

203/212Pb Users Group Meeting SNMMI 2019 (Anaheim, CA)

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Technology Briefs

- Michael K Schultz - Intro
- Matt O'Hara PNNL - Pb-212 Generator Technologies (5 min.)
- Ebrahim Delpassand - Radiomedix, Inc. – Clinical results (5 min.)
- Stephen Graves - University of Iowa - Dosimetry (5 min.)
- Ira Goldman - Lantheus Medical Imaging - Supply of Pb-203 (5 min.)

Discussion

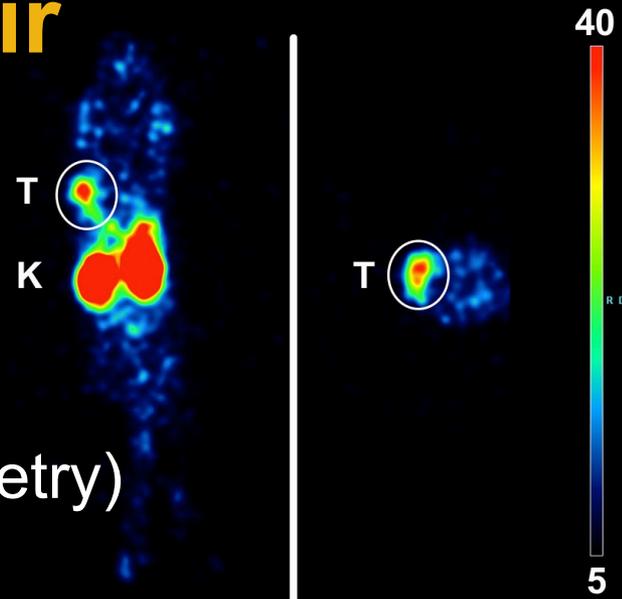
$^{203}\text{Pb}/^{212}\text{Pb}$ Theranostic Pair

- ^{203}Pb – diagnostic

$^{203}\text{Pb} \rightarrow ^{203}\text{Tl}$ (EC; stable)

279 keV gamma (SPECT; $I = 81\%$)

$T_{1/2} = 52$ h (patient selection and dosimetry)



- ^{212}Pb – therapeutic

$^{212}\text{Pb} \rightarrow ^{212}\text{Bi}$ (β ; $I = 100\%$)

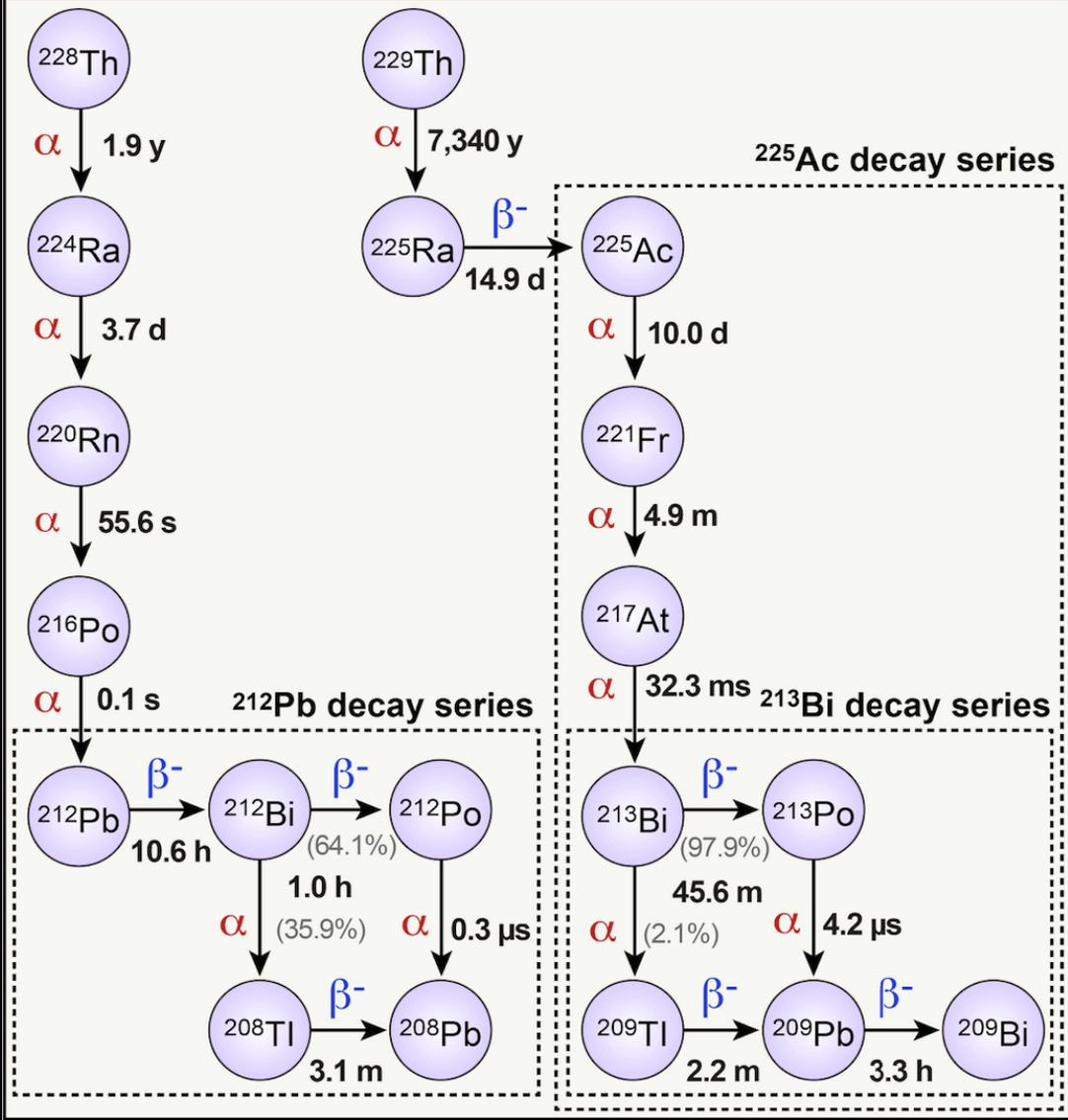
Two α 's in "series" (^{212}Bi and ^{212}Po)

$T_{1/2} = 11$ h (peptides, small molecules, faB's, RNA aptamers)

Energy (keV)	End-point energy (keV)	Intensity (%)
41.1 6	154.6 19	5.08 % 9
93.5 7	331.3 19	83.1 % 16
171.7 7	569.9 19	11.9 % 16

Li et al., 2017 *Appl. Rad. Isot.*

Identical chemistry



Ac vs Pb



Actinium-225

- $T_{1/2} = 10$ d (5 α 's)
- Central prod./distr.
- Capacity? Impurity?
- Fast daughter ingrowth
- mAbs (biological $T_{1/2}$)
- Stable Bi endproduct
- No matching imaging isotope

Lead-212

- $T_{1/2} = 11$ h (2 α 's)
- 224Ra Generator ($T_{1/2} = 3.7$ d)
- Slower daughter ingrowth
- Peptides, small molecules
- 212Bi generator possible
- Stable Pb endproduct
- 203Pb elementally matched

Thank you!!