



Pd-98 (22s) CB+	Pd-97 (3.10m) ECB+	Pd-96 (17.7m) ECB+	Pd-95 (21.4m) ECB+	Pd-100 (3.63d)	Pd-101 (8.47h) ECB+	Pd-102 (STABLE)	Pd-103 (16.991d) EC	Pd-104 (STABLE)
Rh-95 (5.02m) CB+	Rh-96 (9.90m) ECB+	Rh-97 (30.7m) ECB+	Rh-98 (8.47h) ECB+	Rh-99m (4.7h) ECB+	Rh-100 (10.5h) ECB+	Rh-101 (3.3y) EC	Rh-102 (207d) ECB+B-	Rh-103 (STABLE)
Ru-94 (51.8m) CB+	Ru-95 (1.643h) ECB+	Ru-96 (STABLE)	Ru-97 (2.9d) EC	Ru-98 (STABLE)	Ru-99 (STABLE)	Ru-100 (STABLE)	Ru-101 (STABLE)	Ru-102 (STABLE)

RHODIUM-99M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Rh-99m
Atomic number (Z): 45
Mass number (A): 99
Neutron number (N): 54

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 4.7 [h]
Decay constant: 4.0966e-05 [1/s]
Daughters: Ru-99 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.03674 [MeV]
Mean photon energy: 0.65108 [MeV]
Air kerma rate constant, Γ_{10} : 2.997e-17 [Gy·m²/Bq·s]
Air kerma coefficient, K_{air} : 3.281e-17 [Gy·m²/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 5.886e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta^+,e^-}$: 5.886e-15 [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.043e-13 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

Dose point kernel source: **Graves, et al. Medical Physics. 2019 Nov.; 46(11):5284-5293.**

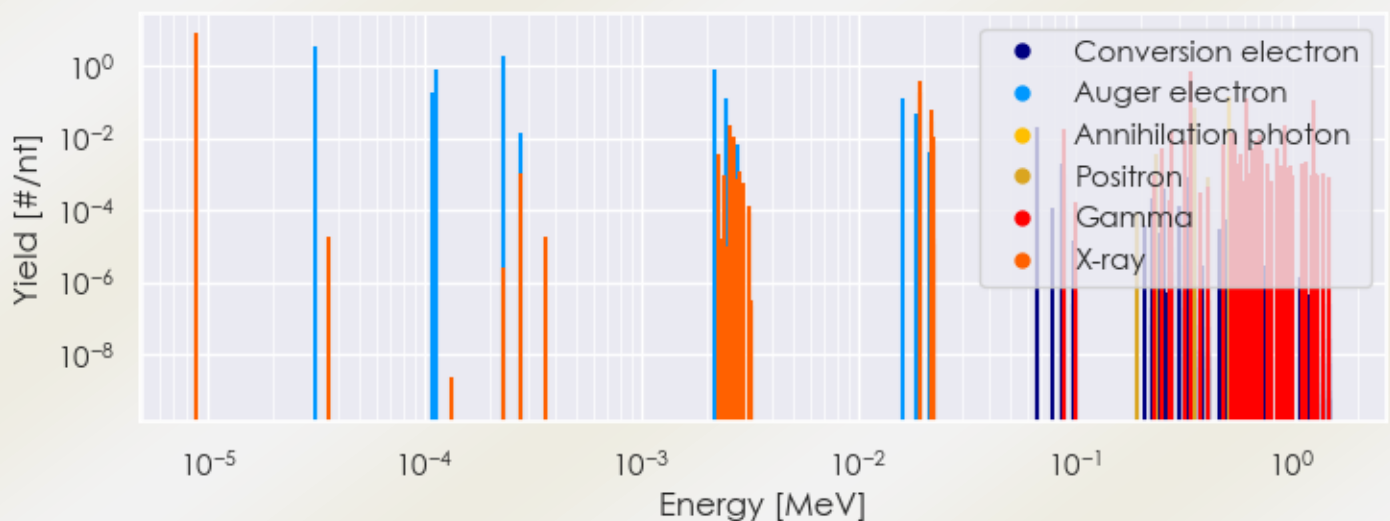
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Rh-99m DPK.csv

SUMMARY SPECTRA (PLOT)

