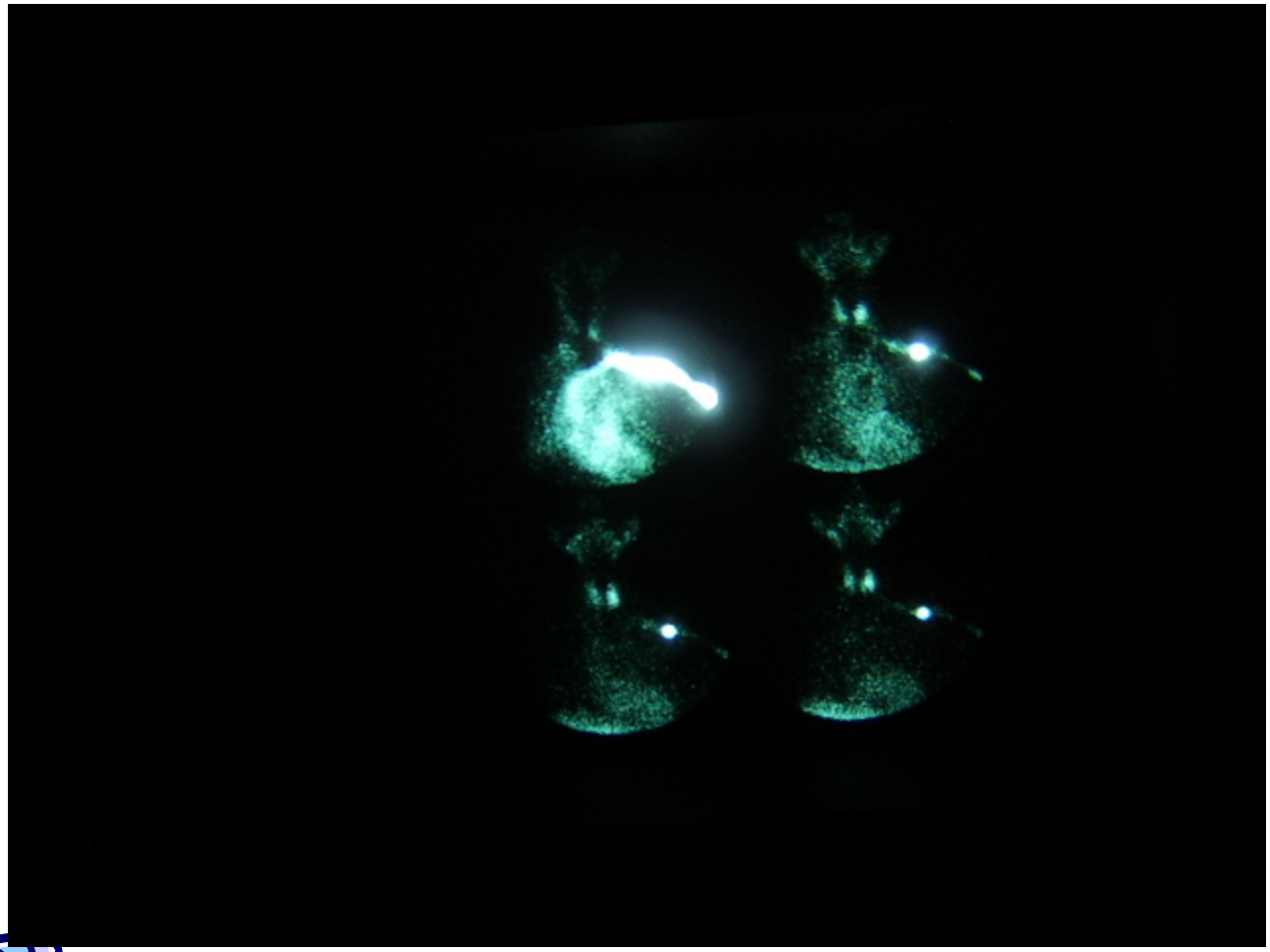


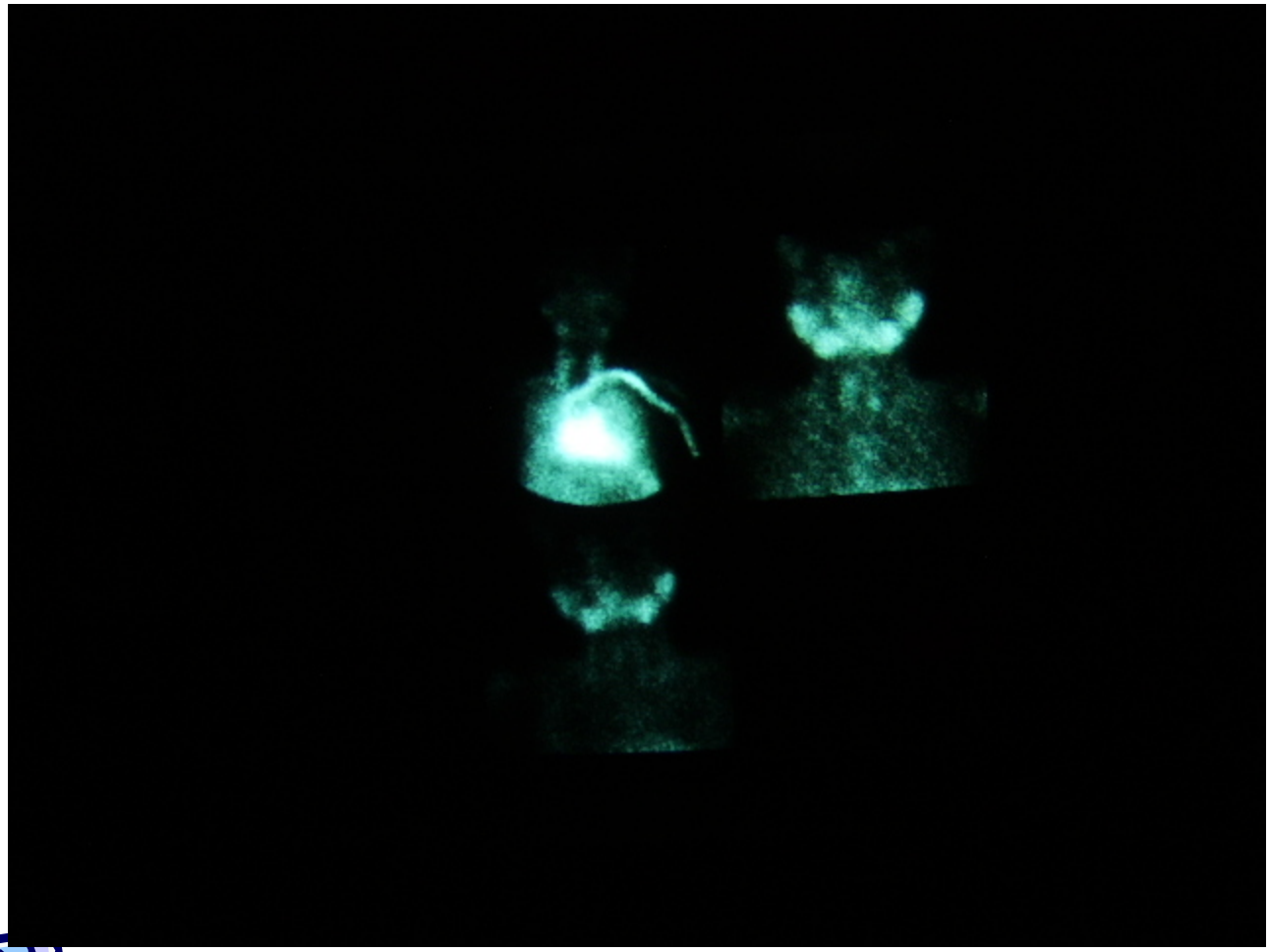

RT ANT LT
2 HR 3.5 MIN
RT ANT LT
2HR 1000K
RT ANT LT

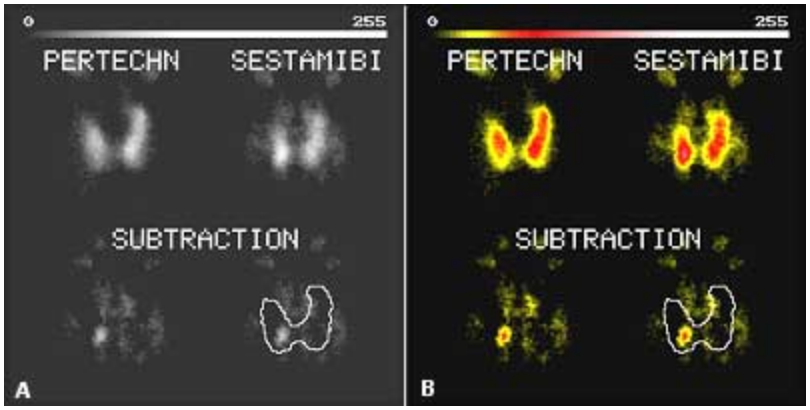

PARATHYROID

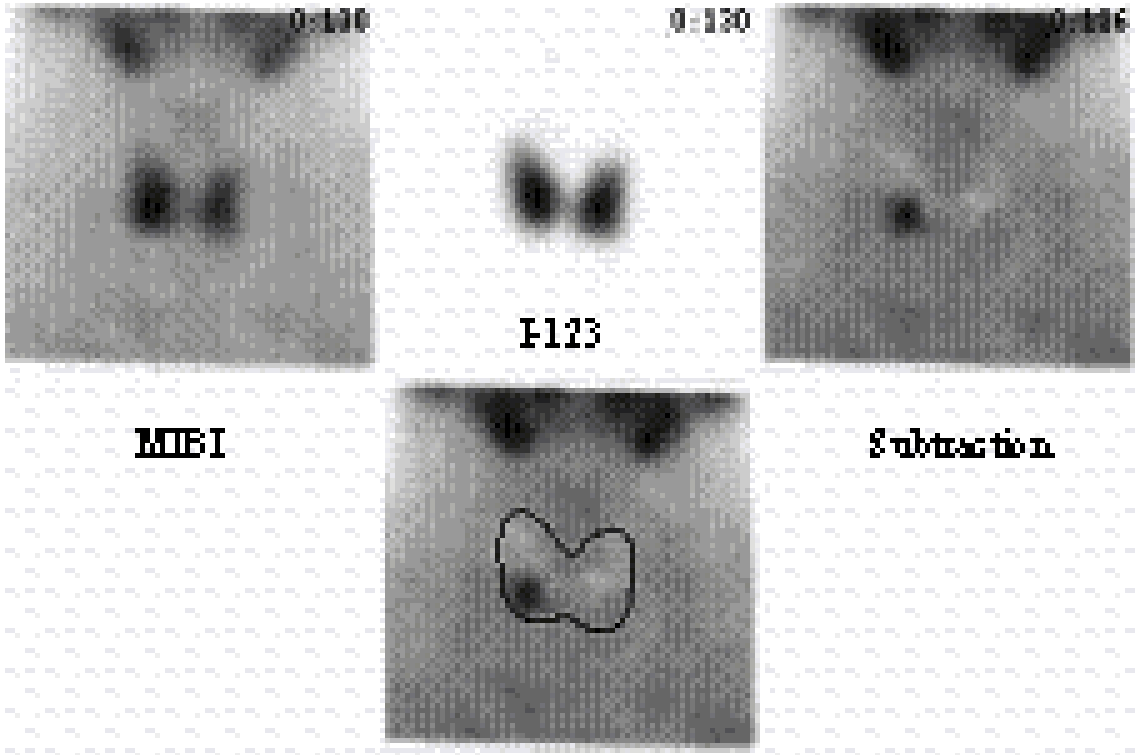




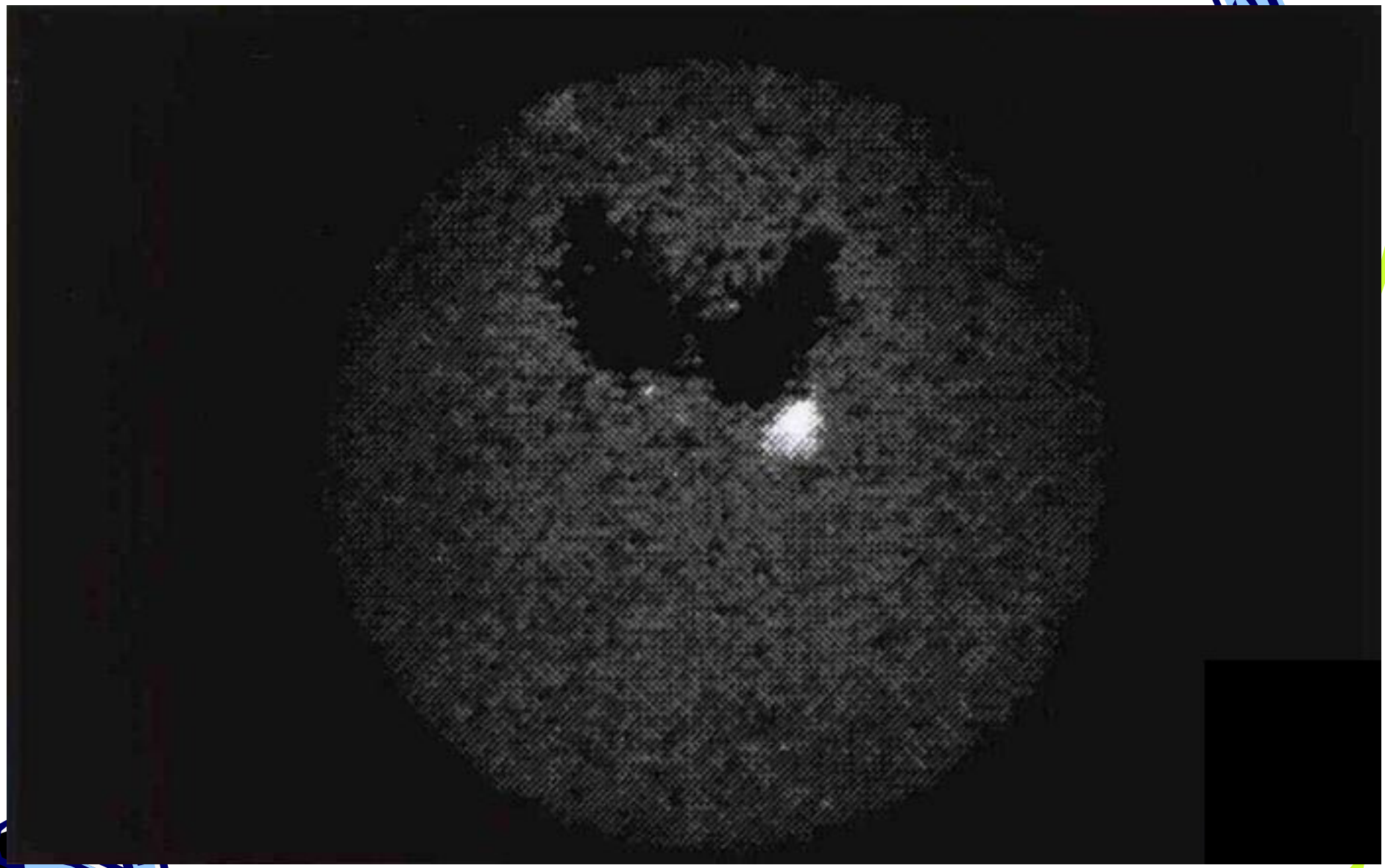


