**Table S5: Comparison of Isotopes Useful for Radiolabeling Liposomes – Estimated Absorbed Radiation Dose in Liver, Based on Mice Injected with $^{64}$Cu-MM-302**

| Isotope | $t_{1/2}$ (h) | Imaging Modality | β- Energy (Abundance)[a] | β+ Energy (Abundance)[a] | γ Energy (Abundance)[a] | Estimated Absorbed Dose (mSv/MBq)[b] | Predicted Necessary Starting Activity (MBq)[c] | Estimated Radiation Dose for Predicted Starting Activity (mSv)[c] |
|---|---|---|---|---|---|---|---|---|
| $^{18}$F | 1.8 | PET | n/a | 634 KeV (97%) | 511 KeV (194%) | 0.013 | 1.78e5 | 2348 |
| $^{99m}$Tc | 6.0 | SPECT | 293 KeV (100%) | n/a | 141 KeV (89%) | 0.003 | 349 | 1 |
| $^{64}$Cu | 12.7 | PET | 578 KeV (37%) | 653 KeV (18%) | 511 KeV (35%) | 0.059 | 400 | 24 |
| $^{111}$In | 67.3 | SPECT | n/a | n/a | 245 KeV (94%) | 0.241 | 26 | 6 |
| $^{67}$Ga | 78.2 | SPECT | n/a | n/a | 93 KeV (39%) | 0.159 | 134 | 21 |
| $^{89}$Zr | 78.4 | PET | n/a | 396 KeV (23%) | 909 KeV (99%) | 0.811 | 134 | 108 |
| $^{186}$Re | 89.2 | SPECT | 1069 KeV (71%) | n/a | 137 KeV (9%) | 0.972 | 260 | 253 |
| $^{124}$I | 100.3 | PET | n/a | 1532 KeV (11%)<br>2135 KeV (11%) | 603 KeV (63%) | 1.320 | 177 | 50 |

[a]Isotope energies were taken from Holland, et al. 2010. Unconventional Nuclides for Radiopharmaceuticals. *Molecular Imaging*, 9(1) and Be, et al. 2013. Table of Radionuclides Vol 7, *Monographie BIPM-5*, and reflect the most abundant transition.
[b]Human absorbed radiation dose estimates for the selected isotopes were extrapolated from $^{64}$Cu-MM-302 mouse biodistribution data.
[c]Starting activity for each isotope was predicted based on estimated activity remaining at 24h post-injection with $^{64}$Cu-MM-302, adjusted for isotope energy efficiency, and estimate a starting activity that would be required to obtain sufficient image quality after 24h. For example, with a positron abundance of 18%, $^{64}$Cu requires approximately 100 MBq of activity at 24h, or 400MBq starting activity, whereas $^{18}$F, with a positron abundance of 97%, requires approximately 20MBq of activity at 24h, but a starting activity of approximately 178GBq due to its much shorter physical half-life.

**Table S6: Absorbed Radiation Doses in Primary Target Organs, Compared for $^{64}$Cu-MM-302 and Approved Molecular Imaging Agents**

| Status | Agent | Target Organs | Radiation Absorbed Dose (mSv/MBq) | Administered Activity (MBq) | Radiation Dose per Administered Activity (mSv) | Reference |
|---|---|---|---|---|---|---|
| Clinical Trial | $^{64}$Cu-MM-302 | Renal Pelvis | 0.61 | 400 | 244 | Table 3 |
| | | Heart Wall | 0.53 | 400 | 210 | Table 2 |
| Approved | BEXXAR ($^{131}$I-tositumomab) | Thyroid | 2.71 | 185 | 501 | [1] |
| | | Kidneys | 1.96 | 185 | 363 | |
| | | Upper Large Intestines | 1.34 | 185 | 248 | |
| | | Lower Large Intestines | 1.30 | 185 | 241 | |
| | | Heart Wall | 1.25 | 185 | 231 | |
| Approved | ProstaScint ($^{111}$In-Capromab pendetide) | Liver | 1.00 | 185 | 185 | [2] |
| | | Spleen | 0.88 | 185 | 163 | |
| Approved | $^{111}$In-Oxiquinoline | Spleen | 10.81 | 18.5 | 200 | [3] |
| Approved | OctreoScan ($^{111}$In-Pentetreotide) | Spleen | 0.67 | 222 | 148 | [4] |
| | | Kidneys | 0.49 | 222 | 108 | |

Information for approved imaging agents was derived from human dosimetry data presented in package inserts:


1. BEXXAR (131I-tositumomab) [Package Insert]. Wilmington (DE): GlaxoSmithKline; 2003.
2. ProstaScint (111In-Capromab Pendetide) [Package Insert]. Langhorne (PA): EUSA Pharma, Jazz Pharmaceuticals; 1996.
3. In-111 Oxyquinoline Solution [Package Insert]. Arlington Heights (IL): Amersham Health, Medi-Physics, Inc.; 1994.
4. OctreoScan (111In-Pentetreotide) [Package Insert]. St. Louis (MO): Mallinckrodt, Inc.; 1995.