Estimation of Radiation Dosimetry for ⁶⁸Ga-HBED-CC (PSMA-11) in Patients with Suspected Recurrence of Prostate Cancer

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Keywords: ⁶⁸Ga-HBED-CC (PSMA-11)

PSMA-Targeted PET/CT

Prostate Cancer Recurrence

Dosimetry

⁶⁸Ga-DKFZ-PSMA-11

Glu-NH-CO-NH-Lys-(Ahx)-[68Ga(HBED-CC)]

Financial support for this work was provided by the Indiana University Department of Urology and the Indiana University Department of Radiology and Imaging Sciences.

Running Title: ⁶⁸Ga-HBED-CC (PSMA-11) Dosimetry

This is the author's manuscript of the article published in final edited form as:

Green, M. A., Eitel, J. A., Fletcher, J. W., Mathias, C. J., Tann, M. A., Gardner, T., ... & Hutchins, G. D. (2016). Estimation of radiation dosimetry for (68) Ga-HBED-CC (PSMA-11) in patients with suspected recurrence of prostate cancer. Nuclear medicine and biology, 46, 32. https://doi.org/10.1016/j.nucmedbio.2016.11.002

ABSTRACT

Introduction: To estimate the human radiation dosimetry for I⁶⁸GalGa-HBED-CC (PSMA-11). Methods: Under an RDRC-approved research protocol, we evaluated the biodistribution and pharmacokinetics of [68Ga]Ga-HBED-CC (PSMA-11) with serial PET imaging following intravenous administration to nine prostate cancer patients in whom clinical [¹¹C]acetate PET/CT exams had been independently performed under Expanded Access IND 118,204. List-mode imaging was performed over the initial 0-10 minutes post-injection with the pelvis in the field-of-view. Whole-body images were acquired, pelvis-to-head, at 15, 60, and 90-minutes post-injection. Additional images of the pelvis were acquired at 40-minutes and 115-minutes, and voided urine collected from each subject at 48-minutes and 120-minutes post-injection. Radiation dosimetry estimates were calculated from these data using the OLINDA software package. Results: Renal uptake was high and relatively invariant, ranging from 11% to 14% of the injected dose between 15 and 90-minutes post-injection. Radioactivity collected in the voided urine accounted for 14% of the injected dose over a period of 120-minutes. Lymph nodes and skeletal metastases suspicious for prostate cancer recurrence were detected in fewer patients using ¹¹C-acetate than using [⁶⁸Ga]Ga-HBED-CC (PSMA-11). **Conclusion**: Kidneys are the critical organ following [⁶⁸Ga]Ga-HBED-CC (PSMA-11) administration, receiving an estimated dose of 0.413 mGy/MBq. Advances in Knowledge and Implications for Patient Care: This study confirms that the kidneys will be the critical organ following intravenous administration of [68Ga]Ga-HBED-CC (PSMA-11), and provided data consistent with the expectation that [⁶⁸Ga]Ga-HBED-CC (PSMA-11) will be superior to [¹¹C]acetate for defining sites of recurrence in prostate cancer patients presenting with biochemical relapse.

Introduction

The PSMA-targeted [⁶⁸Ga]Ga-HBED-CC (PSMA-11) radiopharmaceutical has been shown to be quite useful in imaging patients with prostate cancer to define the location and extent of disease [1-2]. However, despite its fairly extensive human use of [⁶⁸Ga]Ga-HBED-CC, until recently no estimates of the human radiation dosimetry for [⁶⁸Ga]Ga-HBED-CC were available in the published literature. Those recently published data [3,4] represent findings in a very limited number of subjects, in one case only four subjects [3], and the other case, five subjects who received a concurrent dosing with furosemide [4]. To Independently assess [⁶⁸Ga]Ga-HBED-CC (PSMA-11) dosimetry, we have evaluated the radiopharmaceutical's biodistribution and pharmacokinetics with serial PET imaging following intravenous administration to nine prostate cancer patients in whom ¹¹C-acetate PET/CT exams had been clinically performed under Expanded Access IND 118,204 to assess disease recurrence.

Materials and Methods

Our use of [⁶⁸Ga]Ga-HBED-CC (PSMA-11) in PET/CT imaging was reviewed and approved by the Indiana University Radioactive Drug Research Committee and the Indiana University Institutional Review Board (IRB). Subjects were recruited from patients undergoing clinical imaging with ¹¹C-acetate (Expanded Access IND 118,204) due to suspected recurrence of prostate cancer that had previously been treated with surgery or radiation therapy (*i.e.*, all subjects were prostate cancer patients presenting with "biochemical failure"). All subjects provided written informed consent prior to

administration of the [68 Ga]Ga-HBED-CC radiopharmaceutical. The interval between [11 C]acetate and [68 Ga]Ga-HBED-CC PET/CT imaging averaged 21 ± 25 days (median 20 days; range 0-83 days). The reported serum PSA levels (Supplemental Data) were the most recent clinical values at the time of 68 Ga imaging, obtained an average of 61 ± 41 days prior to the [68 Ga]Ga-HBED-CC study (median 42 days; range 33-157 days).

Radiochemistry

The HBED-CC (PSMA-11) conjugate was purchased from ABX GmbH as commercial cGMP-grade product packaged at 10-µg per vial. The [⁶⁸Ga]Ga-HBED-CC (PSMA-11) radiopharmaceutical was prepared using ⁶⁸Ga from ITG Isotope Technologies Garching GmbH ⁶⁸Ge/⁶⁸Ga generators (30-mCi; 1.11 GBg). Briefly, the 4.0-mL 0.05M ultrapure HCl generator eluate was buffered to pH ~4.8 by addition of ultrapure NaOAc and reacted with the HBED-CC conjugate $(10-\mu g)$ with heating at ~95°C for 5-minutes employing ITG's manually controlled iQS® Ga-68 Fluidic Labeling Module [5-8]. The complete synthetic protocol was as we have described for [⁶⁸Ga]Ga-DOTA-NOC, with the exceptions of using only a 5-minute reaction time, and the substitution of HBED-CC (PSMA-11) for DOTA-NOC [5]. Pre-release product quality control procedures included: half-life measurement for confirmation of radionuclidic identity; pH measurement; ITLC assessment of radiochemical purity; endotoxin testing; and a bubble point measurement to confirm the integrity of the single-use sterile 0.2-µm filter employed for terminal product sterilization. The ITLC determination of radiochemical purity employed ITLC-SG strips developed with 1:1 MeOH:1M NH₄OAc to guantify colloidal ⁶⁸Ga-hydroxide plus ionic ⁶⁸Ga, both of which remain at or near the origin while the [⁶⁸Ga]Ga-HBED-CC product migrates near the solvent front. Retrospective analysis of each production batch

included sterility testing, and measurement of ⁶⁸Ge breakthrough levels in the final product [5].

PET/CT Imaging and Image Analysis

Imaging was performed using a Siemens mCT extended FOV time-of-flight PET/CT (128 slice) camera. Following a low-dose pelvis-to-head CT scan for attenuation correction, the radiopharmaceutical was administered intravenously with the patient's pelvis in the PET field-of-view for a list-mode acquisition from 0-10 minutes, followed by a wholebody (pelvis to head) PET acquisition starting at 15-minutes post-injection. An image of the pelvis was again collected at 40-minutes, then the patient removed from the camera and urine collected. The patient then returned to the PET/CT camera for a second lowdose (attenuation correction only) CT scan, followed by whole-body (pelvis-to-head) PET acquisitions at 60-minutes and 90-minutes, with a final PET image of the pelvis collected at 115 minutes. Again the patient was removed from the camera and directed to void his bladder with collection of the excreted urine. The volume of the collected urine samples was measured, and the excreted radioactivity quantified by dose calibrator assay of a 20-mL sample. PET images were reconstructed using both filtered back-projection (FBP), and a standard clinical iterative algorithm, (3 iterations and 21 subsets); 3-D volumes-of-interest were drawn for the tissues of interest using the MIM PET Edge (v6.5) software package, and corresponding SUV_{mean} values extracted for calculation of radiopharmaceutical biodistribution as a percentage of the injected dose per tissue. Iterative vs. FBP reconstruction provided comparable SUV_{mean} values; the reported results (Table 1) are from the iterative reconstructions.

Radiation dosimetry estimates (Table 2) were obtained from the PET/CT biodistribution data (Table 1) using the OLINDA software package (Organ level Internal Dose

Assessment Code, Vanderbilt University, 2003). For these dose estimates, it was assumed that the urinary bladder was completely voided at 120-minutes post-injection, and that over the first 120-minutes the bladder contained the cumulative measured urine levels of radioactivity without intermediate voiding. The remaining unspecified radioactivity was assumed to be uniformly distributed in the remaining body volume.

Results and Discussion

The [⁶⁸Ga]Ga-HBED-CC (PSMA-11) radiopharmaceutical has been shown to be useful in the detection of tumor recurrence in prostate cancer patients previously treated with prostatectomy or radiation therapy [1,2], with lesion detectability appearing to be better than we can achieve with [¹¹C]acetate PET/CT. [⁶⁸Ga]Ga-HBED-CC (PSMA-11) has a relatively low molecular weight (1014 g/mole), and targets the cell surface prostatespecific membrane antigen (PSMA) with the urea fragment of the Glu-urea-Lys(Ahx)-HBED-CC conjugate [9]. The ⁶⁸Ga³⁺ ion is bound with high affinity in an octahedral N₂O₄ coordination sphere by the two phenolate O, two amino-acetate carboxylate O, and the two amino N donor atoms of the HBED chelator [9-12].

Radiochemical purity of the [⁶⁸Ga]Ga-HBED-CC (PSMA-11) averaged 98.9 \pm 0.5% (*n* = 9), with ⁶⁸Ge breakthrough levels in the final product averaging 8.5 x 10⁻⁶ \pm 7.9 x 10⁻⁶% (calculated for the time of dose expiration). Synthesis time, beginning-of-elution to dose release, averaged 42 \pm 1 minutes. Patients reported no symptoms, nor exhibited any adverse reactions, following radiopharmaceutical administration (3.04 \pm 0.09 mCi, 112.5 \pm 3.3 MBq). The administered mass of the HBED-CC (PSMA-11) ligand averaged 3.2 \pm

0.4 μ g, assuming all the HBED-CC (PSMA-11) in the reaction mixture remained present in the final product solution.

