Supplemental Method 1

<Calculation of Radioactivity Concentration for in Vitro Stability>

Radioactivity concentration was set assuming the maximum serum concentration in human

740 MBq/m^2 × 1.89 m^2/2836.0 mL = 0.5 MBq/mL

Putative radiation dose: 740 MBq/m^2

Human body surface area: 1.89 m^2 = $Height^{0.725}$ × $Weight^{0.425}$ × 0.007184 (*1*)

Height: 176 cm (*2*)

Weight: 73 kg (*2*)

Serum volume: 2836.0 mL = Blood volume × (1 − Hematocrit) × Weight

Blood volume: 73.3 mL/kg (*3*)

Hematocrit: 0.47

Supplemental Method 2

<Calculation for Dosage Based on Body Surface Area Conversion; Monkey mg/kg to mg/m^2>

To convert dose in mg/kg to dose in mg/m^2 multiply factor (K_m) of monkey: 12 kg/m^2 (*4*)

0.04 (mg/kg) × 12 (kg/m^2) = 0.48 (mg/m^2)

0.4 (mg/kg) × 12 (kg/m^2) = 4.8 (mg/m^2)

4 (mg/kg) × 12 (kg/m^2) = 48 (mg/m^2)

The mg/head of mouse corresponding to the above dosage based on body surface area was calculated.

To convert dose in mg/kg to dose in mg/m^2 multiply factor (K_m) of mouse: 3 kg/m^2 (*4*)

Mouse body weight: 0.025 kg/head

0.48 (mg/m^2) / 3 (kg/m^2) × 0.025 (kg/head) = 0.004 (mg/head)

4.8 (mg/m^2) / 3 (kg/m^2) × 0.025 (kg/head) = 0.04 (mg/head)

48 (mg/m^2) / 3 (kg/m^2) × 0.025 (kg/head) = 0.4 (mg/head)

Supplemental Method 3

< Calculation for Dosage Based on Body Surface Area Conversion; Mouse MBq/head to MBq/m^2>

The therapeutic radiation dose (MBq/head) of mouse was converted to the dosage based on body surface area

To convert dose in mg/kg to dose in mg/m^2 multiply factor (K_m) of mouse: 3 kg/m^2 (*4*)

The Km for mg/kg was applied to MBq/kg.

Mouse body weight: 0.025 kg/head

7.4 (MBq/head) / 0.025 (kg/head) × 3 (kg/m^2) = 888 (MBq/m^2)

Human body surface area: 1.89 m^2 = $Height^{0.725}$ × $Weight^{0.425}$ × 0.007184 (*1*)

Height: 176 cm (*2*)

Weight: 73 kg (*2*)

888 (MBq/m^2) ×1.89 (m^2) = 1,678 (MBq)

Supplemental Method 4

< Calculation for Dosage Based on Bodyweight Conversion; mg/m^2 to Human mg/kg>

To convert dose in mg/kg to dose in mg/m^2 multiply factor (K_m) of human: 37 kg/m^2 (*4*)

4.8 (mg/m^2) / (37 kg/m^2) = 0.13 (mg/kg)

Supplemental Method 5

<Calculation of Maximum Radiation Dose>

The upper limits of the absorbed dose were set at 3,000 mGy and 20,000 mGy for the red marrow and any other organ, respectively (*5*).

0.04 mg/kg:

Hat wall: 20,000 mGy / 2.31 mGy/MBq = 8,658 MBq

Liver: 20,000 mGy / 2.56 mGy/MBq = 7,813 MBq

Lungs: 20,000 mGy / 1.21 mGy/MBq = 16,529 MBq

Red marrow: 3,000 mGy / 0.661 mGy/MBq = 4,539 MBq

Osteogenic cells: 20,000 mGy / 0.680 mGy/MBq = 29,412 MBq

Spleen: 20,000 mGy / 12.0 mGy/MBq = 1,667 MBq

0.4 mg/kg:

Hat wall: 20,000 mGy / 2.54 mGy/MBq = 7,874 MBq

Liver: 20,000 mGy / 2.47 mGy/MBq = 8,097 MBq

Lungs: 20,000 mGy / 1.19 mGy/MBq = 16,807 MBq

Red marrow: 3,000 mGy / 0.786 mGy/MBq = 3,817 MBq

Osteogenic cells: 20,000 mGy / 0.817 mGy/MBq = 24,480 MBq

Spleen: 20,000 mGy / 6.93 mGy/MBq = 2,886 MBq

4 mg/kg:

Hat wall: 20,000 mGy / 3.28 mGy/MBq = 6,098 MBq

Liver: 20,000 mGy / 2.55 mGy/MBq = 7,843 MBq

Lungs: 20,000 mGy / 1.82 mGy/MBq = 10,989 MBq

Red marrow: 3,000 mGy / 0.885 mGy/MBq = 3,390 MBq

Osteogenic cells: 20,000 mGy / 0.912 mGy/MBq = 21,930 MBq

Spleen: 20,000 mGy / 2.77 mGy/MBq = 7,220 MBq

Supplemental Table 1

Tissue accumulation (%ID/g) of ^{111}In-FF-21101 in NCI-H1373 xenograft mouse model (mean ± SD)

	5min	24h	48h	96h	192h
Blood	42.758 ± 2.419	16.067 ± 1.808	13.465 ± 0.835	9.427 ± 1.673	3.309 ± 2.309
Brain	0.759 ± 0.090	0.333 ± 0.034	0.287 ± 0.037	0.219 ± 0.024	0.096 ± 0.053
Heart	5.383 ± 0.588	3.913 ± 0.666	3.636 ± 0.594	2.859 ± 0.239	1.172 ± 0.424
Lungs	10.515 ± 2.618	6.145 ± 0.683	5.078 ± 0.772	4.216 ± 0.660	1.687 ± 0.944
Liver	7.022 ± 0.488	4.828 ± 1.023	4.286 ± 0.438	3.843 ± 0.326	2.859 ± 0.771
Spleen	6.277 ± 0.365	4.460 ± 0.678	4.447 ± 0.368	4.231 ± 0.328	3.113 ± 0.620
Pancreas	1.302 ± 0.342	1.475 ± 0.200	1.271 ± 0.092	0.984 ± 0.131	0.471 ± 0.188
Stomach	0.858 ± 0.101	1.648 ± 0.392	0.919 ± 0.266	0.970 ± 0.330	0.310 ± 0.103
Small-Int.	1.038 ± 0.177	1.861 ± 0.545	1.385 ± 0.327	1.086 ± 0.017	0.446 ± 0.157
Cecum	0.322 ± 0.078	1.398 ± 0.458	0.808 ± 0.194	0.818 ± 0.142	0.375 ± 0.081
Large-Int.	1.186 ± 0.834	1.753 ± 0.400	1.153 ± 0.106	1.160 ± 0.130	0.453 ± 0.170
Kidneys	7.623 ± 0.936	6.295 ± 0.970	4.977 ± 1.013	4.086 ± 0.184	2.172 ± 0.856
Adrenals	5.200 ± 2.422	3.105 ± 0.889	2.530 ± 0.416	1.983 ± 0.551	1.018 ± 0.200
Adipose	0.790 ± 0.243	1.508 ± 0.532	0.984 ± 0.078	0.639 ± 0.243	0.380 ± 0.162
Testes	0.932 ± 0.186	2.521 ± 0.102	2.257 ± 0.356	2.242 ± 0.236	1.582 ± 0.377
Bone	2.271 ± 0.141	1.747 ± 0.244	1.729 ± 0.039	1.525 ± 0.160	0.883 ± 0.400
Muscle	0.455 ± 0.049	0.943 ± 0.129	1.020 ± 0.204	0.680 ± 0.083	0.290 ± 0.120
Skin	0.927 ± 0.188	5.362 ± 0.732	4.214 ± 0.673	3.834 ± 0.376	1.846 ± 0.027
Tumor	0.852 ± 0.036	34.914 ± 3.962	48.222 ± 5.198	46.398 ± 12.177	42.428 ± 19.80

Supplemental Table 2

Tissue accumulation (%ID/g) of ^{111}In-FF-21101 in EBC-1 xenograft mouse model (mean ± SD)