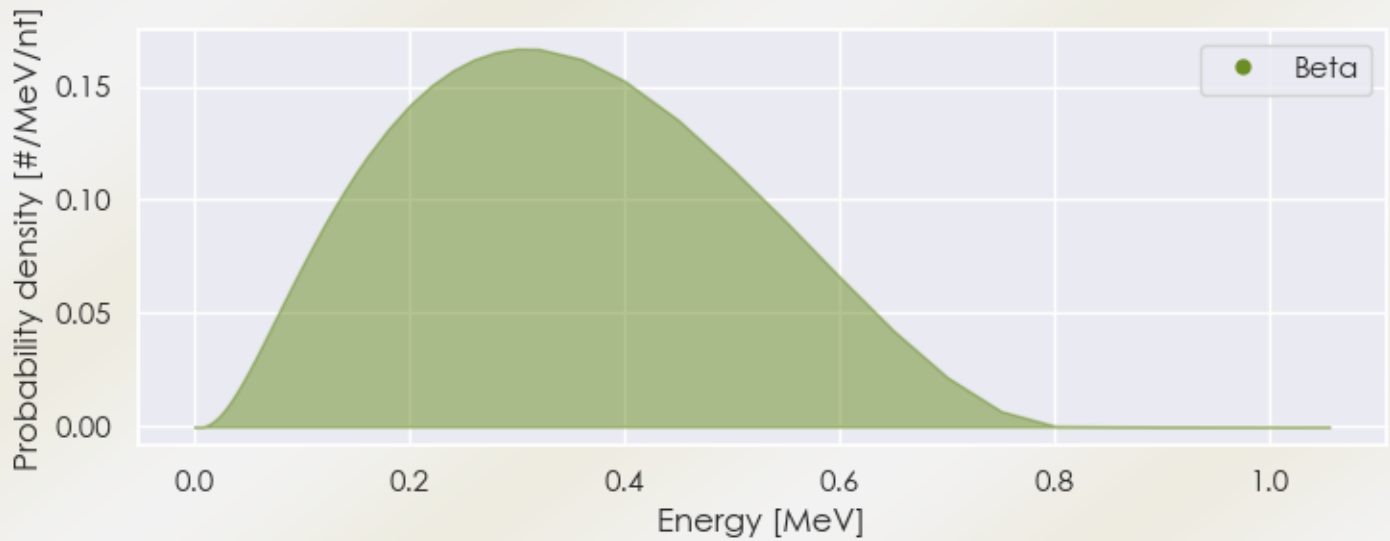
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Rh-99m Summary Spectrum.csv

BETA SPECTRA (PLOT)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated beta spectra file here: [www.mirdsoft.org/products/MIRDspecs/Rh-99m Beta Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Rh-99m%20Beta%20Spectrum.csv)

TABULATED DATA

SUMMARY SPECTRA (TABLE)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**

Note: Radiations with yield < 0.01 are excluded from the table, but are available in the linked *.csv data.

Download tabulated summary spectra file here: [www.mirdsoft.org/products/MIRDspecs/Rh-99m Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Rh-99m%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
8.90921e-06	8.540e+00	X-ray
2.54865e-03	2.277e-02	X-ray
2.67727e-03	1.064e-02	X-ray
1.91152e-02	1.907e-01	X-ray
1.92483e-02	3.618e-01	X-ray
2.16049e-02	3.036e-02	X-ray
2.16277e-02	5.905e-02	X-ray
2.20364e-02	1.145e-02	X-ray
8.96000e-02	1.711e-02	Gamma

2.76600e-01	1.633e-02	Gamma
3.40800e-01	7.033e-01	Gamma
5.11000e-01	1.468e-01	Annihilation photon
5.28200e-01	1.400e-02	Gamma
5.42800e-01	1.300e-02	Gamma
6.17800e-01	1.200e-01	Gamma
7.19300e-01	1.222e-02	Gamma
9.36600e-01	2.200e-02	Gamma
1.26120e+00	1.111e-01	Gamma
3.57278e-01	6.853e-02	Positron
3.14529e-05	3.542e+00	Auger electron
1.07951e-04	1.837e-01	Auger electron
1.14216e-04	8.010e-01	Auger electron
2.31915e-04	1.961e+00	Auger electron
2.77355e-04	1.442e-02	Auger electron
2.15883e-03	7.651e-01	Auger electron
2.46834e-03	1.304e-01	Auger electron
1.61570e-02	1.203e-01	Auger electron
1.86981e-02	4.628e-02	Auger electron
6.75130e-02	2.001e-02	Conversion electron

USEFUL LINKS

Isotope decay characteristics are periodically updated as better measurements can be made - changes that may not be reflected on this page. Please see useful links:

National Nuclear Data Center (NNDC): <https://www.nndc.bnl.gov/nudat3/mird/>

International Atomic Energy Agency (IAEA) Livechart: <https://www-nds.iaea.org/relnsd/vcharthtml/VChartHTML.html>

REFERENCE LINKS

ICRP Report 107: <https://www.icrp.org/publication.asp?id=ICRP%20Publication%20107>

Graves et al. Dose Point Kernels: <https://doi.org/10.1002/mp.13789>

MIRD Decay Schemes 2nd Edition: https://sites.snmmi.org/SNMMI-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6