The PET/CT biodistribution findings for [⁶⁸Ga]Ga-HBED-CC are shown in Table 1, with a patient-by-patient tabulation provided in the Supplemental Data. Observed SUV_{mean} values at 60-minutes for kidneys, liver, spleen, and parotids $(30.1 \pm 6.6; 3.3 \pm 0.6; 5.2 \pm 2.5; and 9.4 \pm 2.0, respectively)$ are in general agreement with the SUV values of 31.7; 5.1; 7.2; and 12.9 reported by Dietlein, *et al.* [13].

Radiation dosimetry estimates, calculated from the Table 1 data using the OLINDA software package, are shown in Table 2. The kidneys are the critical organ, with an absorbed dose of 0.413 mGy/MBq (1.53 Rad/mCi). The total body dose is estimated to be 0.0143 mGy/MBq (0.0529 Rad/mCi), with an effective dose equivalent of 0.044 mSv/MBq (0.163 Rad/mCi). Afshar-Oromich, et al. [3] similarly conclude that the kidneys are the critical organ, arriving at an estimated renal dose of 0.26 mGy/MBq in their study of four subjects that included additional renal clearance data between 2 and 5 hours. Differences in administered mass of PSMA-11 may also result in some changes in renal retention of the radiotracer, but are not possible to directly compare from the published data [3]. Pfob, et al. [4], report a renal adsorbed dose of only 0.121 mGy/MBq, but those data are not directly comparable, since that study was performed with concurrent administration of furosemide at an unspecified dose to promote urine production and urinary clearance.

Comparison of images obtained with [⁶⁸Ga]Ga-HBED-CC and ¹¹C-acetate demonstrated enhanced ⁶⁸Ga identification of lymph nodes and skeletal lesions suspicious for metastatic recurrent prostate cancer, supporting clinical use of [⁶⁸Ga]Ga-HBED-CC

(PSMA-11) as an alternative to [¹¹C]acetate in assessment of prostate cancer patients presenting with biochemical failure. As examples, Figures 1 and 2 illustrate these findings in two of the subjects. While this comparison was not the study objective, and the sample size is small, our results favor clinical use of [⁶⁸Ga]Ga-HBED-CC (PSMA-11) over [¹¹C]acetate, as would be expected based on the reported clinical experience with [⁶⁸Ga]Ga-HBED-CC (PSMA-11) [1,2].

Conclusions

Radiation dosimetry estimates were calculated for [⁶⁸Ga]Ga-HBED-CC (PSMA-11) from nine prostate cancer patients in whom clinical [¹¹C]acetate PET/CT exams had been previously performed under Expanded Access IND118,204. Kidneys are the critical organ following [⁶⁸Ga]Ga-HBED-CC (PSMA-11) administration, receiving an estimated dose of 0.413 mGy/MBq.

Disclosure

The authors have no conflicts-of-interest or relevant financial activities to disclose.

Acknowledgements

Financial support for this work was provided by both the Indiana University Department of Urology, and the Indiana University Department of Radiology and Imaging Sciences. The authors gratefully acknowledge the past collaborations and seminal contributions of the late Professor Arthur E. Martell, Ph.D., whose long dedication to quantification of metal-ligand stability constants, and the design and synthesis of high-affinity chelating ligands such as H₄HBED, provided a critical foundation for development of medically useful bifunctional chelates.

Supplemental Data

A patient-by-patient tabulation of the biodistribution findings, and complete OLINDA output, is available in the online publication.

References

- Afshar-Oromieh A., Avtzi E, Giesel FL, Holland-Letz T, Linhart HG, Eder M, et al. The diagnostic value of PET/CT imaging with the ⁶⁸Ga-labelled PSMA ligand HBED-CC in the diagnosis of recurrent prostate cancer. *Eur J Nucl Med Mol Imaging* 2015;42:197-209.
- Eiber M, Maurer T, Souvatzoglou M, Beer AJ, Ruffani A, Haller B, et al. Evaluation of Hybrid ⁶⁸Ga-PSMA Ligand PET/CT in 248 Patients with Biochemical Recurrence After Radical Prostatectomy. *J Nucl Med* 2015;56:668-674.
- Afshar-Oromich A, Hetzheim H, Kübler W, Kratochwil C, Giesel FL, Hope TA, et al., Radiation dosimetry of ⁶⁸Ga-PSMA-11 (HBED-CC) and preliminary evaluation of optimal imaging timing. Eur J Nucl med Mol Imaging 2016; 43:1611-1620.
- Pfob PH, Ziegler S, Graner FP, Köhner M, Schachoff S, Blechert B, et al. Biodistribution and radiation dosimetry of ⁶⁸Ga-PSMA HBED CC – a PSMA specific probe for PET imaging of prostate cancer. Eur J. Nucl Med Mol Imaging 2016; 43:1962-1970.
- Green MA, Mathias CJ, Fletcher JW. Experience in production of ⁶⁸Ga-DOTA-NOC for clinical use under an expanded access IND. *Applied Radiation and Isotopes* 2016;116:63-68. (DOI: 10.1016/j.apradiso.2016.07.010)
- Roesch F. Maturation of a key resource the germanium-68/gallium-68 generator: development and new insights. *Curr Radiopharmaceuticals* 2012; 5:202-211.

- Vis R, Lavalaye J, van de Garde EM. GMP-compliant ⁶⁸Ga radiolabelling in a conventional small-scale radiopharmacy: a feasible approach for routine clinical use. *EJNMMI Research* 2015;5:27. DOI 10.1186/s13550-015-0105-3.
- Tworowska I, Ranganathan D, Thamake S, Delpassand E, Mojtahedi A, Schultz MK, et al. Radiosynthesis of clinical doses of ⁶⁸Ga-DOTATATE (GalioMedix[™]) and validation of organic-matrix-based ⁶⁸Ge/⁶⁸Ga generators. *Nucl Med Biol* 2016;43:19-26.
- Eder M, Neels O, Müller M, Bauder-Wüst U, Remde Y, Schäfer M, et al. Novel preclinical and radiopharmaceutical aspects of [⁶⁸Ga]Ga-PSMA-HBED-CC: a new PET tracer for imaging of prostate cancer, *Pharmaceuticals* 2014, 7, 779-796; doi:10.3390/ph7070779.
- Mathias CJ, Sun Y, Welch MJ, Green MA, Thomas JA, Wade KR, Martell, AE. Targeting radiopharmaceuticals:comparative biodistribution studies of gallium and indium complexes of multidentate ligands. *Nucl Med Biol* 1998;15:69-81.
- 11. Mathias CJ, Sun Y, Welch MJ, Connett JM, Philpott GW, Martell AE. N,N'-Bis(2hydroxybenzyl)-1-(4-bromoacetamidobenzyl)-1,2-ethylene- diamine-N,N'diacetic acid: a new bifunctional chelate for radiolabelingantibodies. *Bioconjugate Chem* 1990;1:204-211.
- 12. Zöller M, Schuhmacher J, Reed J, Maier-Borst W, Matzku S. Establishment and characterization of monoclonal antibodies against an octahedral gallium chelate suitable for immunoscintigraphy with PET *J Nucl Med* 1992;33:1366-1372.
- M Dietlein, C Kobe, G. Kuhnert, Stockter S, Fischer T, Schomäcker K, et al., Comparison of [¹⁸F]DCFPyL and [⁶⁸Ga]Ga-PSMA-HBED-CC for PSMA-PET

imaging in patients with relapsed prostate cancer. Mol Imaging Biol 2015;17:575-584.

Table 1. Observed Biodistribution of ⁶⁸Ga Following Intravenous Administration of ⁶⁸Ga-HBED-CC (PSMA-11) (3.04 ± 0.09 mCi, 112.5 ± 3.3 MBq; Injected HBED-CC = $3.2 \pm 0.4 \mu$ g) to Adult Males (95.8 ± 20.3 kg) Previously Treated for Prostate Cancer and Presenting with Biochemical Failure

(average serum PSA value of 2.3 ± 3.8 ng/mL; range 0.16 – 11.3 ng/mL; median 0.52 ng/mL).

| | Tissue Uptake of ⁶⁸ Ga as a Percentage of Injected Dose (\pm Std. Dev.; $n = 9$) | | | | | | | | |
|---------------------------------|---|-------------|-------------|--------------------|--------------------|-------------|-------------|--|--|
| | 15 Minutes | 40 Minutes | 48 Minutes | 60 Minutes | 90 Minutes | 115 Minutes | 120 Minutes | | |
| Lacrimal Glands (L + R) | 0.0090 ± 0.0044 | | | 0.0066 ± 0.0050 | 0.0075 ± 0.0049 | | | | |
| Parotid Glands (L + R) | 0.79 ± 0.26 | | | 0.87 ± 0.30 | 0.92 ± 0.35 | | | | |
| Submandibular Glands (L + R) | 0.25 ± 0.15 | | | 0.29 ± 0.19 | 0.30 ± 0.19 | | | | |
| Liver | 9.24 ± 2.14 | | | 6.54 ± 1.43 | 5.98 ± 1.39 | | | | |
| Kidneys (L + R) | 11.23 ± 2.20 | | | 14.02 ± 3.73 | 14.21 ± 4.54 | | | | |
| Spleen | 1.64 ± 0.80 | | | 1.25 ± 0.63 | 1.06 ± 0.55 | | | | |
| Pancreas | 0.12 ± 0.07 | | | 0.091 ± 0.064 | 0.086 ± 0.063 | | | | |
| Urinary bladder | 0.85 ± 0.36 | 2.84 ± 1.04 | | 1.22 ± 0.49 | 2.97 ± 1.32 | 6.53 ± 1.83 | | | |
| Voided Urine | | | 4.18 ± 1.68 | | | | 9.43 ± 2.55 | | |

| Target Organ | Organ Doses (rem/mCi) | Organ Doses (mSv/MBq) |
|---------------------------|-----------------------|-----------------------|
| Adrenals | 6.42E-02 | 1.74E-02 |
| Brain | 3.72E-02 | 1.01E-02 |
| Breasts | 3.74E-02 | 1.01E-02 |
| Gallbladder Wall | 6.06E-02 | 1.64E-02 |
| LLI Wall | 4.70E-02 | 1.27E-02 |
| Small Intestine | 5.07E-02 | 1.37E-02 |
| Stomach Wall | 5.05E-02 | 1.37E-02 |
| ULI Wall | 5.04E-02 | 1.36E-02 |
| Heart Wall | 4.60E-02 | 1.24E-02 |
| Kidneys | 1.53E+00 | 4.13E-01 |
| Liver | 1.46E-01 | 3.95E-02 |
| Lungs | 4.29E-02 | 1.16E-02 |
| Muscle | 4.29E-02 | 1.16E-02 |
| Pancreas | 7.35E-02 | 1.99E-02 |
| Red Marrow | 3.80E-02 | 1.03E-02 |
| Osteogenic Cells | 5.06E-02 | 1.37E-02 |
| Skin | 3.67E-02 | 9.93E-03 |
| Spleen | 2.15E-01 | 5.81E-02 |
| Testes | 4.07E-02 | 1.10E-02 |
| Thymus | 4.13E-02 | 1.12E-02 |
| Thyroid | 4.04E-02 | 1.09E-02 |
| Urinary Bladder Wall | 2.48E-01 | 6.71E-02 |
| Total Body | 5.29E-02 | 1.43E-02 |
| | | |
| Effective Dose Equivalent | 1.63E-01 | 4.40E-02 |
| Effective Dose | 9.53E-02 | 2.58E-02 |