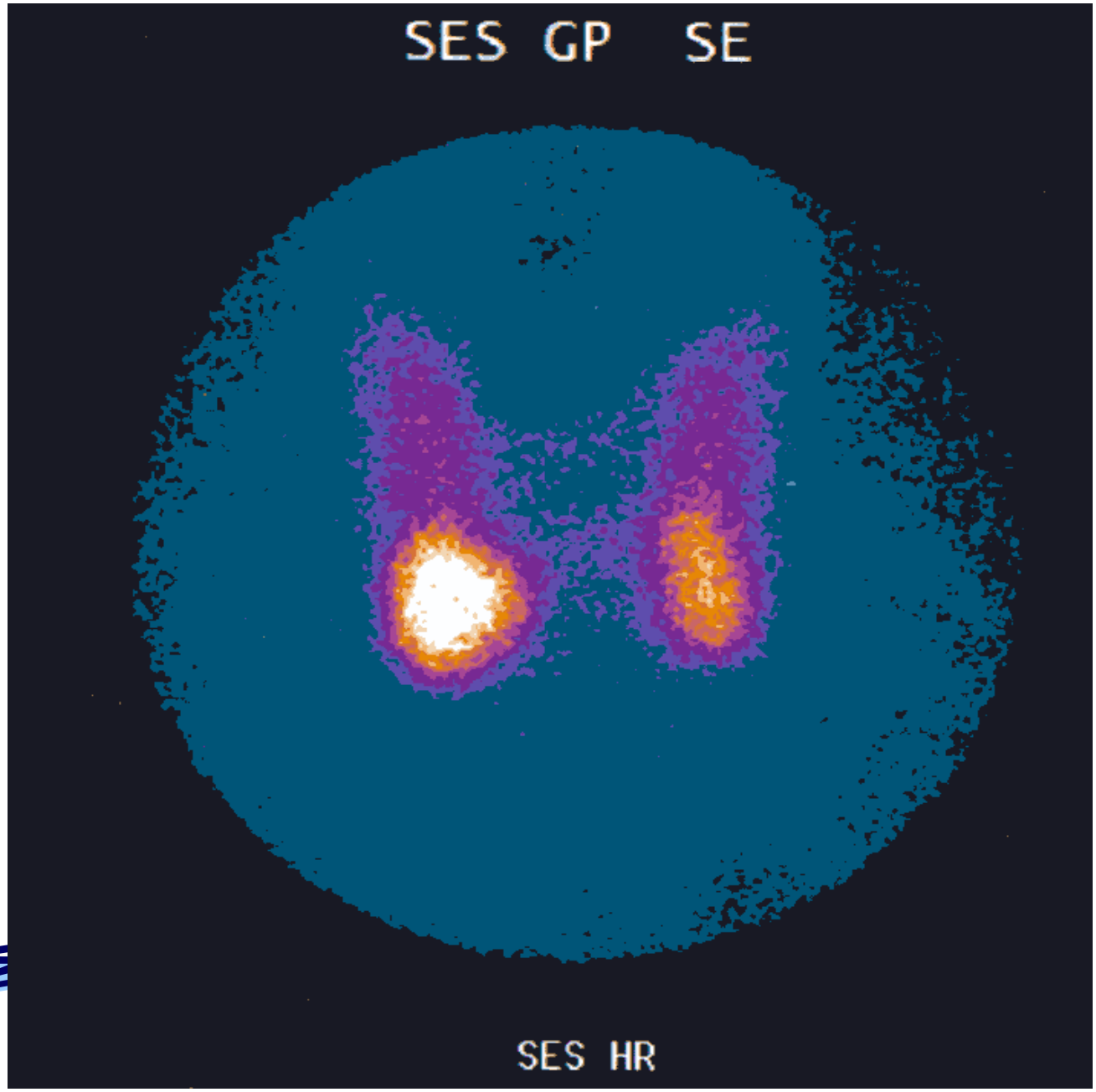






Subtraction overlaid with thyroid region




SES GP SE
SES HR

nadbubreg

- Kora
- Drugim vizualizacionim tehnikama nisu viđene patološke promene
- Rf je derivat holesterola- prekursora hormona nadbubrega

