

Supplemental Table 1. Bio-distribution analysis of  $^{188}\text{Re}$ -BMEDA radiopharmaceutical compound in human NSCLC xenograft mice

(%ID/g)	1h	4h	24h	48h
Heart	1.05±0.81	0.32±0.13	0.16±0.06	0.10±0.01
Lung	1.61±1.33	0.64±0.34	0.26±0.15	0.18±0.02
Liver	20.85±6.53	16.86±1.30	6.77±1.19	1.09±0.82
Stomach <sup>a</sup>	2.32±1.55	1.32±0.99	0.40±0.24	0.18±0.05
S.I. <sup>a</sup>	5.41±4.79	2.27±1.93	0.48±0.27	0.15±0.03
L.I. <sup>a</sup>	0.51±0.35	0.38±0.35	0.20±0.16	0.10±0.01
Pancreas	0.72±0.53	0.19±0.10	0.10±0.04	0.07±0.01
Spleen	4.34±2.97	7.00±2.62	3.17±2.07	2.54±0.93
Kidney	2.36±2.57	0.96±0.27	0.57±0.17	0.36±0.06
Muscle	0.19±0.15	0.14±0.15	0.04±0.02	0.02±0.00
Bone <sup>b</sup>	0.28±0.16	0.20±0.11	0.04±0.06	0.02±0.01
Bone Marrow <sup>b</sup>	1.14±0.40	1.13±0.39	0.35±0.34	0.13±0.08
Urine <sup>c</sup>	3.09±0.29	19.55±7.85	6.08±1.12	2.33±0.27
Whole Blood <sup>d</sup>	8.36±7.80	1.75±0.54	0.63±0.14	0.47±0.03
Feces <sup>e</sup>	0.12±0.13	4.96±5.28	7.20±3.64	2.36±1.04
Tumor	1.02±0.79	0.49±0.13	0.31±0.06	0.20±0.05
T/M	5.36	3.58	7.83	8.18

S.I.: Small intestine; L.I.: Large intestine; T/M: tumor to muscle ratio.

<sup>a</sup> The stomach, small, and large intestine were cleaned by squeezing off the content and digestive food before collection.

<sup>b</sup> The bone and bone marrow was collected from the femoral bone in which the marrow was firstly aspirated by insulin syringe. The bone was then washed and cleaned until all the muscle and other tissues totally removed.

<sup>c</sup> The urine was collected by pressurizing the lower body of nude mice.

<sup>d</sup> The whole blood was sampled by cardiac puncture after CO<sub>2</sub> asphyxiation.

<sup>e</sup> The feces was collected from the rectum of mice.

Supplemental Table 2. Bio-distribution analysis of nanopegylated <sup>188</sup>Re-liposome administration in human NSCLC xenograft mice

(%ID/g)	1h	4h	24h	48h
Heart	1.66±1.70	5.76±1.92	0.97±0.13	0.49±0.29
Lung	3.89±3.20	4.69±5.45	1.06±0.92	0.86±0.50
Liver	5.06±4.73	17.98±9.32	15.99±3.13	16.51±10.01
Stomach <sup>a</sup>	1.92±0.95	2.39±0.87	1.03±0.05	0.89±0.71
S.I. <sup>a</sup>	1.18±0.09	13.62±6.02	8.01±4.01	3.29±4.26
L.I. <sup>a</sup>	0.52±0.50	4.54±2.78	1.66±0.93	1.02±0.66
Pancreas	1.07±0.89	2.43±1.40	0.55±0.02	0.44±0.25
Spleen	3.10±2.43	14.56±7.23	12.44±2.90	16.82±7.17
Kidney	3.03±2.43	9.59±4.65	2.70±0.32	1.87±0.86
Muscle	0.21±0.11	0.51±0.18	0.16±0.03	0.16±0.09
Bone <sup>b</sup>	0.45±0.34	0.69±0.31	0.24±0.08	0.30±0.06
Bone Marrow <sup>b</sup>	7.85±10.02	5.48±3.19	1.48±0.84	2.33±0.99
Urine <sup>c</sup>	32.53±2.60	17.55±8.05	3.42±0.71	6.19±0.53
Whole Blood <sup>d</sup>	17.46±9.70	47.65±18.63	5.29±1.16	1.21±1.11
Feces <sup>e</sup>	0.30±0.34	7.71±3.87	3.36±0.82	2.00±0.52
Tumor	1.26±1.46	8.13±5.21	12.23±9.59	5.66±3.58
T/M	5.92	15.89	76.94	36.00

S.I.: Small intestine; L.I.: Large intestine; T/M: tumor to muscle ratio.