Table 2. Radiation Dosimetry Estimates* for [⁶⁸Ga]Ga-HBED-CC (PSMA-11)

*Calculated with OLINDA using the biodistribution data for the nine male subjects reported in Table 1, assuming no voiding of the urinary bladder until 2-hours post-injection.

Figure 1. Example of PET images (right) and fused PET/CT images (left) obtained with ⁶⁸Ga-HBED-CC (PSMA-11) (top) and ¹¹C-acetate (bottom). The ¹¹C acetate image was obtained 48-days prior to ⁶⁸Ga imaging. Serum PSA was 1.7 ng/mL at the time of the acetate study. The red arrows indicates PSMA-avid retroperitoneal lymph nodes that are not acetate-avid (yellow arrows). The acetate PET image was reconstructed from data collected at 10 minutes post-injection. The ⁶⁸Ga image was reconstructed from data collected at 15 minutes post-injection. Lymph node uptake in the ⁶⁸Ga-images showed slight increase with time (SUV_{mean} values of 6.0, 7.8, and 8.8 (lymph node A) and 5.3, 7.3 and 9.6 (lymph node B) in images collected at 15, 60, and 90-minutes post-injection, respectively).

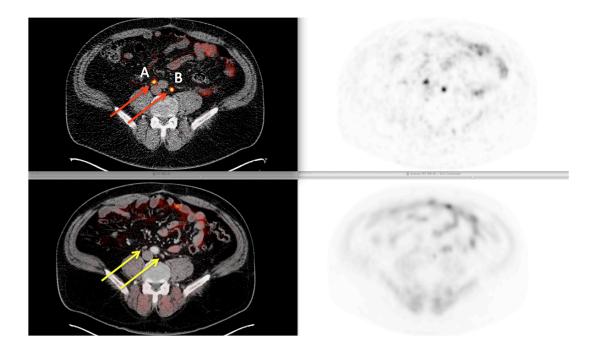
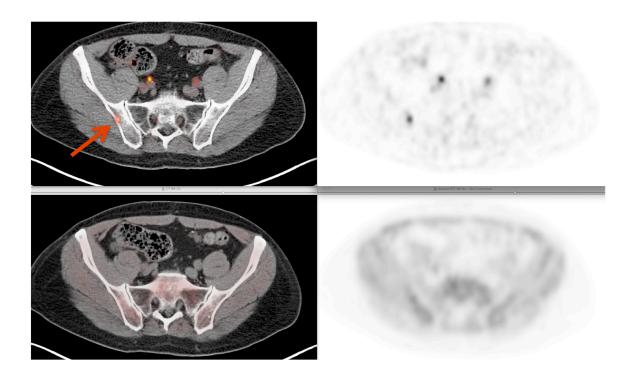


Figure 2. Additional example of PET images (right) and fused PET/CT images (left) obtained with ⁶⁸Ga-HBED-CC (PSMA-11) (top) and ¹¹C-acetate (bottom). The ¹¹C acetate image was obtained 23-days prior to ⁶⁸Ga imaging. Serum PSA was 11.1 ng/mL at the time of the acetate study. Red arrow indicates PSMA-avid bone metastasis in right ilium that was not seen on the ¹¹C-acetate exam. Ureters are noted on the PSMA study. The acetate image was reconstructed from data collected at 10 minutes post-injection, and the ⁶⁸Ga image reconstructed from data collected at 15 minutes post-injection. Tumor uptake in the ⁶⁸Ga-images was again relatively invariant with time (SUV_{mean} values of 3.5, 3.7, 3.9, 2.4, 1.8, 1.7, 1.7 and 2.2 in images collected at 0-3, 4-6, 7-9, 15, 40, 60, 90, and 115-minutes post-injection, respectively).