	5min	24h	48h	96h	192h
Blood	38.459 ± 2.307	12.936 ± 1.015	10.251 ± 1.022	5.464 ± 2.164	2.078 ± 0.884
Brain	0.739 ± 0.123	0.588 ± 0.517	0.248 ± 0.040	0.131 ± 0.090	0.068 ± 0.021
Heart	5.298 ± 1.222	2.763 ± 1.642	3.000 ± 0.680	1.743 ± 0.751	0.818 ± 0.292
Lungs	9.670 ± 0.861	4.409 ± 0.657	3.888 ± 0.301	2.580 ± 0.856	1.223 ± 0.405
Liver	6.831 ± 1.350	4.965 ± 1.152	3.563 ± 0.403	3.086 ± 0.983	2.471 ± 0.608
Spleen	5.302 ± 1.129	3.715 ± 2.021	4.350 ± 0.848	3.101 ± 0.718	2.993 ± 0.937
Pancreas	1.211 ± 0.193	1.597 ± 0.512	1.039 ± 0.081	0.679 ± 0.110	0.385 ± 0.127
Stomach	0.793 ± 0.319	1.125 ± 0.359	0.750 ± 0.145	0.503 ± 0.169	0.260 ± 0.110
Small-Int.	1.006 ± 0.120	1.305 ± 0.090	1.141 ± 0.143	0.721 ± 0.179	0.331 ± 0.125
Cecum	0.328 ± 0.158	0.989 ± 0.179	0.770 ± 0.019	0.708 ± 0.182	0.303 ± 0.068
Large-Int.	0.898 ± 0.459	1.213 ± 0.231	1.033 ± 0.067	0.754 ± 0.203	0.361 ± 0.078
Kidneys	6.977 ± 0.209	5.480 ± 0.516	4.732 ± 0.569	3.347 ± 0.340	1.805 ± 0.429
Adrenals	4.098 ± 0.896	2.121 ± 0.424	2.023 ± 0.332	1.112 ± 0.422	0.672 ± 0.128
Adipose	0.868 ± 0.128	0.928 ± 0.269	0.638 ± 0.055	0.536 ± 0.175	0.262 ± 0.096
Testes	0.737 ± 0.085	2.265 ± 0.236	1.687 ± 0.173	1.272 ± 0.567	1.162 ± 0.274
Bone	1.913 ± 0.221	1.622 ± 0.376	1.479 ± 0.159	1.016 ± 0.169	0.677 ± 0.279
Muscle	0.423 ± 0.049	0.924 ± 0.169	0.846 ± 0.094	0.808 ± 0.426	0.199 ± 0.039
Skin	0.844 ± 0.371	5.467 ± 0.540	4.282 ± 0.194	2.473 ± 0.432	1.410 ± 0.268
Tumor	1.061 ± 0.080	20.752 ± 1.407	28.936 ± 0.274	30.688 ± 0.650	22.026 ± 5.079

Supplemental Table 3

Tissue accumulation (%ID/g) of ^{111}In-FF-21101 in A549 xenograft mouse model (mean ± SD)