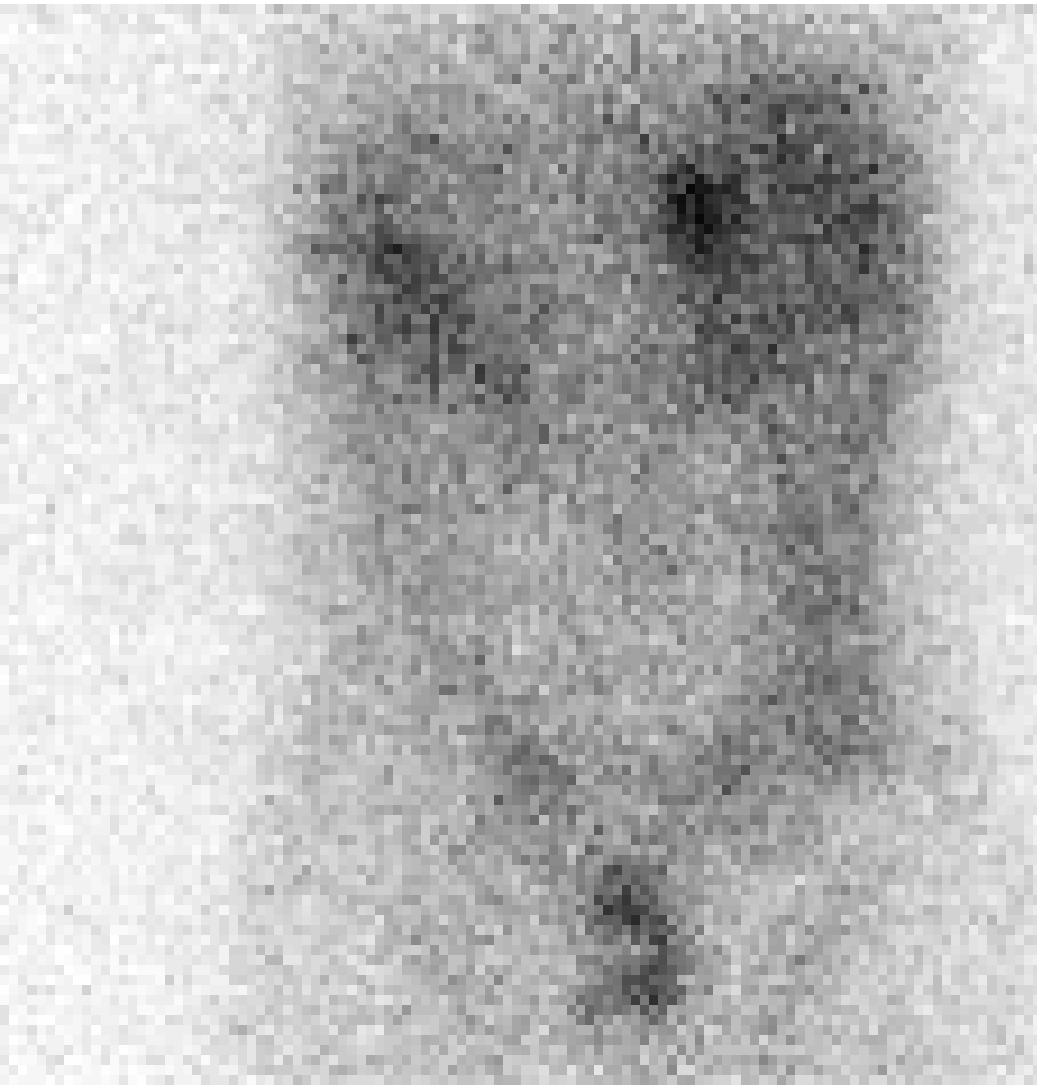
- Srž
- U osoba u kojih druge dg metode ukazuju na postojanje feohromocitoma
- Rf je analog kateholamina koji se deponuju u citoplazmatskim granulama ćelija srži



Protokol metode (kora)

- ^{75} Se metil holesterol iv. u dozi od 7.4 MBq
- statička scintigrafija posle 2 dana
- jasne promene vidljive tek posle 7.dana
- Normalna vrednost fiksacije radiofarmaka ne prelazi 0.3%
- Dodatna scintigrafija bubrega Tc99m DTPA da bi se "lokalizovala" nadbubrežna žlezda





Se ^{75} Scintandren (selenometilnorholesterol)
i.v. apliakcoja 7.4 MBq
Snimanje posle 2 dana

Nalaz

Adenom sa sekrecijom kortizola
Fokusno povećano nakupljanje

Ca sa sekrecijom kortizola
Nejasan sc nalaz

Bileteralna hiperplazija
Hiperfiksacija u obema žlezdama

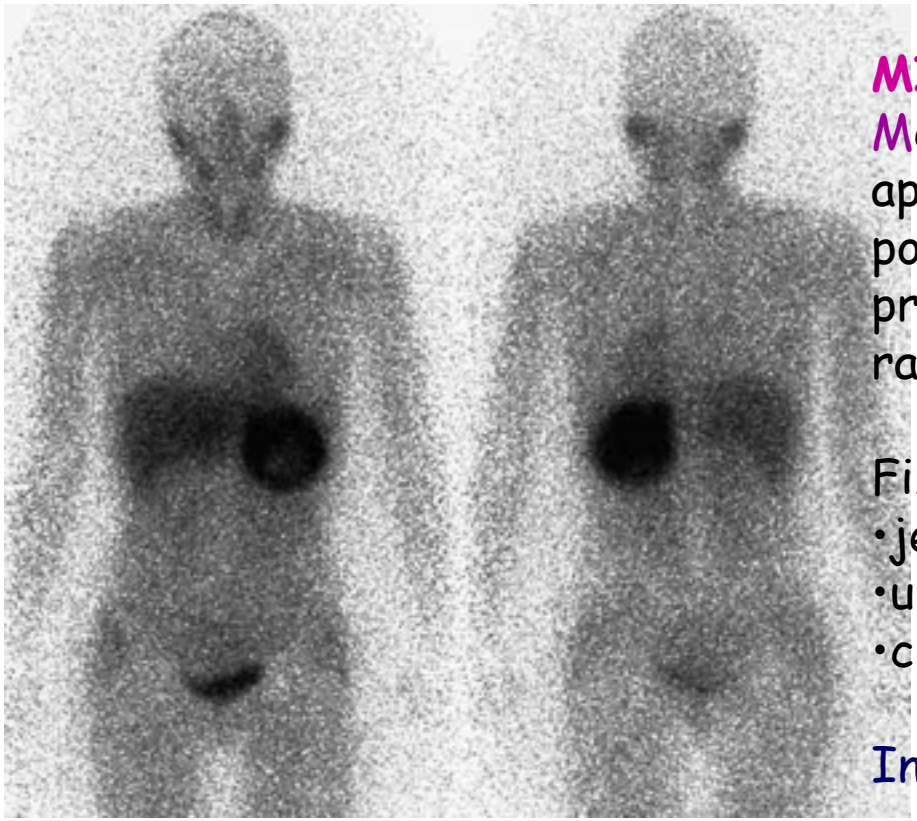
NP 59
J131 6B jodometil nor holesterol

Protokol metode (srž)

- $MI^{131}BG$ (meta jod benzil gvanidin) i.v.

u dozi od 18.5 do 37 MBq

- Statička scintigrafija posle 48 sati
- AP i PA projekcija regiona nadbubrežne žlezde (abdomena) vrata i grudnog koša



MI131BG

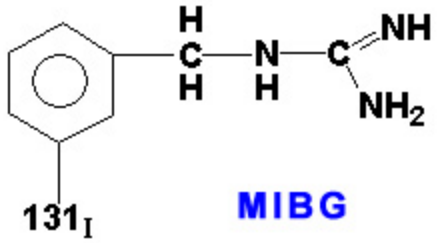
Meta jodo benzil gvanidin i.v. aplikacija 20MBq. Snimanje posle 5do 7 dana uz prethodnu pripremu pacijenta Lugolovim rastvorom