| Night of Date (mc1) 3.18 3.12 2.04 2.05 3.05 3.01 3.07 3.13 3.44 Semin F54 (mg/m1) 2.13 3.13 3.25 3.13 3.25 3.13 3.07 3.13 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 3.14 | | Time Post- Injection (min) | Patient 1 | Patient 2 | Patient 3 | Patient 4 | Patient 5 | Patient 6 | Patient 7 | Patient 8 | Patient 9 | Mean | Std Dev |
|--|------------------------|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|---------------------|
| Bigeted BBD C (tig) 2.82 3.46 3.36 3 3.09 3.27 3.55 3.73 0.16 0.55 Stemer Mody Mass (tig) 9.77 10.61 11.24 11.24 6.35 0.37 0.025 0.005 0.005 0.005 0.005 0.007 0.025 0.005 0.007 0.025 0.006 0.007 0.005 0.006 0.005 0.005 0.005 0.007 0.012 0.013 0.012 0.013 0.027 0.026 0.329 0.234 0.329 0.234 0.329 0.234 0.329 0.234 0.329 0.234 0.329 0.234 0.329 0.234 0.329 0.234 0.339 0.133 0.133 0.133 0.133 0.133 0.133 | njected Dose (mCi) | | 3.18 | 3.12 | 2.94 | 2.95 | 2.94 | 3.06 | 3.01 | 3.07 | 3.13 | 3.04 | 0.09 |
| Varient Body Mass (kg) 97.7 10.6.1 11.8 122.8 70.05 81.85 122.49 93.94 84.55 95.78 Instrinal 15 0.001 0.005 0.007 0.005 0.007 0.005 0.012 0.005 0.014 0.047 0.027 0.000 0.005 0.021 0.001 0.005 0.021 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.007 <td>njected HBED-CC (µg)</td> <td></td> <td>2.82</td> <td>3.45</td> <td>3.36</td> <td>3</td> <td>3.09</td> <td>3.27</td> <td>3.55</td> <td>3.73</td> <td>2.36</td> <td>3.18</td> <td>0.42</td> | njected HBED-CC (µg) | | 2.82 | 3.45 | 3.36 | 3 | 3.09 | 3.27 | 3.55 | 3.73 | 2.36 | 3.18 | 0.42 |
| Hartmal 15 0.001 0.002 0.005 0.003 0.003 0.005 0.003 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.005 0.001 0.013 0.017 0.010 0.017 0.010 0.017 0.010 0.017 0.010 0.017 0.010 0.017 0.010 0.017 0.011 0.011 0.011 0.011 0.011 0.011 0.011 | Serum PSA (ng/mL) | | 0.3 | 0.3 | 0.52 | 1.7 | 11.3 | 5.5 | 0.33 | 0.16 | 0.65 | 2.31 | 3.77 |
| Lectmani 15 0, 0002 0, 0003 0, 0007 0, 0005 0, 007 0, 007 0, 007 0, 0005 0, 0004 0, 0009 0, 0005 0, 0004 0, 0009 0, 0004 0, 0009 0, 0004 0, 0009 0, 0004 0, 0009 0, 0004 0, 0009 0, 0004 0, 0009 0, 0004 0, 0009 0, 0004 0, 0009 0, 0004 0, 0009 0, 00 | Patient Body Mass (kg) | | 97.7 | 106.1 | 118 | 122.6 | 70.05 | 81.65 | 112.49 | 68.94 | 84.5 | 95.78 | 20.35 |
| Liermail 15 0.002 0.003 0.007 0.007 0.007 0.005 0.004 B partiti 15 0.408 0.254 0.422 0.707 0.297 0.388 0.298 0.217 0.297 0.386 0.298 0.217 0.297 0.398 0.298 0.217 0.297 0.398 0.217 0.297 0.398 0.217 0.297 0.396 0.217 0.297 0.396 0.297 0.666 0.797 0.666 0.797 0.566 0.798 0.217 0.297 0.566 0.797 0.567 0.666 0.793 0.577 0.567 0.666 0.793 0.678 0.698 0.204 0.498 0.278 0.561 0.398 0.298 0.238 0.198 0.238 0.298 0.238 0.298 0.238 0.208 0.207 0.235 0.208 0.207 0.235 7.208 5.55 5.56 5.66 5.65 5.56 5.66 5.65 5.56 7.567 1.341 | R lacrimal | 15 | 0.001 | 0.003 | 0.007 | 0.006 | 0.006 | 0.003 | 0.008 | 0.002 | 0.005 | 0.005 | 0.002 |
| OTAL Lacemania 15 0.000 0.004 0.012 0.011 0.007 0.015 0.015 0.011 0.009 purotid 15 0.430 0.238 0.477 0.527 0.377 0.328 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0.002</td></t<> | | | | | | | | | | | | | 0.002 |
| sportid 15 0.400 0.224 0.727 0.236 0.278 0.277 0.207 0.464 0.404 OFOAL Parotid 15 0.733 0.554 0.230 0.737 0.300 0.464 0.404 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0.0044</td></th<> | | | | | | | | | | | | | 0.0044 |
| TOTAL Protection 15 0.782 0.622 0.899 1.271 0.537 1.115 0.675 0.6097 0.6097 0.6097 0.6097 0.6097 0.6097 0.022 0.024 0.0997 0.025 5.818 0.717 0.618 0.623 0.617 <td></td> <td></td> <td>0.400</td> <td></td> <td></td> <td></td> <td></td> <td>0.636</td> <td></td> <td></td> <td></td> <td></td> <td>0.17</td> | | | 0.400 | | | | | 0.636 | | | | | 0.17 |
| Submanibular 15 0.098 0.226 0.128 0.104 0.275 0.020 0.080 0.128 OTDAL Submanibular 15 0.178 0.460 0.174 0.426 0.122 0.084 0.224 0.179 0.225 0.024 0.179 0.235 OTDAL Submanibular 15 0.178 0.460 0.174 0.426 0.225 0.024 0.179 0.556 5.68 Liker 13 5.611 5.62 4.561 3.608 6.104 4.939 6.112 0.719 0.556 5.68 Likering 13 0.744 1.387 1.245 1.244 2.377 1.64 Unrevisit 15 0.274 0.385 1.276 0.384 0.145 0.098 0.003 0.011 0.028 Unrevisit 0.057 0.746 0.384 0.038 0.038 0.001 0.007 0.038 0.003 0.001 0.003 Licerimal 60 0.0021 0.0 | _ parotid | 15 | 0.343 | 0.298 | 0.477 | 0.564 | 0.240 | 0.478 | 0.377 | 0.390 | 0.404 | 0.40 | 0.10 |
| Lachmandbular 15 0.08 0.204 0.085 0.226 0.132 0.088 0.227 0.024 0.099 0.13 Liver 15 10.045 9.431 7.729 8.382 7.854 13.670 6.316 5.39 10.544 9.34 Liker 15 5.511 5.522 4.561 1.865 1.437 13.633 11.235 Likingy 15 5.388 6.090 3.211 3.684 6.104 4.939 5.843 7.066 7.028 5.55 Spleen 15 0.744 1.265 1.275 2.641 2.579 2.064 2.331 0.457 1.642 Parretens 15 0.327 0.744 0.681 0.087 0.097 0.003 0.001 0.007 0.003 0.001 0.007 0.005 0.003 0.001 0.002 0.001 0.007 0.005 0.001 0.002 0.001 0.007 0.005 0.001 0.002 0.001 <td< td=""><td>TOTAL Parotid</td><td></td><td>0.743</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0.26</td></td<> | TOTAL Parotid | | 0.743 | | | | | | | | | | 0.26 |
| TOTAL Submandibular 15 0.747 0.6460 0.174 0.428 0.191 0.328 0.024 0.179 0.25 Kidney 15 5.611 5.626 4.561 3.808 6.361 5.339 6.023 7.109 6.505 5.583 Kidney 15 5.610 5.226 4.561 3.808 6.361 5.339 6.023 7.028 5.553 OTAL Submandibular 15 1.000 11.715 8.381 7.491 12.465 1.477 13.831 0.457 1.486 Pancreas 15 0.260 0.0401 0.081 0.088 0.145 0.046 0.046 0.021 Unarinary bladder 15 0.260 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 | | | | | | | | | | | | | 0.08 |
| User 15 10.045 9.431 7.729 8.382 7.854 13.670 5.16 9.272 10.544 9.24 Lödney 15 5.581 6.000 3.821 3.684 6.104 4.939 5.83 7.066 7.028 5.55 Splen 15 0.744 1.395 1.265 1.275 2.641 2.579 2.064 2.331 0.457 1.642 Jancreas 15 0.744 0.397 0.766 0.068 0.068 0.069 0.001 0.033 0.001 0.033 0.001 0.002 0.007 0.008 0.003 0.001 0.003 0.001 0.003 0.001 0.003 0.001 0.003 0.001 0.003 0.001 0.003 0.001 0.003 0.001 0.003 0.001 0.003 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.003 0.001 0.001 0.001 0.003 0.001 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0.07</td></t<> | | | | | | | | | | | | | 0.07 |
| B kincy 15 5.6.11 5.6.26 4.561 3.808 6.301 5.393 6.005 5.605 5.68 TOTAL Kidney 15 1.000 1.17.16 8.381 7.491 12.465 10.478 11.866 14.175 13.533 11.236 Pancreas 15 0.233 0.250 0.041 0.081 0.081 0.084 0.044 0.046 0.122 Urinary bladder 15 0.233 0.250 0.041 0.001 0.007 0.003 0.003 0.001 0.001 0.007 0.003 0.008 0.001 0.001 0.001 0.007 0.003 0.001 0.001 0.001 0.001 0.001 0.007 0.003 0.008 0.001 0.002 0.008 0.018 0.008 0.012 0.001 0.002 0.001 0.007 0.018 0.022 0.006 0.022 0.006 0.022 0.006 0.022 0.006 0.011 0.024 0.001 0.017 0.013 | | | | | | | | | | | | | 0.15 |
| Lédney 15 5.38 6.090 3.821 3.644 6.104 4.939 5.843 7.066 7.028 5.55 Spleen 15 0.744 1.395 1.265 1.2465 1.0465 1.1275 1.333 1.123 Spleen 15 0.231 0.266 0.041 0.081 0.018 0.045 0.064 0.045 0.045 0.024 0.025 0.035 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.001 0.002 0.005 0.005 0.006 0.002 0.001 0.002 0.005 0.006 0.002 0.001 0.002 0.005 0.006 0.002 0.001 0.003 0.011 0.002 0.005 0.005 0.006 0.002 0.001 0.007 0.035 0.006 0.002 0.001 0.003 0.011 0.002 0.007 0.016 0.002 0.006 0.002 0.006 0.002 0.006 0.002 0.006 0.017 | | | | | | | | | | | | | 2.14 |
| TOTAL Kelony 15 11.000 11.716 8.381 7.491 12.465 10.478 11.866 14.175 13.533 11.28 Pancrass 15 0.233 0.260 0.041 0.081 0.081 0.048 0.044 0.044 0.044 0.044 0.044 0.045 0.044 0.044 0.021 0.033 0.001 0.003 0.001 0.002 0.003 0.003 0.001 0.002 0.003 0.001 0.002 0.003 0.001 0.002 0.003 0.016 0.002 0.003 0.010 0.002 0.003 0.016 0.006 0.002 0.003 0.011 0.022 0.003 0.014 0.028 0.022 0.006 0.002 0.003 0.010 0.022 0.006 0.002 0.001 0.022 0.006 0.022 0.000 0.003 0.013 0.013 0.024 0.024 0.026 0.021 0.101 0.135 0.346 0.346 0.349 0.323 0.489 | • | | | | | | | | | | | | 1.01 1.23 |