	5min	24h	48h	96h	192h
Blood	37.997 ± 1.216	17.084 ± 0.301	15.451 ± 0.781	16.027 ± 0.945	9.558 ± 2.434
Brain	0.861 ± 0.068	0.400 ± 0.048	0.393 ± 0.052	0.370 ± 0.026	0.266 ± 0.056
Heart	4.657 ± 1.285	4.657 ± 0.623	4.367 ± 0.824	4.158 ± 0.205	2.764 ± 0.758
Lungs	11.610 ± 1.107	5.719 ± 0.597	6.211 ± 0.505	6.220 ± 0.467	4.399 ± 1.006
Liver	6.750 ± 0.173	4.656 ± 0.447	5.769 ± 1.151	4.753 ± 1.354	4.768 ± 0.851
Spleen	6.843 ± 0.369	6.080 ± 1.727	5.977 ± 1.318	7.219 ± 1.329	4.690 ± 1.029
Pancreas	1.056 ± 0.156	1.188 ± 0.028	1.325 ± 0.085	1.559 ± 0.104	1.016 ± 0.267
Stomach	0.657 ± 0.190	1.494 ± 0.211	1.150 ± 0.091	1.346 ± 0.049	0.993 ± 0.405
Small-Int.	0.912 ± 0.214	1.455 ± 0.042	1.665 ± 0.076	1.662 ± 0.242	1.161 ± 0.372
Cecum	0.333 ± 0.021	0.936 ± 0.127	1.223 ± 0.177	1.152 ± 0.284	0.678 ± 0.124
Large-Int.	0.848 ± 0.171	1.192 ± 0.190	1.718 ± 0.084	1.513 ± 0.270	0.962 ± 0.182
Kidneys	8.473 ± 1.551	4.474 ± 0.460	4.612 ± 0.410	4.733 ± 0.434	3.437 ± 1.010
Adrenals	4.685 ± 3.032	3.028 ± 0.905	3.006 ± 0.166	2.903 ± 0.273	2.269 ± 0.807
Adipose	0.849 ± 0.120	1.082 ± 0.112	1.317 ± 0.301	1.084 ± 0.257	0.832 ± 0.254
Testes	0.760 ± 0.143	2.807 ± 0.167	2.921 ± 0.267	3.161 ± 0.369	2.673 ± 0.456
Bone	2.575 ± 0.094	1.769 ± 0.246	1.922 ± 0.195	2.468 ± 0.225	1.610 ± 0.353
Muscle	0.544 ± 0.004	1.098 ± 0.099	1.256 ± 0.059	1.154 ± 0.149	0.785 ± 0.218
Skin	1.117 ± 0.294	4.468 ± 0.149	6.479 ± 1.081	5.416 ± 0.288	3.613 ± 0.418
Tumor	1.030 ± 0.055	6.347 ± 0.679	7.482 ± 1.157	8.120 ± 0.198	5.200 ± 0.194

Supplemental Table 4

Tissue accumulation (%ID/g) of ^{111}In-hIgG in NCI-H1373 xenograft mouse model (mean ± SD)

	5min	24h	48h	96h	192h
Blood	42.704 ± 3.745	17.800 ± 0.904	18.417 ± 2.365	15.096 ± 1.340	9.585 ± 3.631
Brain	0.852 ± 0.039	0.404 ± 0.027	0.391 ± 0.052	0.332 ± 0.040	0.214 ± 0.084
Heart	6.262 ± 1.060	5.417 ± 1.196	4.637 ± 0.499	3.933 ± 0.443	2.698 ± 1.051
Lungs	11.594 ± 1.236	7.140 ± 0.872	6.474 ± 0.897	6.605 ± 0.653	4.366 ± 1.289
Liver	8.464 ± 2.029	5.630 ± 1.134	5.062 ± 0.515	5.430 ± 1.429	4.561 ± 0.553
Spleen	8.735 ± 3.571	4.360 ± 0.327	4.984 ± 0.637	5.529 ± 1.240	4.041 ± 1.061
Pancreas	1.644 ± 0.293	1.486 ± 0.320	1.491 ± 0.168	1.327 ± 0.016	1.110 ± 0.325
Stomach	1.134 ± 0.124	1.472 ± 0.377	1.240 ± 0.313	1.234 ± 0.259	1.171 ± 0.038
Small-Int.	1.171 ± 0.346	1.833 ± 0.175	1.691 ± 0.201	1.645 ± 0.089	1.142 ± 0.315
Cecum	0.313 ± 0.048	1.469 ± 0.276	1.141 ± 0.073	1.142 ± 0.124	0.692 ± 0.104
Large-Int.	0.967 ± 0.084	1.874 ± 0.297	1.642 ± 0.202	1.446 ± 0.056	1.088 ± 0.244
Kidneys	8.076 ± 1.851	7.138 ± 1.302	6.184 ± 0.360	5.249 ± 0.196	3.588 ± 0.981
Adrenals	6.136 ± 0.295	3.191 ± 0.172	3.042 ± 1.126	2.968 ± 0.120	2.765 ± 0.754
Adipose	0.943 ± 0.048	1.020 ± 0.118	1.005 ± 0.333	1.113 ± 0.134	0.999 ± 0.470
Testes	0.815 ± 0.179	2.941 ± 0.174	3.100 ± 0.066	3.079 ± 0.641	2.893 ± 0.478
Bone	2.223 ± 0.491	1.832 ± 0.120	1.897 ± 0.446	1.887 ± 0.293	1.467 ± 0.632
Muscle	0.373 ± 0.049	1.363 ± 0.263	1.261 ± 0.010	1.004 ± 0.186	0.760 ± 0.250
Skin	1.230 ± 0.440	4.894 ± 0.212	4.480 ± 0.138	4.416 ± 0.380	3.709 ± 0.573
Tumor	0.991 ± 0.075	8.847 ± 1.490	9.709 ± 0.023	8.365 ± 1.267	5.459 ± 0.335