<sup>a</sup> The stomach, small, and large intestine were cleaned by squeezing off the content and digestive food before collection.

<sup>b</sup> The bone and bone marrow was collected from the femoral bone in which the marrow was firstly aspirated by insulin syringe. The bone was then washed and cleaned until all the muscle and other tissues totally removed.

<sup>c</sup> The urine was collected by pressurizing the lower body of nude mice.

<sup>d</sup> The whole blood was sampled by cardiac puncture after CO<sub>2</sub> asphyxiation.

<sup>e</sup> The feces was collected from the rectum of mice.

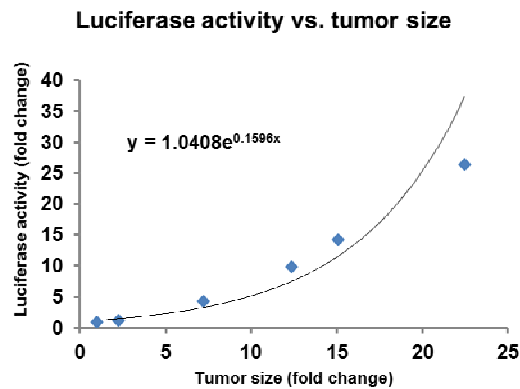
Supplemental Table 3. The estimation of internal absorbed dose in humans.

	Number of disintegration	Effective Dose (mSv/MBq)
Adrenals	0.00E+00	1.69E-05
Brain	0.00E+00	4.07E-07
Breasts	0.00E+00	6.16E-05
Gallbladder Wall	0.00E+00	0.00E+00
LLI Wall	4.48E-01	8.36E-02
Small Intestine	1.54E+00	2.04E-03
Stomach Wall	3.48E-01	3.63E-02
ULI Wall	0.00E+00	1.52E-05
Heart Wall	0.00E+00	0.00E+00
Kidneys	4.84E-01	3.60E-03
Liver	9.63E-01	4.07E-02
Lungs	3.41E+00	2.95E-02
Muscle	5.39E-01	7.91E-06
Ovaries	5.89E-02	1.12E-03
Pancreas	0.00E+00	2.89E-03
Red Marrow	2.45E-01	1.85E-02
Osteogenic Cells	7.86E-01	1.03E-03
Skin	0.00E+00	9.13E-06
Spleen	9.46E-02	1.74E-01
Testes	2.87E+00	0.00E+00
Thymus	0.00E+00	3.73E-06
Thyroid	0.00E+00	1.76E-05
Urinary Bladder Wall	0.00E+00	1.27E-01
Uterus	2.36E+00	1.78E-05
Summary		5.20E-01
Tumor (300mm <sup>3</sup> )	8.68	2.95

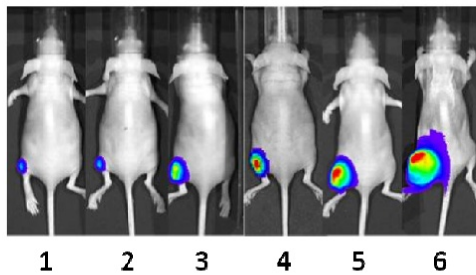
Supplemental Table 4. The estimated absorbed dose in different size of spheroid solid mass.