| Sphem 15 0.744 1.395 1.265 1.255 2.641 2.799 2.064 2.311 0.457 1.64 Panreas 15 0.325 0.326 0.041 0.081 0.088 0.094 0.046 0.125 0.375 0.355 Riscrimal 60 0.001 0.002 0.001 0.002 0.003 0.008 0.003 0.001 0.003 Riscrimal 60 0.001 0.002 0.001 0.002 0.003 0.008 0.003 0.001 0.003 Riscrimal 60 0.002 0.004 0.004 0.004 0.005 0.014 0.014 0.024 0.014 0.028 0.014 0.024 0.014 0.024 0.014 0.246 0.517 0.346 0.456 0.457 Rubmandibular 60 0.732 0.529 0.529 0.224 0.121 0.101 0.111 0.15 TOTAL Lorinnal 60 0.073 0.232 0.899 | • | | | | | | | | | | | | 1.23 2.20 |
| Pancess 15 0.203 0.260 0.041 0.081 0.081 0.084 0.094 0.064 0.046 Narimal 60 0.001 0.002 0.003 0.001 0.007 0.008 0.008 0.003 0.001 0.007 Icharimal 60 0.001 0.002 0.001 0.007 0.008 0.008 0.001 0.003 TOTAL Lacrimal 60 0.002 0.004 0.004 0.004 0.005 0.016 0.006 0.002 0.0066 parcetid 60 0.022 0.024 0.361 0.756 0.331 0.276 0.244 0.42 L parcetid 60 0.722 0.682 0.483 0.546 0.517 0.346 0.452 0.700 0.471 L parcetid 60 0.732 0.525 0.168 0.523 0.021 0.111 0.573 0.456 0.451 0.451 L parcetid 60 0.732 0.525 0.548 | • | | | | | | | | | | | | 0.80 |
| Urinary bladder 15 0.857 0.746 0.844 1.320 1.120 0.463 1.390 0.572 0.375 0.85 Riscrimal 60 0.001 0.002 0.001 0.002 0.003 0.008 0.003 0.001 0.003 Liscrimal 60 0.001 0.002 0.001 0.005 0.008 0.002 0.001 0.003 TOTAL Lacrimal 60 0.0414 0.247 0.4033 0.659 0.246 0.517 0.346 0.456 0.456 0.455 Lacrimal 60 0.212 0.687 8.453 0.664 1.300 0.000 0.007 0.44 Labromdibular 60 0.733 0.252 0.453 0.464 1.300 0.848 6.522 0.700 0.41 Labromdibular 60 6.173 0.525 0.464 0.157 0.118 0.401 1.51 TOTAL Submandibular 60 6.314 5.397 5.280 7.274 | • | | | | | | | | | | | | 0.07 |
| Lacrimal 60 0.001 0.002 0.007 0.008 0.002 0.001 0.003 R parotid 60 0.002 0.004 0.008 0.014 0.006 0.002 0.0068 R parotid 60 0.414 0.274 0.403 0.764 0.351 0.766 0.331 0.276 0.244 0.425 L parotid 60 0.712 0.682 0.896 1.453 0.646 1.300 0.848 0.622 0.070 0.14 L submandibular 60 0.073 0.232 0.099 0.243 0.120 0.118 0.240 0.000 0.070 0.14 Lishmandibular 60 0.173 0.525 0.188 0.607 0.288 0.222 0.621 0.111 0.15 TOTAL Submandibular 60 6.131 4.376 7.704 7.404 5.59 7.584 8.598 6.544 R kidney 60 1.517 1.0414 1.207 1.4949 1 | Urinary bladder | | 0.857 | 0.746 | 0.844 | 1.320 | 1.120 | 0.463 | 1.390 | | | 0.85 | 0.36 |
| TOTAL Lacrimal 60 0.002 0.004 0.003 0.014 0.006 0.016 0.005 0.002 0.0068 R parotid 60 0.434 0.274 0.403 0.764 0.311 0.776 0.244 0.422 L parotid 60 0.712 0.682 0.896 0.285 0.544 0.517 0.346 0.456 0.421 L submandibular 60 0.073 0.232 0.079 0.243 0.120 0.118 0.240 0.000 0.070 0.14 L submandibular 60 0.073 0.232 0.670 0.288 0.222 0.021 0.111 0.15 L submandibular 60 0.737 0.525 0.168 0.570 2.88 0.222 0.621 0.517 0.14 0.203 1.8,751 0.161 0.401 7.17 L kidney 60 6.314 4.390 9.679 8.482 15.027 1.049 1.402 1.402 1.402 1.402 | R lacrimal | 60 | 0.001 | 0.002 | 0.003 | 0.001 | 0.007 | 0.003 | 0.008 | 0.003 | 0.001 | 0.003 | 0.003 |
| B parotid 60 0.414 0.274 0.403 0.764 0.361 0.776 0.331 0.276 0.244 0.424 L parotid 60 0.272 0.493 0.689 0.285 0.544 0.517 0.366 0.456 0.455 R submandibular 60 0.072 0.682 0.899 0.228 0.120 0.118 0.242 0.000 0.000 0.001 0.14 Submandibular 60 0.073 0.225 0.688 0.507 0.228 0.021 0.111 0.29 User 60 6.914 5.992 5.320 5.207 7.876 3.695 7.548 8.598 6.544 R kidney 60 7.552 4.338 4.105 7.322 6.694 5.849 9.754 9.350 6.855 TOTAL Kidney 60 0.517 1.014 1.000 1.042 2.007 1.409 12.003 19.870 18.751 1.425 Pances 0 | L lacrimal | 60 | 0.001 | 0.002 | 0.001 | 0.002 | 0.007 | 0.005 | 0.008 | 0.002 | 0.001 | 0.003 | 0.002 |
| Larindid 60 0.238 0.407 0.438 0.689 0.285 0.544 0.517 0.346 0.456 0.456 0.45 TOTAL Parcetal R submandibular 60 0.073 0.232 0.689 0.264 0.167 0.104 0.282 0.021 0.101 0.15 TOTAL Submandibular 60 0.073 0.232 0.689 0.264 0.167 0.104 0.282 0.021 0.101 0.15 TOTAL Submandibular 60 0.173 0.525 0.168 0.070 0.288 0.222 0.523 0.021 0.171 0.29 Liver 60 6.5914 5.992 5.999 6.320 5.920 7.746 3.665 7.584 8.598 6.54 R idney 60 7.094 6.837 5.441 4.376 7.704 7.400 6.155 10.16 9.401 7.17 Lider 60 6.512 7.552 4.238 4.106 7.322 6.649 5.849 9.754 9.350 6.85 TOTAL Kidney 60 6.517 1.014 1.000 1.043 2.097 1.741 1.509 1.997 0.321 1.25 Panceas 60 0.517 1.014 1.000 1.042 2.066 0.012 0.005 0.009 0.004 0.005 0.009 Urinary bladder 60 0.033 0.002 0.001 0.002 0.006 0.004 0.009 0.004 0.005 0.009 Licrimal 90 0.001 0.002 0.001 0.002 0.006 0.004 0.009 0.004 0.005 0.009 Licrimal 90 0.002 0.001 0.002 0.006 0.004 0.009 0.004 0.005 0.009 Licrimal 90 0.002 0.001 0.002 0.006 0.004 0.009 0.002 0.005 0.009 Licrimal 90 0.002 0.001 0.002 0.006 0.004 0.009 0.002 0.005 0.009 Licrimal 90 0.002 0.001 0.001 0.002 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.003 0.003 0.002 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.020 0.001 0.002 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.020 0.001 0.001 0.002 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.020 0.001 0.001 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.020 0.001 0.002 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.020 0.001 0.002 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.023 0.003 0.022 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.023 0.003 0.022 0.006 0.005 0.009 0.002 0.005 0.009 Licrimal 90 0.023 0.035 0.072 0.275 0.167 0.177 0.368 0.544 0.336 0.524 0.458 Licrimal 90 0.033 0.002 0.021 0.012 0.306 0.025 0.009 0.021 0.011 0.055 Licrimal 90 0.026 0.357 0.220 0.191 0.336 0.357 0.220 0.191 0.358 Licrimal 90 0.028 5.389 5.886 5.588 5.506 6.619 3.384 6.547 5.524 5.98 R Ridney 90 0.422 0.857 0.802 0.823 1.860 1.4300 1.330 0.235 7.22 Licrimar 91adder | TOTAL Lacrimal | 60 | 0.002 | 0.004 | 0.004 | 0.003 | 0.014 | 0.008 | 0.016 | 0.006 | 0.002 | 0.0066 | 0.0050 |
| rD7A Parotid 60 0.712 0.682 0.896 1.433 0.646 1.300 0.848 0.622 0.700 0.87 Submandibular 60 0.073 0.233 0.079 0.243 0.120 0.118 0.240 0.000 0.070 0.141 Submandibular 60 0.073 0.232 0.168 0.507 0.248 0.022 0.523 0.021 0.101 0.151 OTAL Submandibular 60 6.141 5.992 5.990 6.320 5.920 7.854 8.998 6.54 View 60 7.052 4.238 4.106 7.322 6.649 5.849 9.754 9.350 6.85 OTAL Kidney 60 0.217 0.161 0.002 0.062 0.064 0.103 1.999 0.321 1.25 Pancreas 60 0.217 0.161 0.002 0.066 0.004 0.009 0.002 0.005 0.004 Jrinrary bladder 0 </td <td>R parotid</td> <td>60</td> <td>0.414</td> <td>0.274</td> <td>0.403</td> <td>0.764</td> <td>0.361</td> <td>0.756</td> <td>0.331</td> <td>0.276</td> <td>0.244</td> <td>0.42</td> <td>0.20</td> | R parotid | 60 | 0.414 | 0.274 | 0.403 | 0.764 | 0.361 | 0.756 | 0.331 | 0.276 | 0.244 | 0.42 | 0.20 |
| R submandibular 60 0.099 0.233 0.079 0.243 0.120 0.118 0.240 0.000 0.070 0.14 L submandibular 60 0.073 0.232 0.089 0.264 0.167 0.104 0.282 0.021 0.101 0.15 Liver 60 0.514 5.922 5.920 5.826 0.727 0.523 0.021 0.111 0.121 Liver 60 5.914 4.376 7.704 7.400 6.155 1.116 9.401 7.171 Lkidney 60 6.520 7.552 4.238 4.106 7.322 6.694 5.849 9.754 9.350 6.85 Spleen 60 0.517 1.014 1.000 1.043 2.097 1.741 1.509 1.8771 1.402 Spleen 60 0.217 0.162 0.064 0.108 0.025 0.004 1.007 0.021 0.005 0.0091 0.0042 0.005 0.0091 | • | | | | | | | | | | | | 0.13 |