Fiziološka akumulacija

- jetra
- urinarni trakt
- creva

Indikacija

feohromocitom
neuroblastom
paraganglion

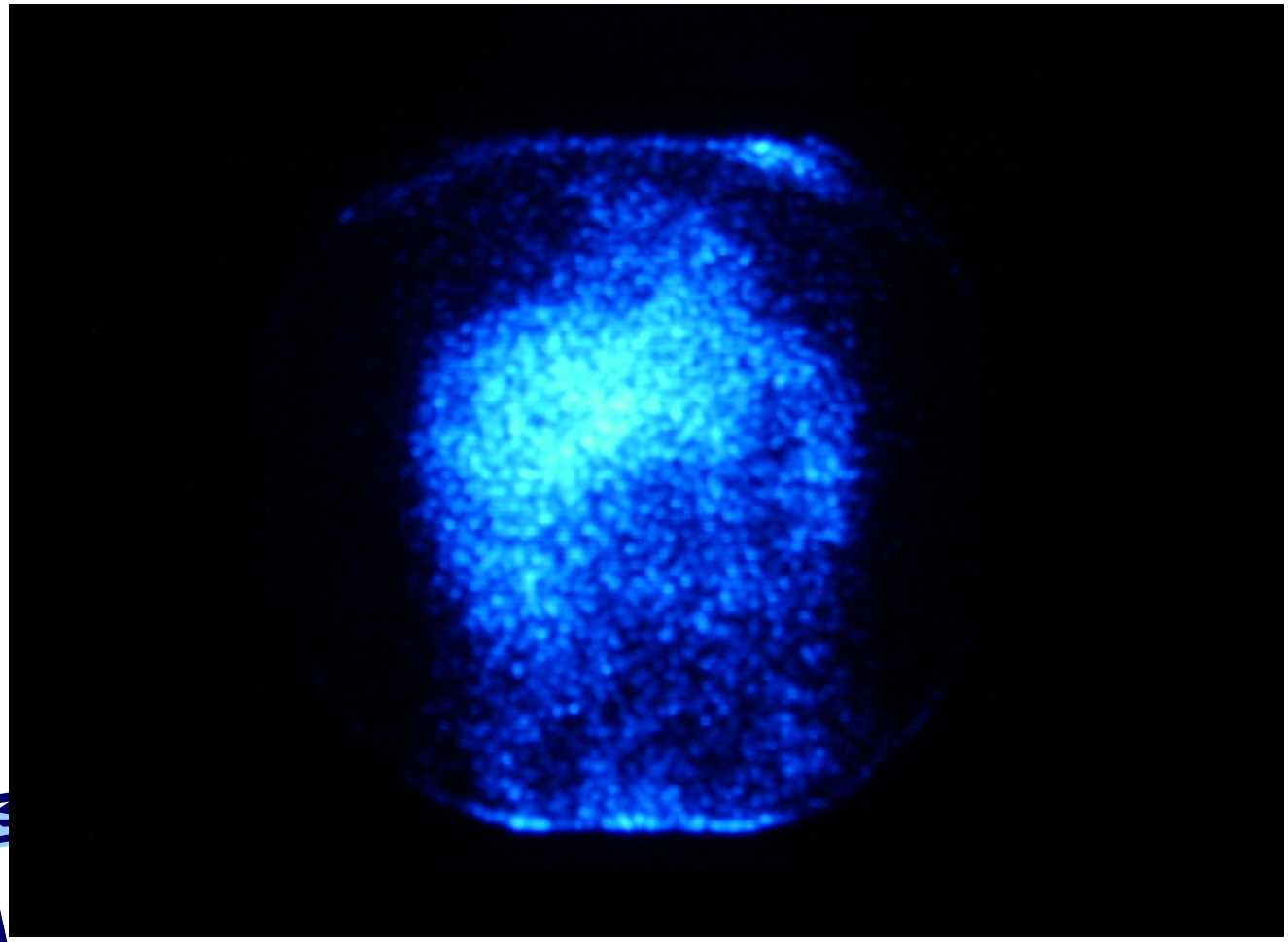


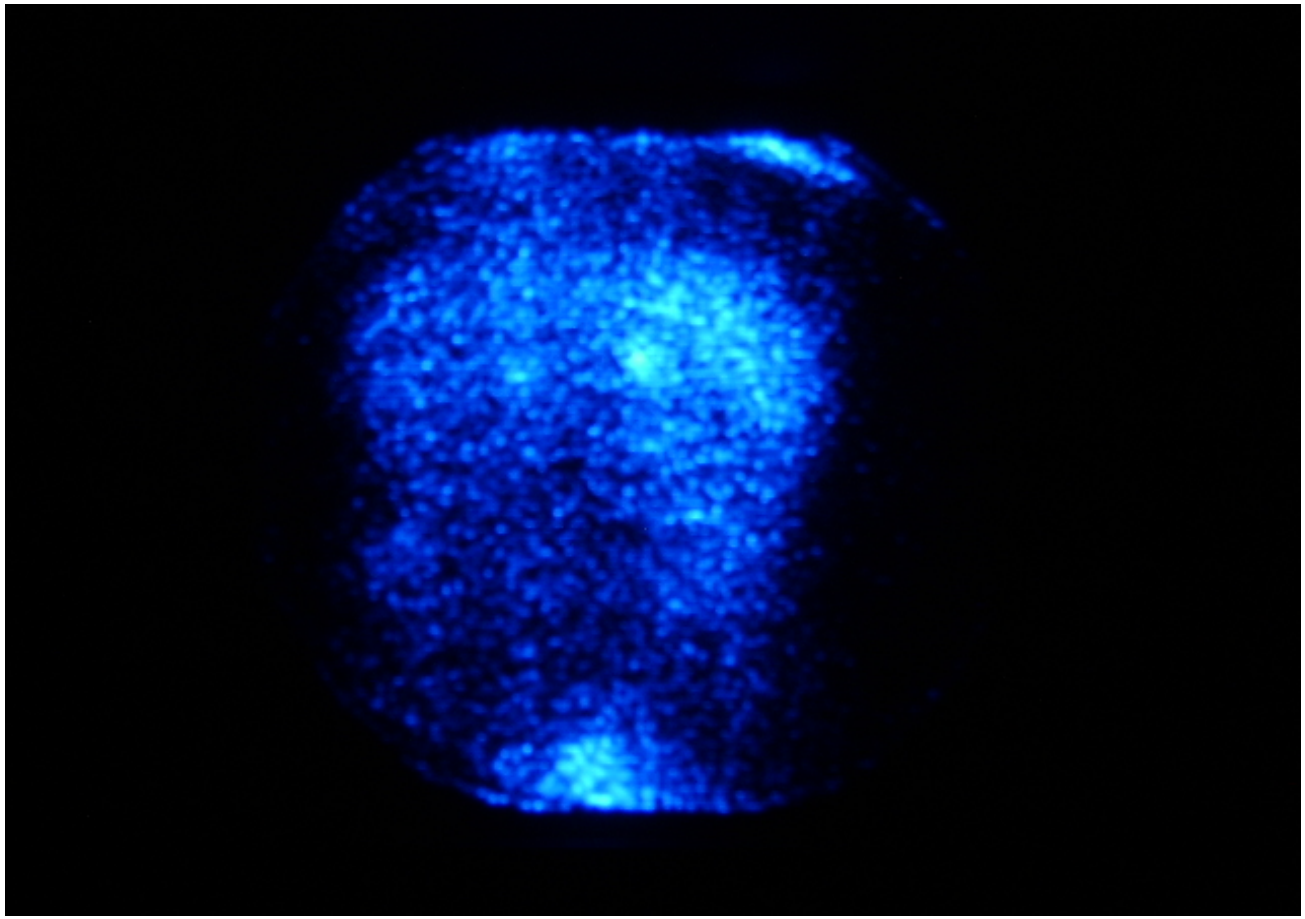
MIBG

Scintigrafski nalaz

- Normalno se slaba aktivnost vidi u malom broju zdravih osoba
- Povećano nakupljanje radiofarmaka se viđa u feohromocitomu kao jasna fokusna akumulacija u jednoj ili obe žlezde
- Ekstraadrenalna lokalizacija tumora u grudnom košu i abdomenu