Sphere Mass (g)	Dose (mGy/MBq)
0.01	28800.000
0.1	5620.000
0.5	1390.000
1	738.000
2	385.000
4	200.000
6	135.000
8	103.000
10	82.500
20	42.100
40	21.400
60	14.400
80	10.900
100	8.680
300	2.950
400	2.210
500	1.770
600	1.480
1000	0.897
2000	0.458

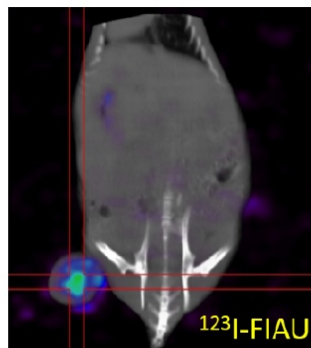
(a)



(b)

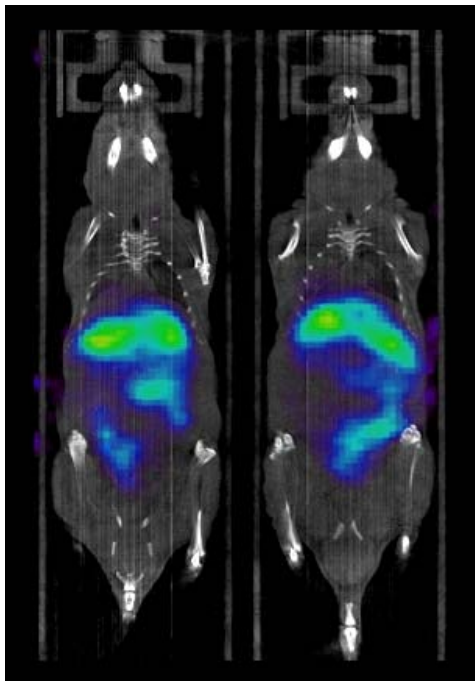


(c)

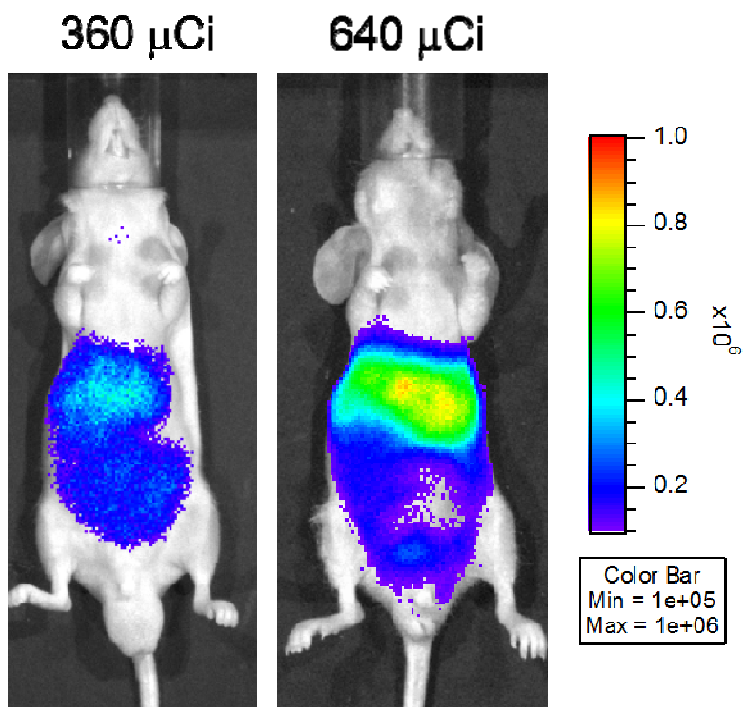


Supplemental Figure 1 The correlation between transduced reporter gene and the growth of tumor was assayed by luciferase activity and optical imaging. (A) The bioluminescent signal and the size of xenograft tumor was confirmed for having the positive correlation property; (B) bioluminescent image demonstrated the growth of tumor weekly; (C) the HSV1-tk trapped <sup>123</sup>I-FIAU was imaged by the microSPECT/CT in subcutaneous implantation.