| Lisbmandibular 60 0.073 0.232 0.089 0.264 0.167 0.104 0.282 0.021 0.1011 0.15 TOTAL Submandibular 60 0.173 0.525 0.168 0.507 0.288 0.222 0.523 0.021 0.171 0.29 Vier 60 6.344 5.920 7.876 3.695 7.584 8.598 6.544 R kidney 60 7.094 6.837 5.441 4.376 7.704 7.400 6.155 10.116 9.401 7.17 Kidney 60 13.914 14.390 9.679 8.482 15.027 14.094 12.003 19.870 18.751 14.02 Spleen 60 0.517 1.014 1.000 1.043 2.097 1.741 1.509 1.999 0.321 1.25 Panceas 60 0.017 0.062 0.064 0.009 0.002 0.004 0.005 0.009 0.002 0.004 0.005 0.009 | | | | | | | | | | | | | 0.30 |
| TOTAL Submandibular 60 0.173 0.525 0.168 0.507 0.288 0.222 0.523 0.021 0.171 0.29 Liver 60 6.914 5.999 6.320 5.920 7.876 3.695 7.584 8.598 6.54 Kidney 60 6.820 7.552 4.238 4.106 7.322 6.694 5.849 9.754 9.350 6.85 Spleen 60 15.31 1.014 1.000 1.043 2.097 1.404 1.009 1.8.751 1.4.02 Spleen 60 0.517 1.014 1.000 1.043 2.097 1.741 1.509 1.999 0.321 1.25 Panceas 60 0.217 0.165 0.027 0.062 0.080 0.099 0.004 0.005 0.009 Urinary bladder 60 1.396 1.464 0.206 0.004 0.009 0.004 0.005 0.004 Urinary bladder 90 0.003 | | | | | | | | | | | | | 0.10 |
| Liver 60 6.914 5.992 5.999 6.320 5.207.876 3.695 7.584 8.598 6.54 R kidney 60 7.094 6.837 5.441 4.376 7.704 7.400 6.155 10.116 9.401 7.17 kidney 60 13.914 14.390 9.679 8.482 15.027 14.094 12.003 19.870 18.751 14.02 Spleen 60 0.217 0.165 0.027 0.062 0.064 0.108 0.026 0.097 0.050 0.091 Urinary bladder 60 0.319 1.464 0.780 1.464 2.206 0.892 1.312 0.758 0.662 1.22 R lacrimal 90 0.001 0.002 0.001 0.002 0.006 0.004 0.009 0.004 0.005 0.009 L lacrimal 90 0.002 0.001 0.001 0.004 0.006 0.005 0.009 0.002 0.005 0.004 L lacrimal 90 0.002 0.001 0.001 0.004 0.006 0.005 0.009 0.002 0.005 0.004 L lacrimal 90 0.003 0.003 0.002 0.006 0.012 0.008 0.017 0.006 0.011 0.008 R parotid 90 0.313 0.389 0.387 0.732 0.280 0.588 0.544 0.336 0.524 0.45 R parotid 90 0.313 0.389 0.387 0.732 0.281 0.588 0.544 0.336 0.524 0.45 R parotid 90 0.313 0.389 0.387 0.732 0.281 0.588 0.544 0.336 0.524 0.45 R parotid 90 0.012 0.005 0.072 0.275 0.161 0.17 0.006 0.011 0.080 0.45 R parotid 90 0.122 0.305 0.072 0.275 0.161 0.17 0.875 0.6628 0.824 0.92 R submandibular 90 0.009 0.007 0.275 0.161 0.377 0.875 0.6628 0.824 0.92 R submandibular 90 0.025 0.399 0.397 0.732 0.281 0.317 0.875 0.6628 0.824 0.92 R submandibular 90 0.422 0.350 0.072 0.275 0.114 0.129 0.251 0.001 0.080 0.15 I submandibular 90 0.422 0.359 0.475 0.461 0.336 0.574 0.45 TOTAL Lacrimal 90 0.422 0.359 0.475 0.461 0.396 0.392 0.311 0.292 0.51 0.011 0.080 0.15 R kidney 90 0.422 0.879 0.439 4.114 7.581 7.265 5.572 10.905 10.235 7.22 R kidney 90 6.549 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 0.594 R kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.379 10.206 0.111 0.15 TOTAL Submandibular 90 0.422 0.857 0.802 0.888 1.803 1.4305 1.4300 10.911 2.1574 20.468 1.42.11 Spleen 90 7.098 6.773 5.439 4.114 7.581 7.265 5.572 10.905 10.235 7.22 Urinary Bladder 40 2.449 2.77 3.64 3.59 3.53 2.11 4.43 1.17 1.83 2.84 Urinary Bladder 40 2.49 2.77 3.64 3.59 3.53 2.11 4.43 1.17 1.83 2.84 Urinary Bladder 40 2.49 2.77 3.64 3.59 3.53 2.11 4.78 8.80 2.92 7.20 6.53 | | | | | | | | | | | | | 0.09 |
| R kidney 60 7.094 6.837 5.441 4.376 7.7400 6.155 10.116 9.401 7.17 L kidney 60 6.820 7.352 4.238 4.106 7.322 6.694 5.849 9.754 9.350 6.685 Spleen 60 1.517 1.014 1.000 1.043 2.097 1.741 1.509 1.999 0.321 1.25 Pancreas 60 0.217 0.165 0.027 0.062 0.064 0.108 0.026 0.097 0.050 0.091 Urnary bladder 90 0.001 0.002 0.001 0.002 0.006 0.004 0.009 0.004 0.005 0.004 L lacrimal 90 0.002 0.001 0.002 0.006 0.017 0.006 0.011 0.008 0.017 0.006 0.011 0.008 0.017 0.006 0.011 0.004 0.005 0.001 0.004 0.004 0.005 0.001 0.004 0.004 0.005 0.001 0.002 0.011 0.004 0.011 0.0 | | | | | | | | | | | | | 0.19 |
| L kidney 60 6.820 7,552 4.238 4.106 7,322 6.694 5.849 9,754 9.350 6.85 TOTAL Kidney 60 13.914 14.390 9.679 8.482 15.027 14.094 12.003 19.870 18.751 14.02 Spleen 60 0.517 1.014 1.000 1.043 2.097 1.741 1.509 1.999 0.321 1.25 Pancreas 60 0.217 0.165 0.027 0.062 0.064 0.108 0.026 0.097 0.050 0.091 Urinary bladder 60 1.396 1.464 0.780 1.464 2.206 0.892 1.312 0.758 0.662 1.22 R lacrimal 90 0.001 0.002 0.001 0.002 0.006 0.004 0.009 0.004 0.005 0.004 L acrimal 90 0.003 0.003 0.002 0.001 0.006 0.005 0.009 0.002 0.005 0.004 L acrimal 90 0.003 0.003 0.002 0.001 0.001 0.004 0.005 0.009 0.004 0.005 0.004 R parotid 90 0.425 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.046 L parotid 90 0.425 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.46 L parotid 90 0.313 0.389 0.387 0.732 0.280 0.588 0.544 0.336 0.524 0.45 TOTAL Lacrimal 90 0.005 0.007 0.275 0.167 0.107 0.306 0.020 0.111 0.082 R submandibular 90 0.095 0.199 0.077 0.275 0.167 0.107 0.306 0.020 0.111 0.15 L submandibular 90 0.095 0.199 0.077 0.275 0.167 0.107 0.306 0.020 0.111 0.15 L submandibular 90 0.095 0.199 0.077 0.275 0.167 0.107 0.306 0.020 0.111 0.15 L submandibular 90 0.028 5.369 5.686 5.588 5.506 6.619 3.384 6.547 8.524 5.98 R kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 TOTAL kidney 90 6.208 5.369 5.686 5.588 5.506 6.619 3.384 6.547 8.524 5.98 Pancreas 90 0.421 0.457 0.452 0.302 0.452 0.057 0.020 0.111 0.35 TOTAL kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 TOTAL kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Pancreas 90 0.217 0. | | | | | | | | | | | | | 1.43 1.80 |
| TOTAL kidney 60 13.914 14.390 9.679 8.482 15.027 14.094 12.003 19.870 18.751 14.02 Spleen 60 0.517 1.014 1.000 1.043 2.097 1.741 1.509 1.999 0.321 1.25 Pancreas 60 0.517 0.165 0.027 0.062 0.064 0.091 0.091 0.021 0.050 0.091 Urinary bladder 60 1.396 1.464 0.780 1.464 2.206 0.892 1.312 0.758 0.662 0.004 Itarinal 90 0.001 0.002 0.001 0.002 0.006 0.012 0.008 0.017 0.006 0.011 0.008 0.001 0.004 0.006 0.011 0.008 0.011 0.008 0.004 0.006 0.011 0.006 0.011 0.006 0.011 0.006 0.011 0.006 0.011 0.006 0.011 0.006 0.011 0.006 0.011 0.008 0.524 0.534 0.544 0.544 0.524 0.544 | | | | | | | | | | | | | 1.80 |
| Spleen 60 0.517 1.014 1.000 1.043 2.097 1.741 1.509 1.999 0.321 1.25 Pancreas 60 0.217 0.165 0.027 0.062 0.064 0.108 0.026 0.091 0.091 0.091 0.091 0.091 0.091 0.091 0.091 0.002 0.064 0.108 0.026 0.004 0.005 0.004< | • | | | | | | | | | | | | 3.73 |
| Pancreas 60 0.217 0.165 0.027 0.062 0.064 0.108 0.026 0.097 0.050 0.091 Urinary bladder 60 1.396 1.464 0.780 1.464 2.206 0.892 1.312 0.758 0.662 1.22 R lacrimal 90 0.001 0.002 0.001 0.002 0.006 0.004 0.009 0.002 0.005 0.004 L lacrimal 90 0.002 0.001 0.001 0.004 0.006 0.005 0.009 0.002 0.005 0.004 R parotid 90 0.002 0.006 0.012 0.008 0.017 0.006 0.011 0.008 R parotid 90 0.313 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.466 L parotid 90 0.133 0.348 0.742 0.738 0.541 0.336 0.524 0.451 R submandibular 90 </td <td></td> <td>0.63</td> | | | | | | | | | | | | | 0.63 |
| R lacrimal 90 0.001 0.002 0.001 0.002 0.006 0.004 0.009 0.004 0.005 0.004 L lacrimal 90 0.003 0.003 0.002 0.006 0.012 0.008 0.017 0.006 0.011 0.008 R parotid 90 0.425 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.46 L parotid 90 0.425 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.46 TOTAL Parotid 90 0.738 0.715 0.815 1.655 0.651 1.377 0.875 0.628 0.824 0.92 R submandibular 90 0.102 0.305 0.072 0.275 0.167 0.107 0.306 0.020 0.111 0.15 TOTAL Submandibular 90 0.197 0.503 0.148 0.546 0.281 0.236 0.557 0.020 0.191 0.30 Liver 90 6.208 5.859 5.666 | • | | | | | | | | | | | | 0.064 |
| L lacrimal 90 0.002 0.001 0.004 0.006 0.005 0.009 0.002 0.005 0.004 TOTAL Lacrimal 90 0.025 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.466 L parotid 90 0.425 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.466 L parotid 90 0.338 0.735 0.628 0.824 0.92 TOTAL Parotid 90 0.738 0.715 0.815 1.655 0.651 1.377 0.875 0.628 0.824 0.92 R submandibular 90 0.095 0.199 0.077 0.275 0.167 0.107 0.306 0.020 0.111 0.15 L submandibular 90 0.99 7.050 0.144 0.546 0.281 0.557 0.020 0.191 0.30 Liver 90 6.208 5.369 5.686 5.588 5.506 6.619 3.384 6.947 8.524 5.98 | Urinary bladder | 60 | 1.396 | 1.464 | 0.780 | 1.464 | 2.206 | 0.892 | 1.312 | 0.758 | 0.662 | 1.22 | 0.49 |