AP polozaj MIBG scintigrafija





OBOSTRANA HIPERPLAZIJA
NADBUBREZNIH ZLEZDA

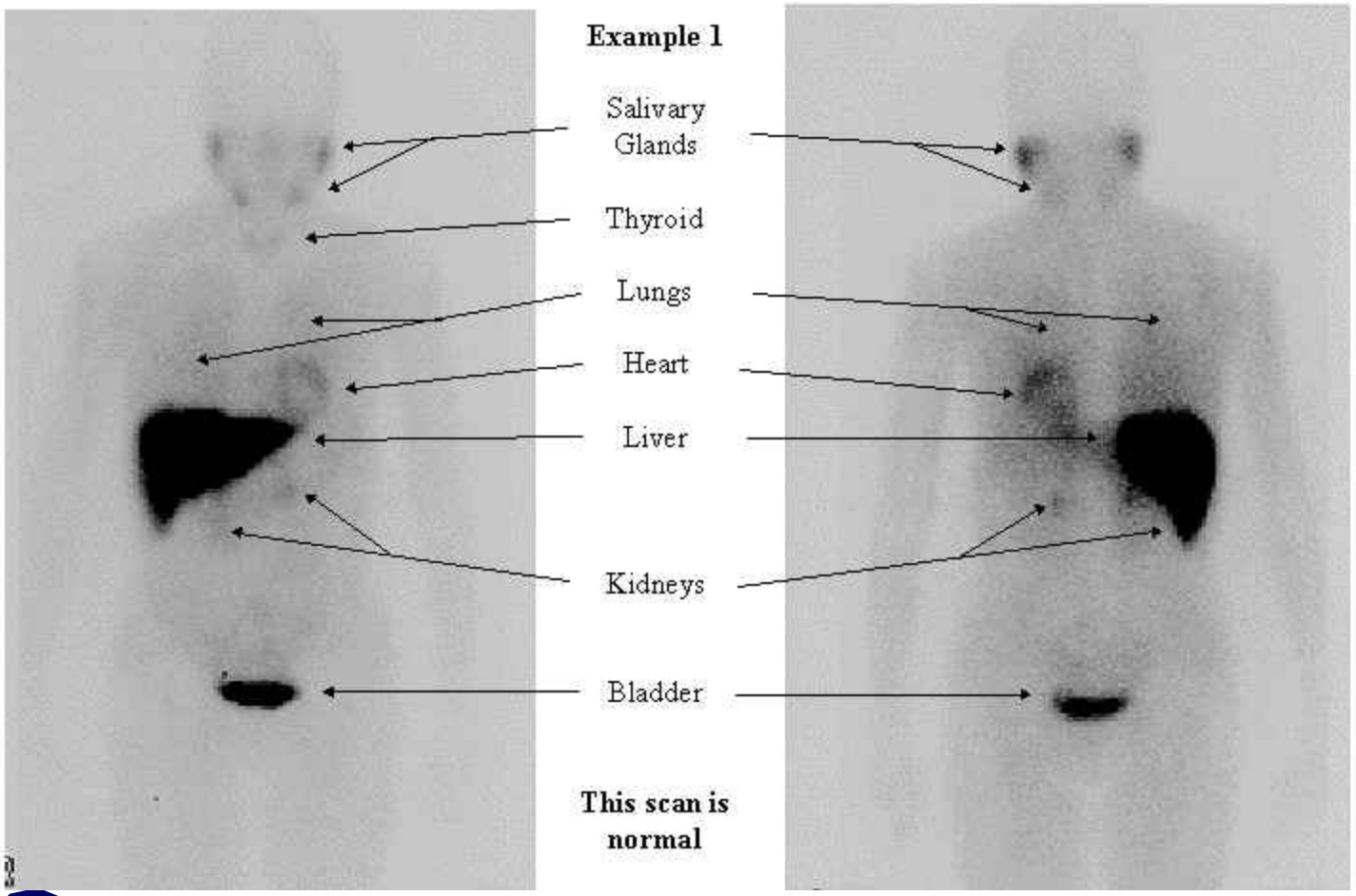
Drugi tumori neuroendokrinog sistema

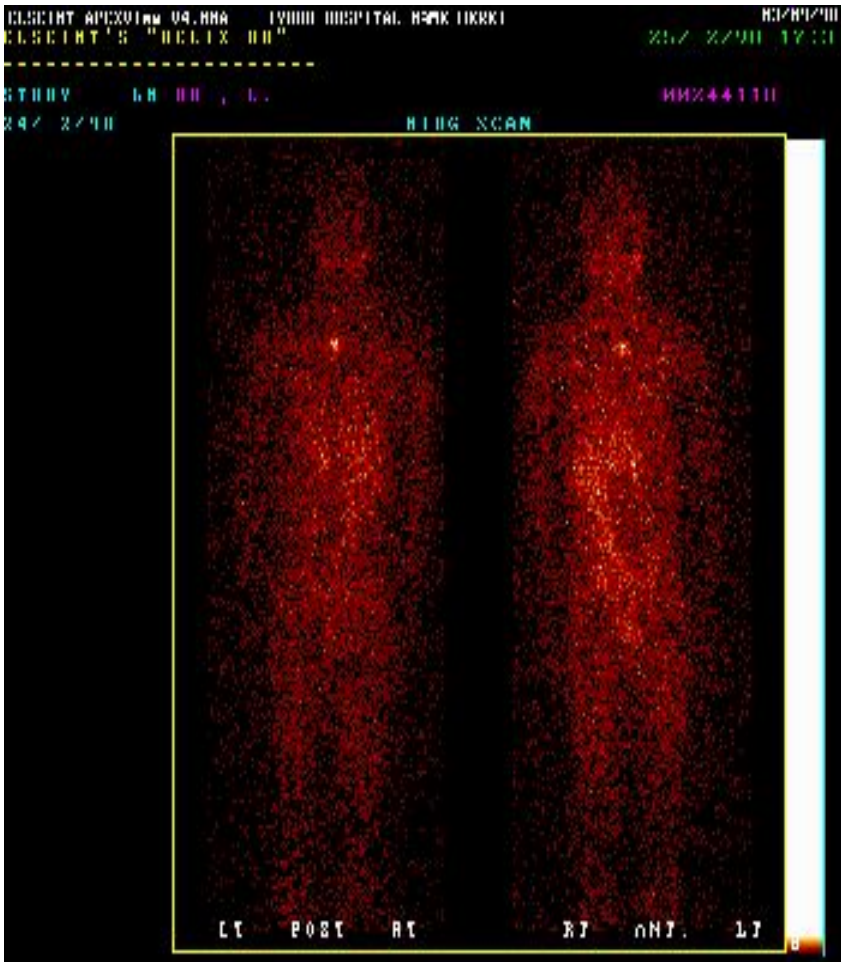
- paraganglion
- neuroblastom
- APUDom
- medulski karcinom štitaste žlezde

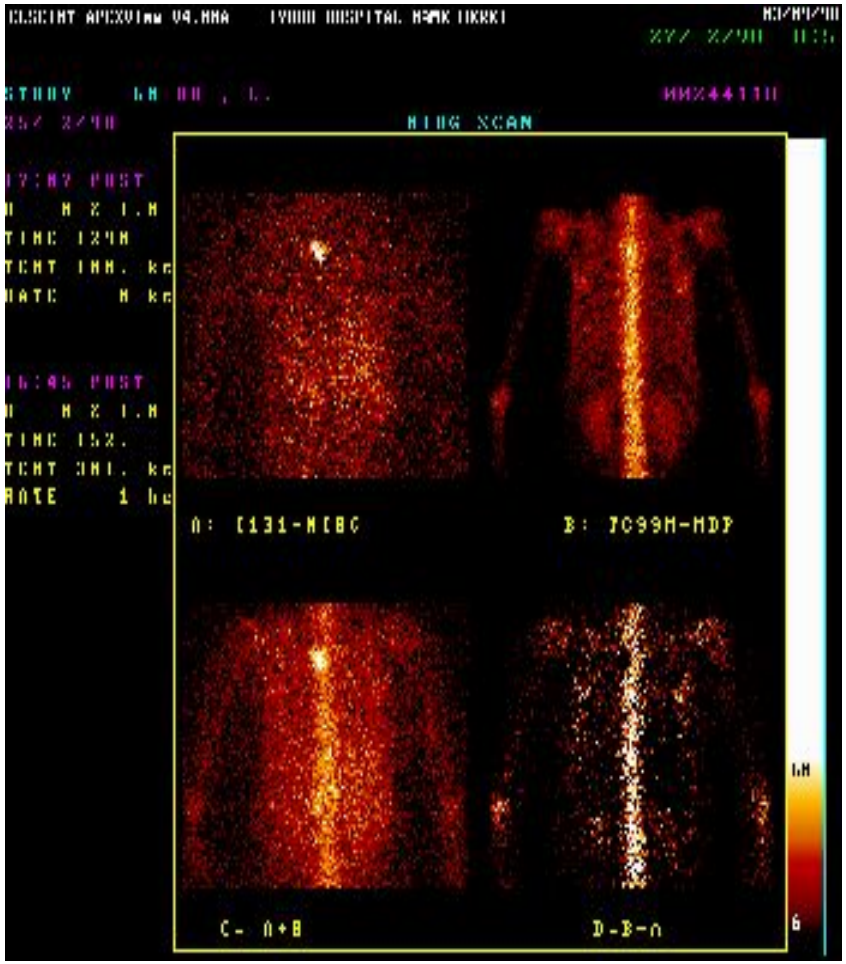
Visoke doze $MI^{131}BG$ se koriste u **terapiji** nekih bolesnika sa neuroblastomom ili feohromocitomom