Supplemental Table 5

Tissue accumulation (%ID/g) of ^{111}In-hIgG in EBC-1 xenograft mouse model (mean ± SD)

	5min	24h	48h	96h	192h
Blood	45.249 ± 4.358	18.859 ± 1.898	18.049 ± 0.773	16.221 ± 1.819	12.188 ± 1.859
Brain	0.981 ± 0.109	0.430 ± 0.074	0.406 ± 0.036	0.351 ± 0.053	0.267 ± 0.020
Heart	5.766 ± 1.820	4.849 ± 0.651	4.317 ± 0.558	2.270 ± 1.264	2.718 ± 0.398
Lungs	11.832 ± 1.139	6.821 ± 0.332	6.875 ± 0.751	5.738 ± 0.533	5.152 ± 0.345
Liver	8.860 ± 0.414	5.725 ± 0.064	4.950 ± 0.824	4.197 ± 0.314	4.417 ± 1.706
Spleen	7.913 ± 1.741	4.539 ± 0.458	5.099 ± 0.771	5.803 ± 1.449	5.538 ± 0.692
Pancreas	1.415 ± 0.329	1.407 ± 0.148	1.457 ± 0.271	1.383 ± 0.138	1.078 ± 0.163
Stomach	0.764 ± 0.294	1.152 ± 0.414	1.096 ± 0.195	1.212 ± 0.241	1.003 ± 0.474
Small-Int.	1.041 ± 0.258	1.614 ± 0.293	1.451 ± 0.122	1.527 ± 0.094	1.157 ± 0.366
Cecum	0.330 ± 0.079	1.144 ± 0.152	0.922 ± 0.008	0.932 ± 0.102	0.852 ± 0.016
Large-Int.	0.691 ± 0.111	1.545 ± 0.284	1.410 ± 0.207	1.271 ± 0.244	1.107 ± 0.137
Kidneys	7.967 ± 2.198	6.680 ± 1.235	6.749 ± 0.837	5.871 ± 0.295	3.867 ± 0.508
Adrenals	4.602 ± 0.674	3.293 ± 0.270	2.814 ± 0.284	2.881 ± 0.108	2.419 ± 0.642
Adipose	0.832 ± 0.125	1.026 ± 0.103	0.910 ± 0.211	1.100 ± 0.005	0.906 ± 0.052
Testes	0.754 ± 0.094	3.316 ± 0.346	3.175 ± 0.529	2.896 ± 0.327	2.783 ± 0.163
Bone	2.499 ± 0.456	1.801 ± 0.290	1.923 ± 0.106	1.672 ± 0.072	1.847 ± 0.186
Muscle	0.451 ± 0.067	1.201 ± 0.197	1.357 ± 0.304	1.171 ± 0.162	0.821 ± 0.058
Skin	0.995 ± 0.196	5.604 ± 0.318	5.499 ± 0.635	5.032 ± 0.398	4.147 ± 0.113
Tumor	1.425 ± 0.175	11.278 ± 1.999	10.946 ± 2.354	7.908 ± 1.090	5.501 ± 0.881