| TOTAL Lacrimal 90 0.003 0.003 0.002 0.006 0.012 0.008 0.017 0.006 0.011 0.008 R parotid 90 0.425 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.46 L parotid 90 0.313 0.389 0.387 0.732 0.280 0.588 0.544 0.326 0.524 0.45 TOTAL Parotid 90 0.338 0.715 0.815 1.655 0.661 1.377 0.875 0.628 0.824 0.92 R submandibular 90 0.102 0.305 0.072 0.271 0.114 0.129 0.251 0.001 0.080 0.15 L submandibular 90 0.197 0.503 0.148 0.546 0.281 0.236 0.557 0.020 0.111 0.30 Liver 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 TOTAL Laroid 90 6.949 7.459 4.052 | R lacrimal | 90 | 0.001 | 0.002 | 0.001 | 0.002 | 0.006 | 0.004 | 0.009 | 0.004 | 0.005 | 0.004 | 0.0025 |
| R parotid 90 0.425 0.326 0.428 0.923 0.371 0.789 0.331 0.292 0.300 0.46 L parotid 90 0.313 0.389 0.387 0.732 0.280 0.588 0.544 0.336 0.524 0.45 TOTAL Parotid 90 0.738 0.715 0.815 1.655 0.651 1.377 0.875 0.628 0.824 0.92 R submandibular 90 0.102 0.305 0.072 0.271 0.114 0.129 0.251 0.001 0.080 0.15 TOTAL Submandibular 90 0.197 0.503 0.148 0.546 0.281 0.236 0.557 0.020 0.191 0.300 Liver 90 6.208 5.369 5.686 5.588 5.506 6.619 3.384 6.947 8.524 5.98 R kidney 90 7.098 6.773 5.439 4.114 7.861 7.265 5.572 10.905 10.235 7.22 TOTAL Kidney 90 14.047 14.232 9.491 | | | | | | | | | | | | | 0.0025 |
| L parotid 90 0.313 0.389 0.387 0.732 0.280 0.588 0.544 0.336 0.524 0.45 TOTAL Parotid 90 0.738 0.715 0.815 1.655 0.651 1.377 0.875 0.628 0.824 0.92 R submandibular 90 0.102 0.305 0.072 0.271 0.114 0.129 0.251 0.001 0.080 0.15 L submandibular 90 0.197 0.503 0.148 0.546 0.281 0.236 0.557 0.020 0.191 0.30 Liver 90 6.208 5.369 5.686 5.588 5.506 6.619 3.384 6.947 8.524 5.98 R kidney 90 7.098 6.773 5.439 4.114 7.581 7.265 5.572 10.905 10.235 7.22 L kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 TOTAL Kidney 90 14.047 14.232 9.491 | | | | | | | | | | | | | 0.005 |
| TOTAL Parotid900.7380.7150.8151.6550.6511.3770.8750.6280.8240.92R submandibular900.1020.3050.0720.2710.1140.1290.2510.0010.0800.15L submandibular900.0950.1990.0770.2750.1670.1070.3060.0200.1110.15TOTAL Submandibular900.1970.5030.1480.5460.2810.2360.5570.0200.1910.30Liver906.2085.3695.6865.5885.5066.6193.3846.9478.5245.98R kidney907.0986.7735.4394.1147.5817.2655.57210.90510.2357.22L kidney906.9497.4594.0523.9097.2247.0355.33910.66810.2346.99TOTAL Kidney900.4220.8570.8020.8851.8601.4021.3571.7090.2821.06Pancreas900.2170.1420.0520.0570.0920.0230.1120.0540.086Urinary Bladder402.492.773.643.593.532.114.431.171.832.84Urinary Bladder1158.127.166.155.827.814.788.802.927.206.53 | • | | | | | | | | | | | | 0.23 |
| R submandibular 90 0.102 0.305 0.072 0.271 0.114 0.129 0.251 0.001 0.080 0.15 L submandibular 90 0.095 0.199 0.077 0.275 0.167 0.107 0.306 0.020 0.111 0.15 TOTAL Submandibular 90 0.197 0.503 0.148 0.546 0.281 0.236 0.557 0.020 0.191 0.30 Liver 90 6.208 5.369 5.686 5.588 5.506 6.619 3.384 6.947 8.524 5.98 R kidney 90 7.098 6.773 5.439 4.114 7.581 7.265 5.572 10.905 10.235 7.22 L kidney 90 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 TOTAL Kidney 90 14.047 14.232 9.491 8.023 14.805 14.300 10.911 21.574 20.468 14.21 Spleen 90 0.422 0.857 0.802 0.885 | • | | | | | | | | | | | | 0.15 |
| L submandibular 90 0.095 0.199 0.077 0.275 0.167 0.107 0.306 0.020 0.111 0.15 TOTAL Submandibular 90 0.197 0.503 0.148 0.546 0.281 0.236 0.557 0.020 0.191 0.30 Liver 90 6.208 5.369 5.686 5.588 5.506 6.619 3.384 6.947 8.524 5.98 R kidney 90 7.098 6.773 5.439 4.114 7.581 7.265 5.572 10.905 10.235 7.22 L kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.6688 10.234 6.99 TOTAL Kidney 90 0.422 0.857 0.802 0.885 14.805 14.300 10.911 21.574 20.4688 14.21 Spleen 90 0.217 0.142 0.024 0.52 0.057 0.092 0.023 0.112 0.054 0.086 Urinary Bladder 90 3.083 4.362 1.097 | | | | | | | | | | | | | 0.35 0.10 |
| TOTAL Submandibular 90 0.197 0.503 0.148 0.546 0.281 0.236 0.557 0.020 0.191 0.30 Liver 90 6.208 5.369 5.686 5.588 5.506 6.619 3.384 6.947 8.524 5.98 R kidney 90 7.098 6.773 5.439 4.114 7.581 7.265 5.572 10.905 10.235 7.22 L kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 TOTAL Kidney 90 14.047 14.232 9.491 8.023 14.805 14.300 10.911 21.574 20.468 14.21 Spleen 90 0.422 0.857 0.802 0.885 1.860 1.402 1.357 1.709 0.282 1.06 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Urinary Bladder 90 3.083 4.362 1.097 | | | | | | | | | | | | | 0.10 |
| Liver906.2085.3695.6865.5885.5066.6193.3846.9478.5245.98R kidney907.0986.7735.4394.1147.5817.2655.57210.90510.2357.22L kidney906.9497.4594.0523.9097.2247.0355.33910.66810.2346.99TOTAL Kidney9014.04714.2329.4918.02314.80514.30010.91121.57420.46814.21Spleen900.4220.8570.8020.8851.8601.4021.3571.7090.2821.06Pancreas900.2170.1420.0240.0520.0570.0920.0230.1120.0540.086Urinary Bladder903.0834.3621.0972.0034.8113.0584.3831.7732.1202.97Urinary Bladder1158.127.166.155.827.814.788.802.927.206.53 | | | | | | | | | | | | | 0.09 0.19 |
| R kidney 90 7.098 6.773 5.439 4.114 7.581 7.265 5.572 10.905 10.235 7.22 L kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 TOTAL Kidney 90 14.047 14.232 9.491 8.023 14.805 14.300 10.911 21.574 20.468 14.21 Spleen 90 0.422 0.857 0.802 0.885 1.860 1.402 1.357 1.709 0.282 1.06 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Urinary bladder 90 3.083 4.362 1.097 2.003 4.811 3.058 4.383 1.773 2.120 2.97 | | | | | | | | | | | | | 1.39 |
| L kidney 90 6.949 7.459 4.052 3.909 7.224 7.035 5.339 10.668 10.234 6.99 TOTAL Kidney 90 14.047 14.232 9.491 8.023 14.805 14.300 10.911 21.574 20.468 14.21 Spleen 90 0.422 0.857 0.802 0.885 1.860 1.402 1.357 1.709 0.282 1.06 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Urinary bladder 90 3.083 4.362 1.097 2.003 4.811 3.058 4.383 1.773 2.120 2.97 | | | | | | | | | | | | | 2.20 |
| TOTAL Kidney 90 14.047 14.232 9.491 8.023 14.805 14.300 10.911 21.574 20.468 14.21 Spleen 90 0.422 0.857 0.802 0.885 1.860 1.402 1.357 1.709 0.282 1.06 Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Urinary bladder 90 3.083 4.362 1.097 2.003 4.811 3.058 4.383 1.773 2.120 2.97 | | | | | | | | | | | | | 2.38 |
| Pancreas 90 0.217 0.142 0.024 0.052 0.057 0.092 0.023 0.112 0.054 0.086 Urinary bladder 90 3.083 4.362 1.097 2.003 4.811 3.058 4.383 1.773 2.120 2.97 Urinary Bladder 40 2.49 2.77 3.64 3.59 3.53 2.11 4.43 1.17 1.83 2.84 Urinary Bladder 115 8.12 7.16 6.15 5.82 7.81 4.78 8.80 2.92 7.20 6.53 | | 90 | 14.047 | 14.232 | 9.491 | | | 14.300 | 10.911 | 21.574 | | | 4.54 |
| Urinary bladder 90 3.083 4.362 1.097 2.003 4.811 3.058 4.383 1.773 2.120 2.97 Urinary Bladder 40 2.49 2.77 3.64 3.59 3.53 2.11 4.43 1.17 1.83 2.84 Urinary Bladder 115 8.12 7.16 6.15 5.82 7.81 4.78 8.80 2.92 7.20 6.53 | • | | | | | | | | | | | | 0.55 |
| Urinary Bladder 115 8.12 7.16 6.15 5.82 7.81 4.78 8.80 2.92 7.20 6.53 | | | | | | | | | | | | | 0.063 1.32 |
| Urinary Bladder 115 8.12 7.16 6.15 5.82 7.81 4.78 8.80 2.92 7.20 6.53 | | | | | | | | | | | 4.65 | | |
| Voided Urine 48 4.7 4.4 5.5 5.2 5.4 2.1 6.2 1.5 2.6 4.18 | | | | | | | | | | | | | 1.04 1.83 |
| VUIEU VIIIE 40 47 44 3.3 3.2 3.4 2.1 67 1.5 7.6 41X | Voided Urine | ло | . 7 | лл | | E 3 | E / | 3 1 | 6.2 | 1 5 | 26 | A 10 | 1.68 |
| Voided Unite 40 4.7 4.4 5.5 5.2 5.4 2.1 6.2 1.5 2.6 4.10 Voided Urine 120 10.6 10.5 11.1 9 10.6 6.4 12.5 4.3 9.9 9.43 | | | | | | | | | | | | | 1.68 2.55 |