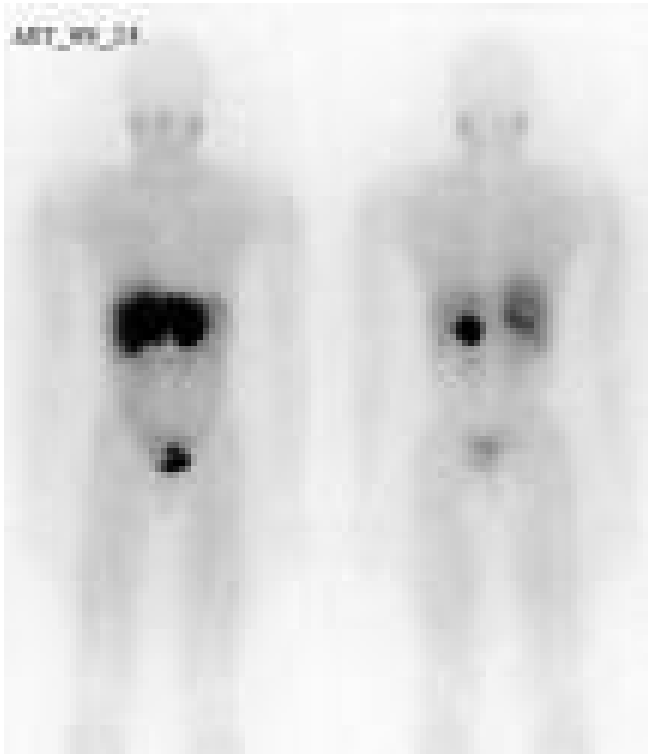


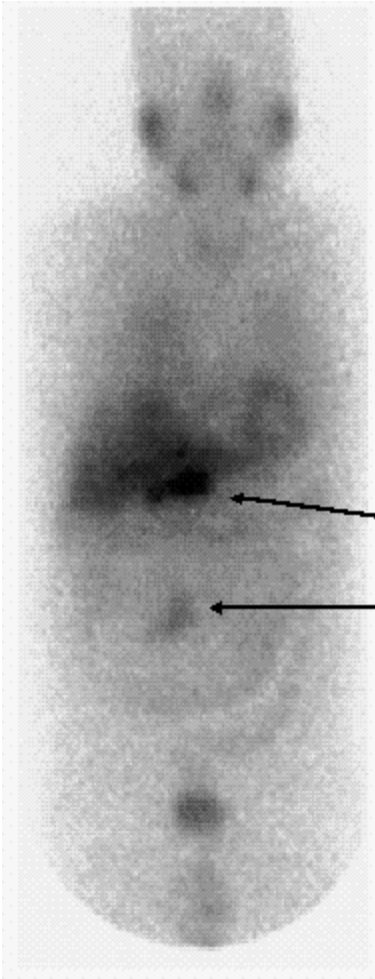
Two Examples of Adrenal mIBG Scans




KIDS SCAN
LT POST RT
RT ANT. LT


WHOLE BODY SCAN
A: I131-MIBG
B: TC99M-MDP
C- A+B
D-B-A





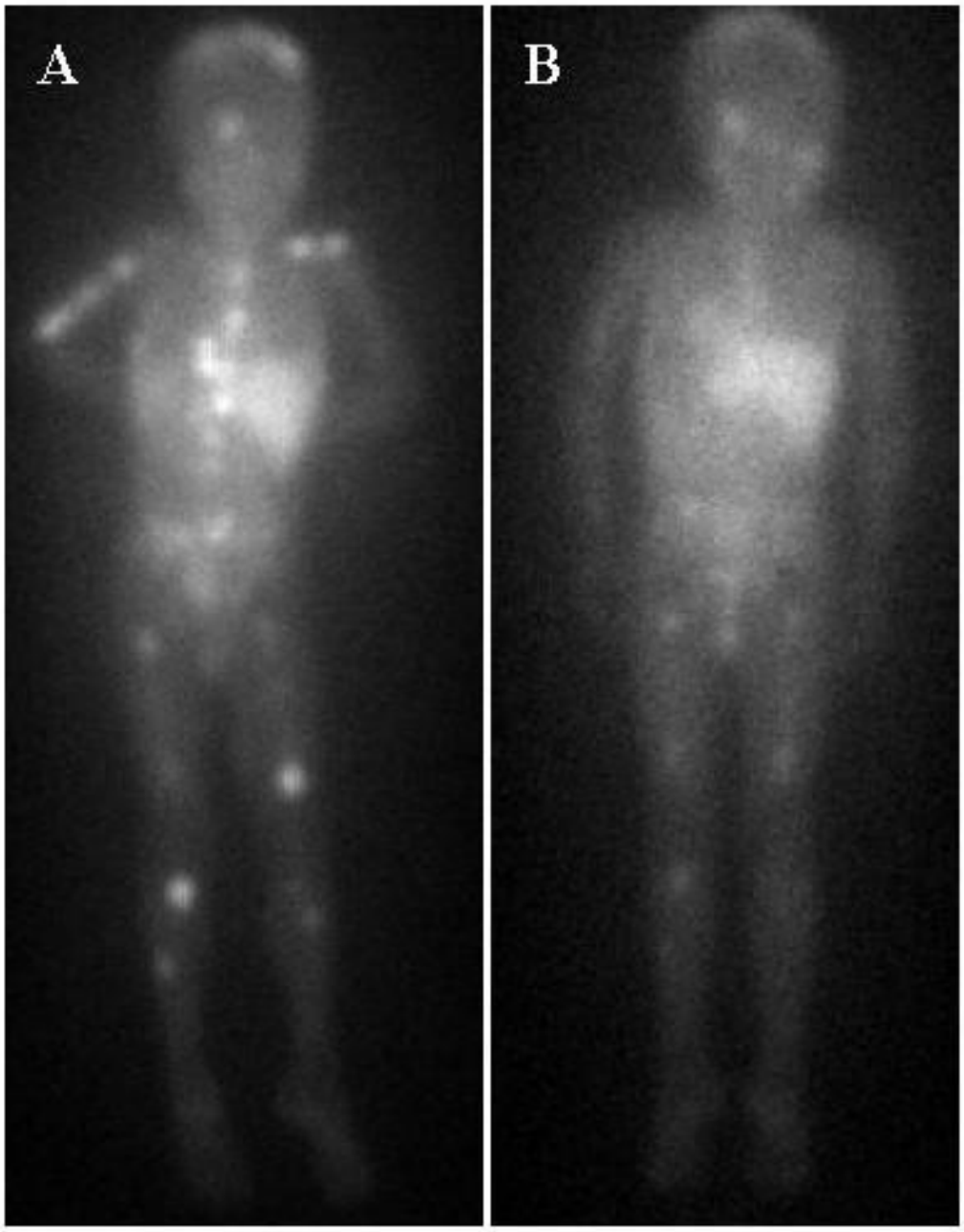
Example 2

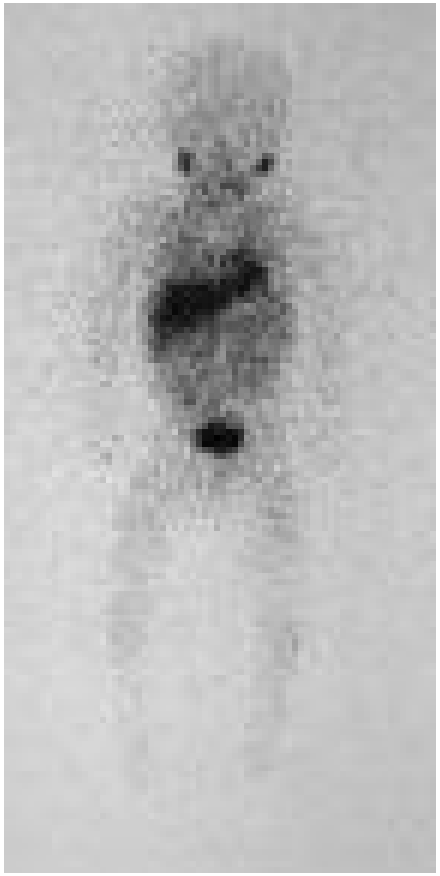
In addition to the normal uptake, this patient has two additional areas of uptake which needed further investigation.