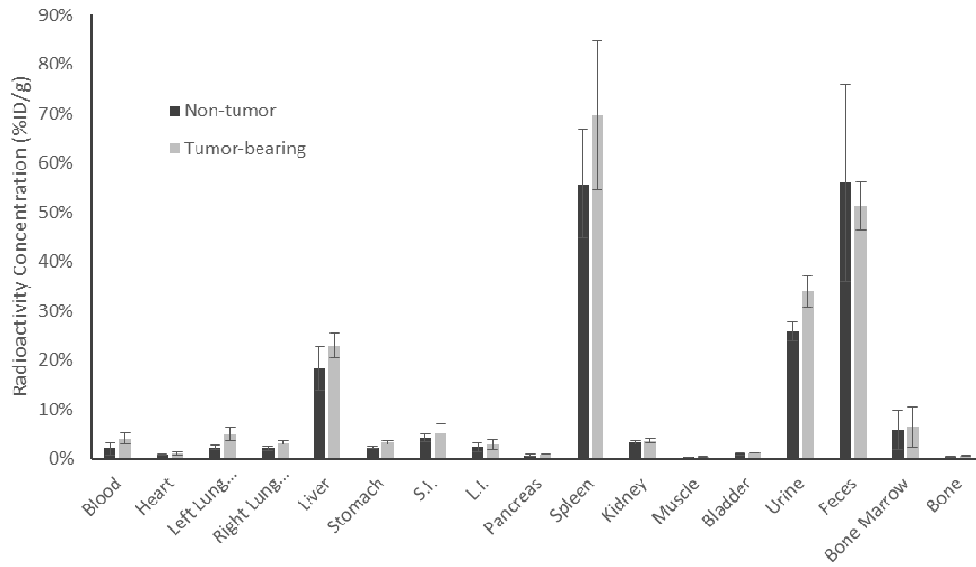
(A)



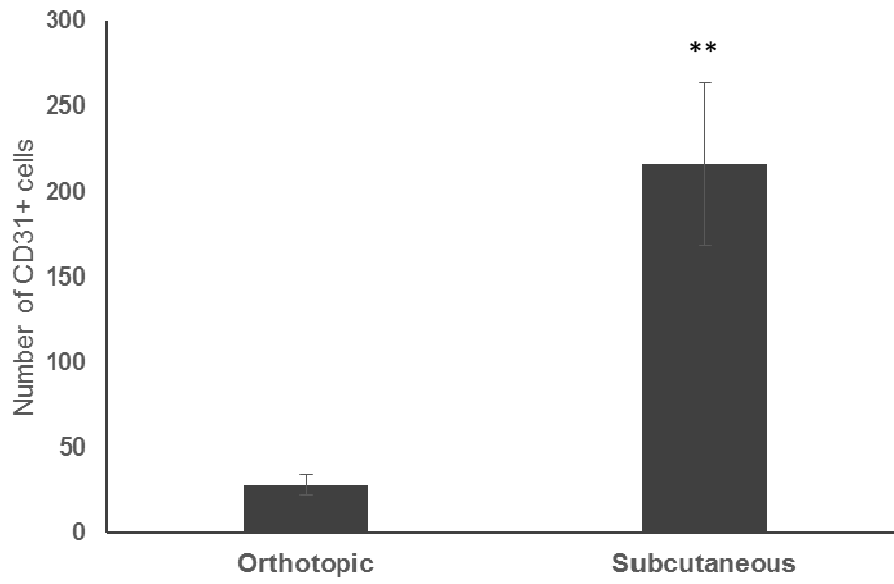
(B)



Supplemental Figure 2. Two orthotopic human NSCLC-bearing mice were imaged 24 hours after  $^{188}\text{Re}$  liposome was injected; however, no significant signal was determined in the chest cavity by (A) nanoSPECT/CT and (B) Cerenkov luminescent imaging (360  $\mu\text{Ci}$  and 640  $\mu\text{Ci}$ ).



Supplemental Figure 3. Bio-distribution analysis of the orthotopic NSCLC tumor-bearing mice (n=6), in which the lungs were separated by left (tumor-bearing) and right (tumor-free) to distinguish the different radioactivity concentration.



Supplemental Figure 4. The immunohistochemistry (IHC) staining results was quantified by counting the CD31-positive areas by 6 microscopic images randomly picked. \*\*  $p < 0.01$