Observed Distribution of ⁶⁸Ga by PET/CT Following Intravenous Administration of ⁶⁸Ga-HBED-CC (PSMA-11) (% Injected Dose per Organ or Tissue)

OLINDA - Organ Level INternal Dose Assessment Code (copyright Vanderbilt University, 2003)

- NOTE: This code gives doses for stylized models of average individuals results should be applied with caution to specific human subjects.
- NOTE: Users should always carefully check input data (shown below) and critically review the reported results.

Organ Doses (mSv/MBq), Nuclide: Ga-68 (6.76E01 min), Adult Male

| Target Organ | Alpha | Beta | Photon | Total | EDE Cont. | ED Cont. |
|----------------------|----------|-------------------|-------------------|----------|-----------|-------------------|
| Adrenals | 0.00E000 | 7.18E-03 | 1.02E-02 | 1.74E-02 | 0.00E000 | 4.34E-05 |
| Brain | 0.00E000 | 7 . 18E-03 | 2 . 88E-03 | 1.01E-02 | 0.00E000 | 2.52E-05 |
| Breasts | 0.00E000 | 7.18E-03 | 2 . 94E-03 | 1.01E-02 | 1.52E-03 | 5 . 06E-04 |
| Gallbladder Wall | 0.00E000 | 7 . 18E-03 | 9.20E-03 | 1.64E-02 | 0.00E000 | 0.00E000 |
| LLI Wall | 0.00E000 | 7 . 18E-03 | 5.52E-03 | 1.27E-02 | 0.00E000 | 1.52E-03 |
| Small Intestine | 0.00E000 | 7.18E-03 | 6.52E-03 | 1.37E-02 | 0.00E000 | 3.42E-05 |
| Stomach Wall | 0.00E000 | 7.18E-03 | 6.48E-03 | 1.37E-02 | 0.00E000 | 1.64E-03 |
| ULI Wall | 0.00E000 | 7.18E-03 | 6.44E-03 | 1.36E-02 | 0.00E000 | 3.41E-05 |
| Heart Wall | 0.00E000 | 7.18E-03 | 5.26E-03 | 1.24E-02 | 0.00E000 | 0.00E000 |
| Kidneys | 0.00E000 | 3.72E-01 | 4.04E-02 | 4.13E-01 | 2.48E-02 | 1.03E-02 |
| Liver | 0.00E000 | 2.91E-02 | 1.05E-02 | 3.95E-02 | 2.37E-03 | 1 . 98E-03 |
| Lungs | 0.00E000 | 7.18E-03 | 4.42E-03 | 1.16E-02 | 1.39E-03 | 1.39E-03 |
| Muscle | 0.00E000 | 7.18E-03 | 4.42E-03 | 1.16E-02 | 0.00E000 | 2.90E-05 |
| Ovaries | 0.00E000 | 7.18E-03 | 5 . 86E-03 | 1.30E-02 | 3.26E-03 | 2.61E-03 |
| Pancreas | 0.00E000 | 1.04E-02 | 9.49E-03 | 1.99E-02 | 1.19E-03 | 4 . 97E-05 |
| Red Marrow | 0.00E000 | 4.91E-03 | 5.35E-03 | 1.03E-02 | 1.23E-03 | 1.23E-03 |
| Osteogenic Cells | 0.00E000 | 8.82E-03 | 4 . 86E-03 | 1.37E-02 | 4.10E-04 | 1.37E-04 |
| Skin | 0.00E000 | 7.18E-03 | 2.75E-03 | 9.93E-03 | 0.00E000 | 9.93E-05 |
| Spleen | 0.00E000 | 4.55E-02 | 1.26E-02 | 5.81E-02 | 3.49E-03 | 1.45E-04 |
| Testes | 0.00E000 | 7.18E-03 | 3.82E-03 | 1.10E-02 | 0.00E000 | 0.00E000 |
| Thymus | 0.00E000 | 7.18E-03 | 3 . 99E-03 | 1.12E-02 | 0.00E000 | 2.79E-05 |
| Thyroid | 0.00E000 | 7.18E-03 | 3.73E-03 | 1.09E-02 | 3.27E-04 | 5.46E-04 |
| Urinary Bladder Wall | 0.00E000 | 5.63E-02 | 1.08E-02 | 6.71E-02 | 4.03E-03 | 3.35E-03 |
| Uterus | 0.00E000 | 7.18E-03 | 6.60E-03 | 1.38E-02 | 0.00E000 | 3.45E-05 |
| Total Body | 0.00E000 | 9.64E-03 | 4.65E-03 | 1.43E-02 | 0.00E000 | 0.00E000 |

Effective Dose Equivalent (mSv/MBq) Effective Dose (mSv/MBq) 4.40E-02

2.58E-02

Organ Doses (rem/mCi), Nuclide: Ga-68 (6.76E01 min), Adult Male

| Target Organ | Alpha | Beta | Photon | Total | EDE Cont. | ED Cont. |
|----------------------|----------|----------|----------|----------|-----------|----------|
| Adrenals | 0.00E000 | 2.66E-02 | 3.76E-02 | 6.42E-02 | 0.00E000 | 1.61E-04 |
| Brain | 0.00E000 | 2.66E-02 | 1.07E-02 | 3.72E-02 | 0.00E000 | 9.31E-05 |
| Breasts | 0.00E000 | 2.66E-02 | 1.09E-02 | 3.74E-02 | 5.62E-03 | 1.87E-03 |
| Gallbladder Wall | 0.00E000 | 2.66E-02 | 3.41E-02 | 6.06E-02 | 0.00E000 | 0.00E000 |
| LLI Wall | 0.00E000 | 2.66E-02 | 2.04E-02 | 4.70E-02 | 0.00E000 | 5.64E-03 |
| Small Intestine | 0.00E000 | 2.66E-02 | 2.41E-02 | 5.07E-02 | 0.00E000 | 1.27E-04 |
| Stomach Wall | 0.00E000 | 2.66E-02 | 2.40E-02 | 5.05E-02 | 0.00E000 | 6.06E-03 |
| ULI Wall | 0.00E000 | 2.66E-02 | 2.38E-02 | 5.04E-02 | 0.00E000 | 1.26E-04 |
| Heart Wall | 0.00E000 | 2.66E-02 | 1.95E-02 | 4.60E-02 | 0.00E000 | 0.00E000 |
| Kidneys | 0.00E000 | 1.38E000 | 1.50E-01 | 1.53E000 | 9.16E-02 | 3.82E-02 |
| Liver | 0.00E000 | 1.07E-01 | 3.87E-02 | 1.46E-01 | 8.77E-03 | 7.31E-03 |
| Lungs | 0.00E000 | 2.66E-02 | 1.63E-02 | 4.29E-02 | 5.15E-03 | 5.15E-03 |
| Muscle | 0.00E000 | 2.66E-02 | 1.63E-02 | 4.29E-02 | 0.00E000 | 1.07E-04 |
| Ovaries | 0.00E000 | 2.66E-02 | 2.17E-02 | 4.82E-02 | 1.21E-02 | 9.65E-03 |
| Pancreas | 0.00E000 | 3.84E-02 | 3.51E-02 | 7.35E-02 | 4.41E-03 | 1.84E-04 |
| Red Marrow | 0.00E000 | 1.82E-02 | 1.98E-02 | 3.80E-02 | 4.56E-03 | 4.56E-03 |
| Osteogenic Cells | 0.00E000 | 3.26E-02 | 1.80E-02 | 5.06E-02 | 1.52E-03 | 5.06E-04 |
| Skin | 0.00E000 | 2.66E-02 | 1.02E-02 | 3.67E-02 | 0.00E000 | 3.67E-04 |
| Spleen | 0.00E000 | 1.68E-01 | 4.66E-02 | 2.15E-01 | 1.29E-02 | 5.38E-04 |
| Testes | 0.00E000 | 2.66E-02 | 1.41E-02 | 4.07E-02 | 0.00E000 | 0.00E000 |
| Thymus | 0.00E000 | 2.66E-02 | 1.48E-02 | 4.13E-02 | 0.00E000 | 1.03E-04 |
| Thyroid | 0.00E000 | 2.66E-02 | 1.38E-02 | 4.04E-02 | 1.21E-03 | 2.02E-03 |
| Urinary Bladder Wall | 0.00E000 | 2.08E-01 | 3.98E-02 | 2.48E-01 | 1.49E-02 | 1.24E-02 |
| Uterus | 0.00E000 | 2.66E-02 | 2.44E-02 | 5.10E-02 | 0.00E000 | 1.27E-04 |
| Total Body | 0.00E000 | 3.57E-02 | 1.72E-02 | 5.29E-02 | 0.00E000 | 0.00E000 |

Effective Dose Equivalent (rem/mCi) Effective Dose (rem/mCi)

1.63E-01

9.53E-02

| Number of Disintegrations i Adrenals Brain Breasts Gallbladder Contents LLI Small Intestine Stomach ULI Heart Contents Heart Wall Kidneys Liver Lungs Muscle Ovaries | 0.00E000 0.00E000 0.00E000 0.00E000 0.00E000 0.00E000 0.00E000 0.00E000 0.00E000 2.66E-01 1.30E-01 0.00E000 0.00E000 0.00E000 | MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq MBq-h/MBq | or uCi-h/uCi or uCi-h/uCi |
|---|--|---|--|
| - | | | |
| Liver | 1.30E-01 | | |
| Lungs | 0.00E000 | MBq-h/MBq | or uCi-h/uCi |
| Muscle | 0.00E000 | MBq-h/MBq | or uCi-h/uCi |
| 0varies | 0.00E000 | MBq-h/MBq | or uCi-h/uCi |
| Pancreas | 2.36E-03 | MBq-h/MBq | or uCi-h/uCi |
| Red Marrow | 0.00E000 | | or uCi-h/uCi |
| Cortical Bone | 0.00E000 | | or uCi-h/uCi |
| Trabecular Bone | 0.00E000 | | or uCi-h/uCi |
| Spleen | 2.00E-02 | | or uCi-h/uCi |
| Testes | 0.00E000 | | or uCi-h/uCi |
| Thymus | 0.00E000 | | or uCi-h/uCi |
| Thyroid | 0.00E000 | | or uCi-h/uCi |
| Urinary Bladder Contents | 4.86E-02 | | or uCi-h/uCi |
| Uterus/Uterine Wall | 0.00E000 | | or uCi-h/uCi |
| Remainder | 1.24E000 | MBq-h/MBq | or uCi-h/uCi |

| Target Organ Masses: Adrenals Brain Breasts Gallbladder Wall LLI Wall Small Intestine Stomach Wall | 1.63E001 g 1.42E003 g 3.51E002 g 1.05E001 g 1.67E002 g 6.77E002 g 1.58E002 g |
|---|--|
| ULI Wall Heart Wall | 2.20E002 g 3.16E002 g |
| Kidneys | 3.16E002 g 2.99E002 g |
| Liver | 1.91E003 g |
| Lungs | 1.00E003 g |
| Muscle | 2.80E004 g |
| Ovaries | 8.71E000 g |
| Pancreas | 9.43E001 g |
| Red Marrow | 1.12E003 g |
| Osteogenic Cells | 1.20E002 g |
| Skin | 3.01E003 g |
| Spleen | 1.83E002 g |
| Testes | 3 . 91E001 g |
| Thymus | 2.09E001 g |
| Thyroid | 2.07E001 g |
| Urinary Bladder Wall | 4.76E001 g |
| Uterus | 7.90E001 g |
| Total Body | 7.37E004 g |

* Mass modified by user

RadiationWeighting Factors:Alpha:5.00E00Beta:1.00E00Photon:1.00E00

** Weighting factor modified by user