One is just beneath the liver. The other in the centre of the abdomen

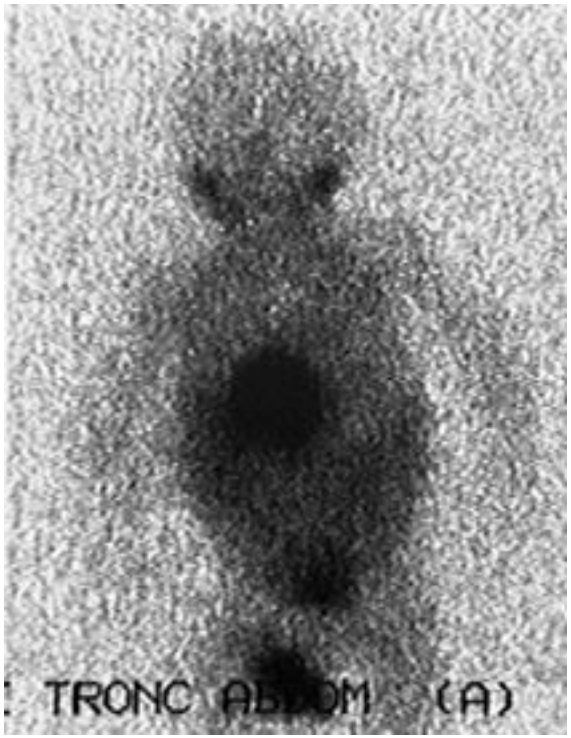

ANT_WB_24

neuroblastom

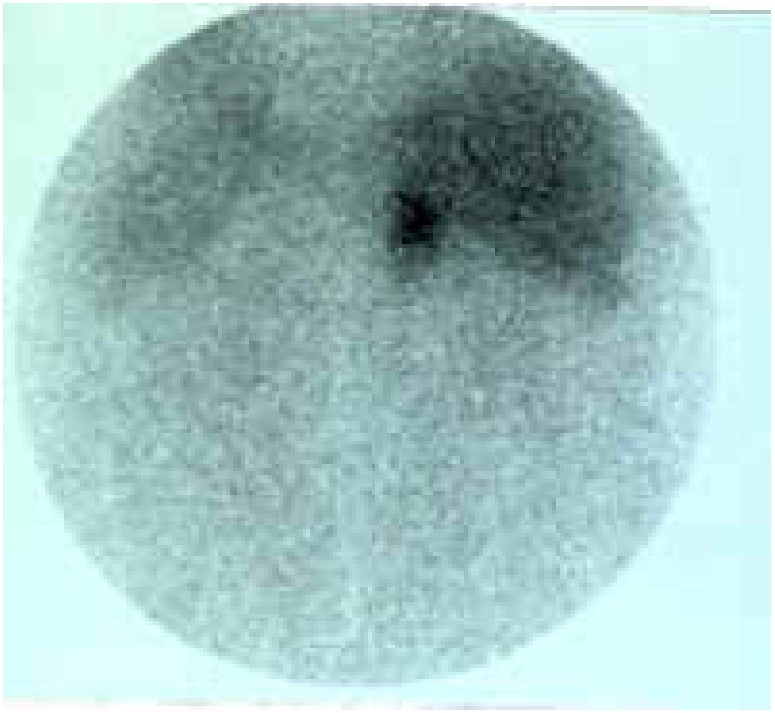


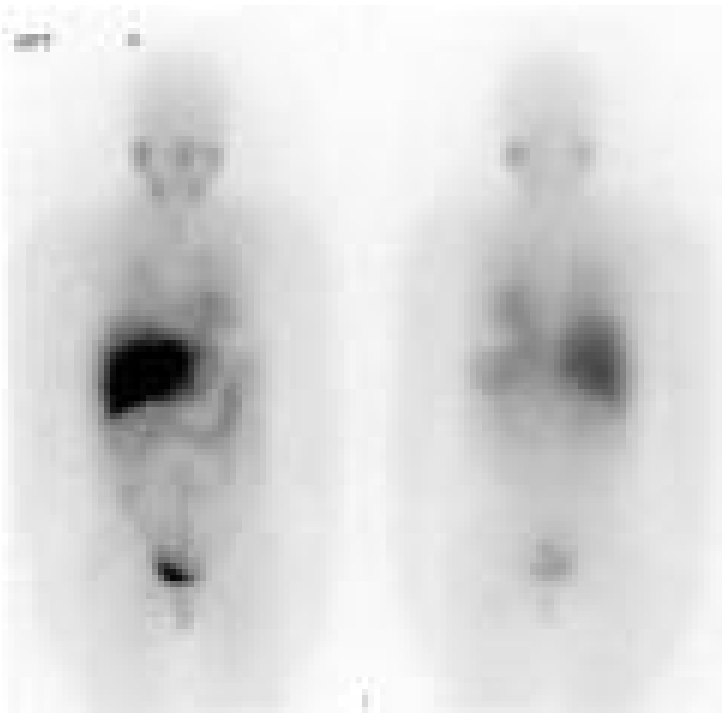


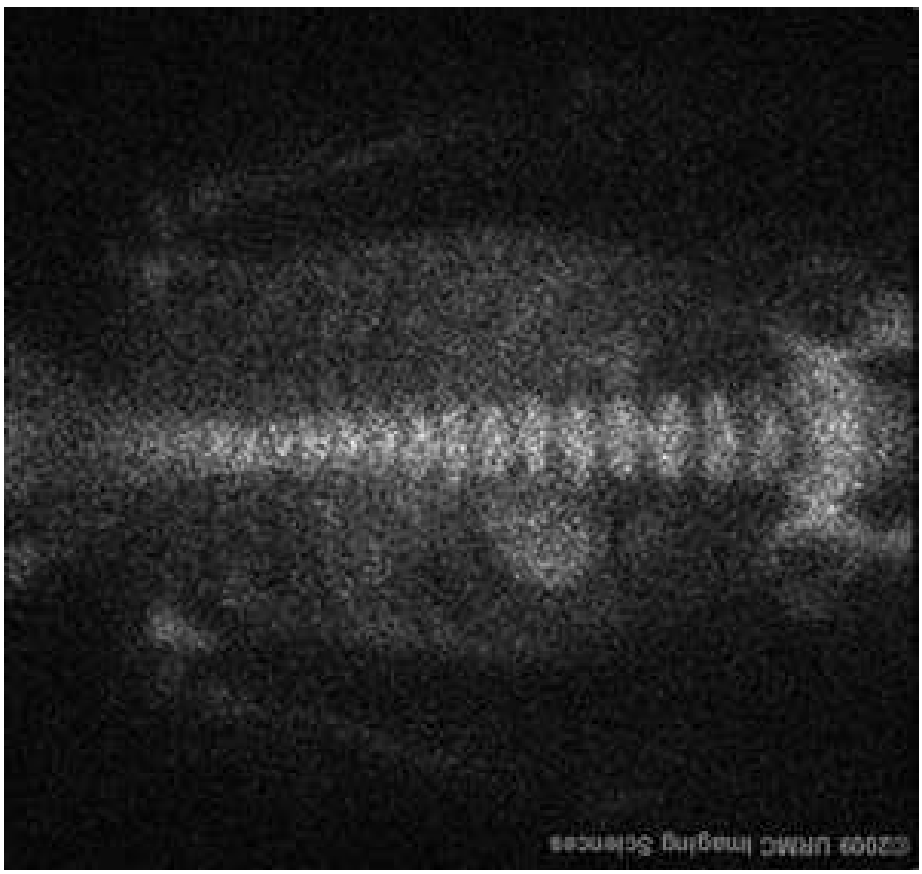
Normalna sc dete

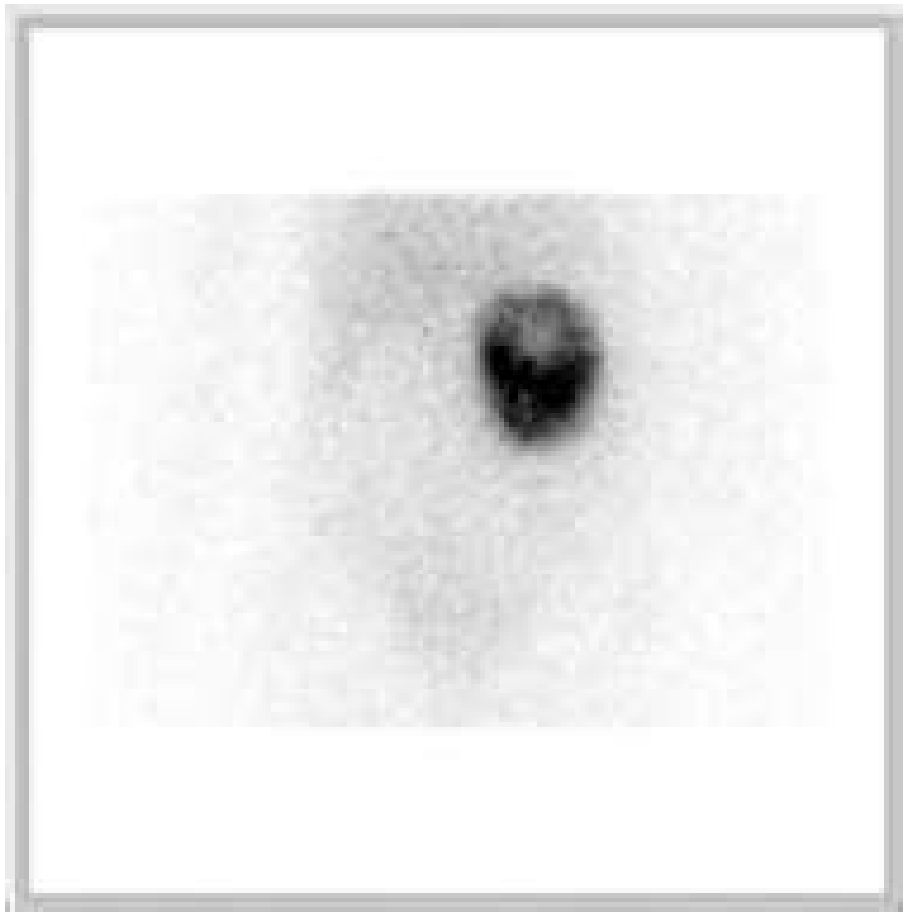


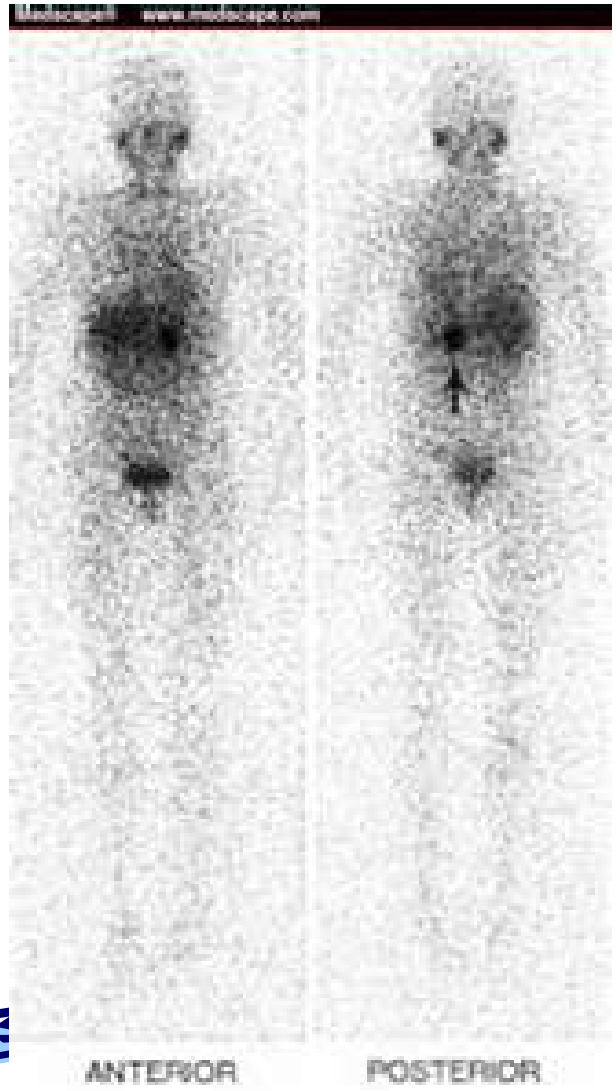
neuroblastom

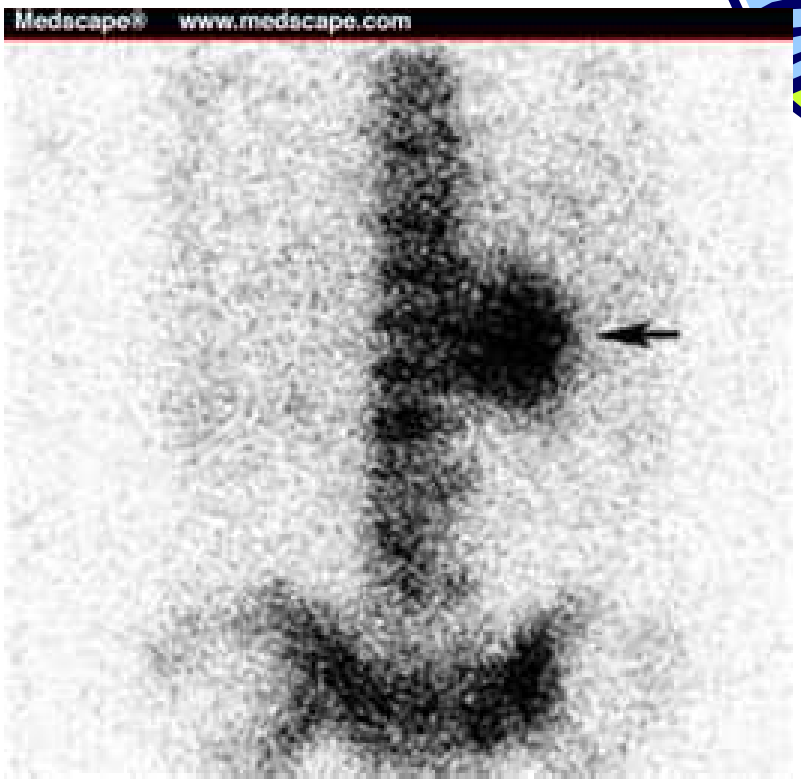


