

PHYSICAL CHARACTERISTICS OF RADIONUCLIDES USED IN NUCLEAR MEDICINE

RADIO-NUCLIDE	PHYSICAL HALF-LIFE	MODE OF DECAY	MAIN GAMMA PHOTON(S)	%	MAX BETA	AVG BETA	GAMMA RAY CONSTANT	HALF VALUE LAYER	Prepared by James H. Corley MS Nuclear Medicine, Medical College of Georgia
			keV	ABUNDANCE	keV	keV	R/hr-mCi at 1 cm	in LEAD	METHOD OF PRODUCTION
F-18	110 min	Positron (β^+)	511	100	no beta	no beta	6	4.1mm	Cyclotron - O-18(p,n)F-18
P-32	14.3 days	(β^-)	no gamma	no gamma	1710	695	n/a	n/a	Nuclear Reactor - Neutron Activation S-32(n,p)P-32
Cr-51	27.8 days	(EC,gamma)	320	10.00%	no beta	no beta	0.18	0.17 cm	Nuclear Reactor - Neutron Capture Cr-50(n,gamma)Cr-51
Co-57	270.9 days	(EC,gamma)	122 136	86.00% 11.00%	no beta	no beta	0.5657	0.02 cm	Charged Particle Accelerator Fe-56(d,n)Co-57
Fe-59	45 days	(β^- ,gamma)	1100 1300	56.00% 43.00%	1562	116			Nuclear Reactor - Neutron Capture Fe-58(n,gamma)Fe-59
Ga-67	3.3 days	(EC,gamma)	93 185 300 394	38.00% 24.00% 16.00% 4.00%	no beta	no beta	1.6	0.066 cm	Cyclotron - Zn-68(p,2n)Ga-67
Se-75	120 days	(EC,gamma)	136 265 280	56.00% 59.00% 25.00%	no beta	no beta			Nuclear Reactor - Neutron Capture Se-74(n,gamma)Se-75
Rb-81	4.6 hours	(EC, β^+)	2070	30.00%					Cyclotron - Br-79(alpha,2n)Rb-81
Kr-81m	13 seconds	IT	190	66.00%	no beta	no beta			Rb-81/Kr-81m Generator
Sr-89	50.6 days	(β^-)	910	0.02%	1460	583	n/a	n/a	Nuclear Reactor - Neutron Activation Sr-88(n,gamma)Sr-89
Mo-99	67 hours	(β^- ,gamma)	181 740 780	7.00% 12.00% 4.00%	1230	398			Nuclear Reactor - Neutron Capture Mo98(n,gamma)Mo-99 ----- Nuclear Reactor - Fission U-235(n,f)Mo-99 (Current)
Tc-99m	6 hours	IT	140	89.00%	no beta	no beta	0.78	0.017 cm	Mo-99/Tc99m Generator
In-111	2.8 days	(EC,gamma)	171 245	90.00% 94.00%	no beta	no beta	3.21	0.023 cm	Cyclotron - Cd-111(p,n)In-111 or Cyclotron Ag-109(alpha,2n)In-111
I-123	13 hours	(EC,gamma)	159	83.80%	no beta	no beta	1.6	0.0005 cm	Cyclotron - Te-124(p,2n)I-123 or Cyclotron - I-127(p,5n)Xe-123-2hrs-I-123
I-125	60 days	(EC,gamma)	35	7.00%	no beta	no beta			Nuclear Reactor Xe-124(n,gamma)Xe-125 EC (17hrs)I-125
Xe-127	36.4 days	(EC,gamma)	172 203	22.00% 65.00%	no beta	no beta			Cyclotron - I-127(p,n)Xe127
I-131	8.0 days	(β^- ,gamma)	284 364 637	5.00% 82.00% 7.00%	810	180	2.27	0.24 cm	Nuclear Reactor Te-130(n,gamma)Te-131 - β^- -(25min) I-131 or Nuclear Reactor U-235(n,f)Te-131 - β^- -(25 min) I-131
Xe-133	5.3 days	(β^- ,gamma)	80	37.00%	343	99	0.51	0.0035 cm	Nuclear Reactor - U235(n,f)Xe-133
Sm-153	1.93 days	(β^- ,gamma)	103	29.00%	810	233	0.46	0.1 mm	Nuclear Reactor - Sm-152(n,gamma)Sm-153
Tl-201	3.1 days	(EC,gamma)	70-80 135 167	95.00% 0.03 10.00%	no beta	no beta	0.46	0.023 cm	Cyclotron Tl-203(p,3n)Pb-201 -- EC (9.4hrs) -- Tl-201