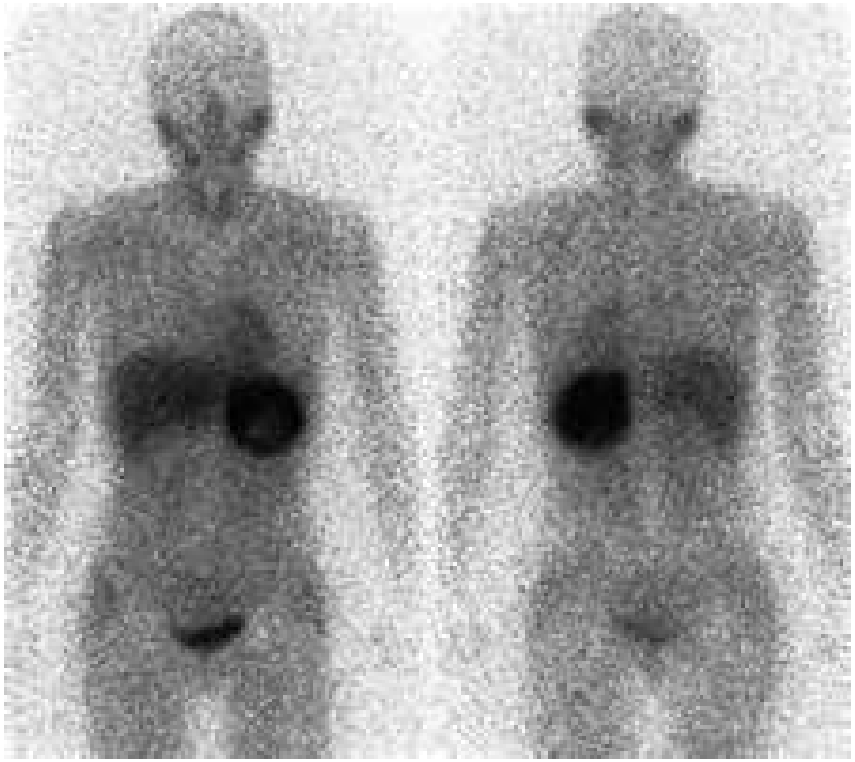


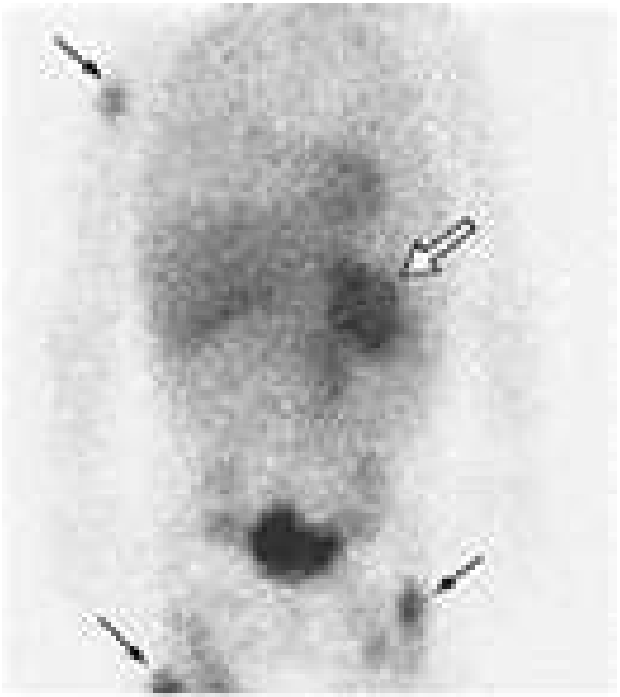

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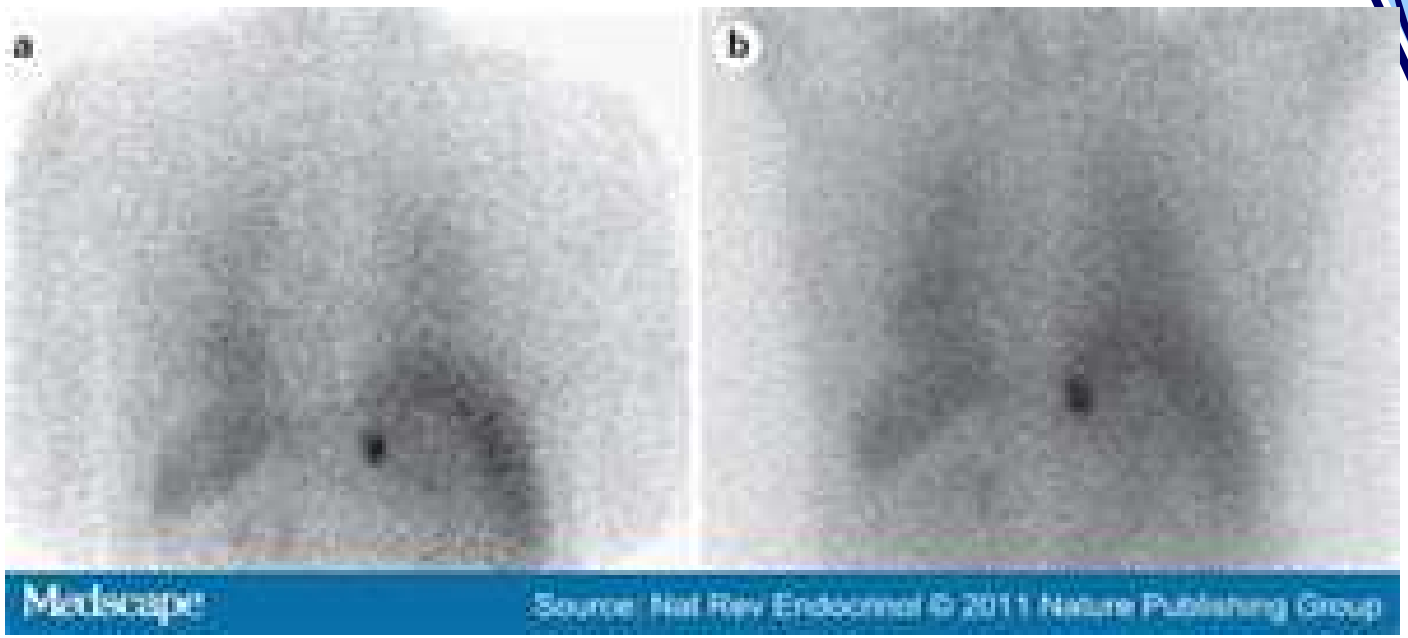


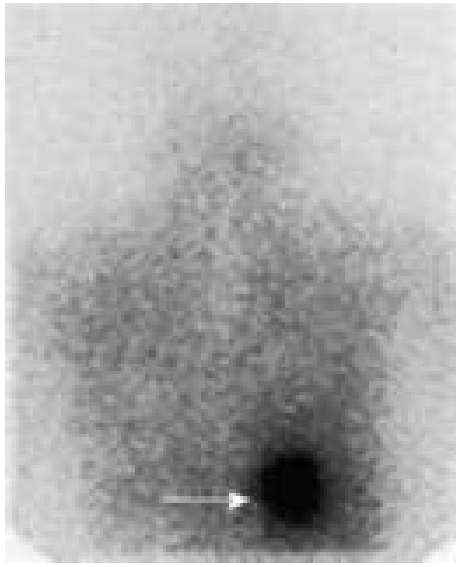

ANTERIOR
POSTERIOR

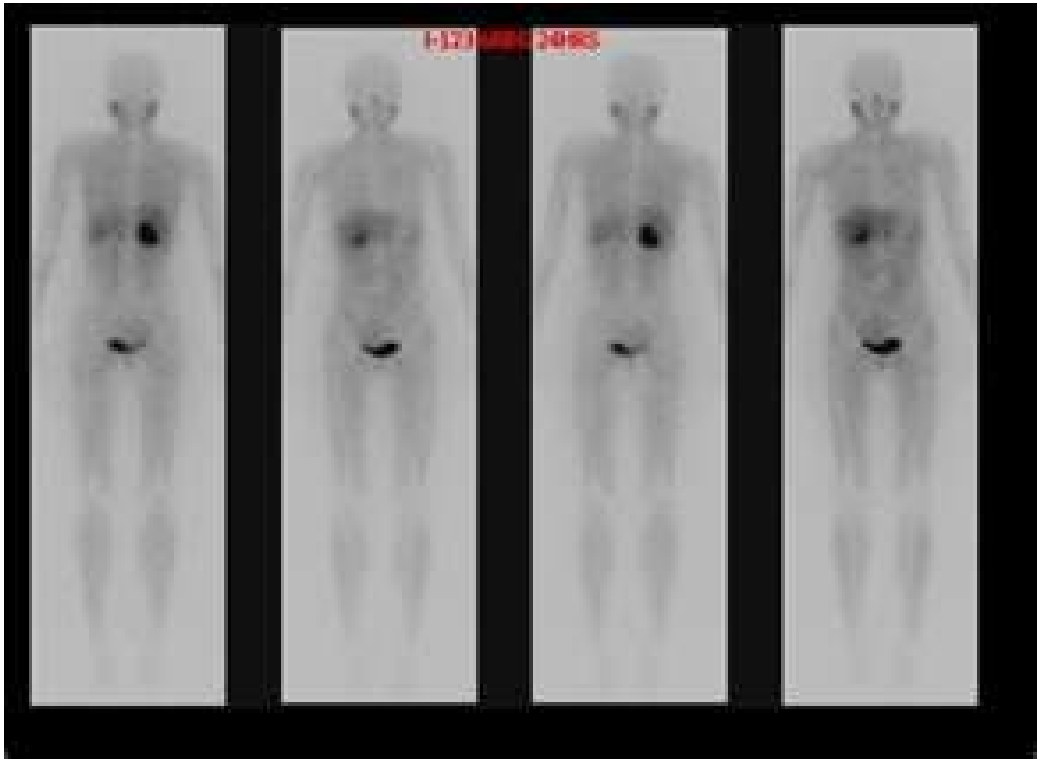

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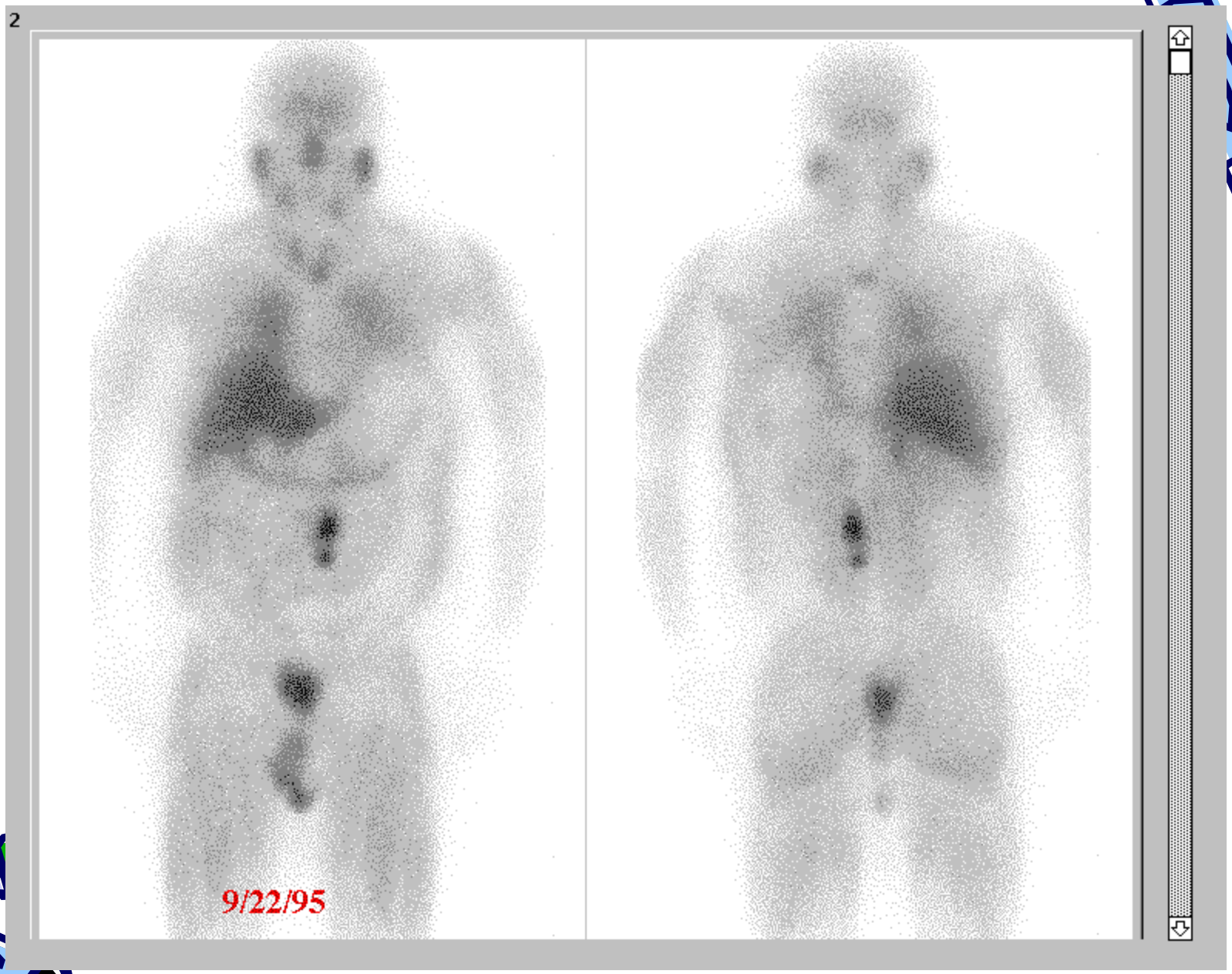





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