Supplemental Table 6

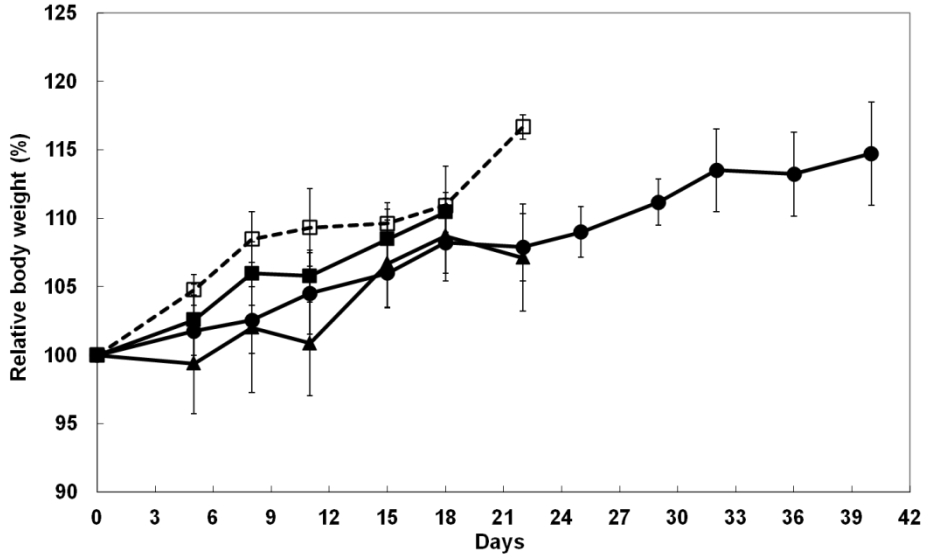
Tissue accumulation (%ID/g) of ^{111}In-hIgG in A549 xenograft mouse model (mean ± SD)

	5min	24h	48h	96h	192h
Blood	39.980 ± 3.194	18.477 ± 1.355	16.656 ± 3.269	15.947 ± 1.178	13.193 ± 0.974
Brain	0.664 ± 0.051	0.347 ± 0.060	0.336 ± 0.070	0.347 ± 0.010	0.307 ± 0.077
Heart	4.533 ± 1.500	4.655 ± 1.160	4.709 ± 1.323	3.915 ± 0.411	3.402 ± 0.414
Lungs	9.031 ± 1.245	6.748 ± 1.736	5.724 ± 0.589	6.574 ± 0.827	5.975 ± 0.462
Liver	7.949 ± 0.847	5.131 ± 0.664	5.044 ± 0.635	5.364 ± 1.674	4.189 ± 0.408
Spleen	7.949 ± 2.641	6.312 ± 2.043	5.277 ± 1.136	5.837 ± 0.505	5.971 ± 0.829
Pancreas	1.058 ± 0.109	1.359 ± 0.361	1.386 ± 0.140	1.269 ± 0.115	1.237 ± 0.195
Stomach	0.796 ± 0.105	1.508 ± 0.702	1.109 ± 0.326	1.363 ± 0.214	0.647 ± 0.056
Small-Int.	0.881 ± 0.104	1.535 ± 0.134	1.668 ± 0.160	1.448 ± 0.180	1.165 ± 0.056
Cecum	0.323 ± 0.044	1.118 ± 0.344	1.330 ± 0.334	0.957 ± 0.020	0.775 ± 0.059
Large-Int.	0.660 ± 0.051	1.499 ± 0.716	1.569 ± 0.338	1.486 ± 0.267	1.074 ± 0.054
Kidneys	7.949 ± 0.890	6.975 ± 1.294	6.067 ± 1.112	5.313 ± 0.483	4.353 ± 0.557
Adrenals	4.697 ± 0.615	2.631 ± 0.598	3.259 ± 0.406	3.028 ± 0.740	3.251 ± 0.706
Adipose	1.108 ± 0.198	1.035 ± 0.138	1.774 ± 0.161	1.079 ± 0.113	1.084 ± 0.175
Testes	0.800 ± 0.075	2.860 ± 0.500	2.747 ± 0.598	3.390 ± 0.729	3.131 ± 0.261
Bone	2.317 ± 0.164	2.006 ± 0.477	1.995 ± 0.311	2.093 ± 0.271	1.951 ± 0.161
Muscle	0.469 ± 0.053	1.064 ± 0.072	1.174 ± 0.245	1.023 ± 0.063	0.936 ± 0.092
Skin	1.224 ± 0.608	5.455 ± 1.846	6.472 ± 2.032	5.288 ± 0.477	3.750 ± 0.449
Tumor	0.816 ± 0.121	5.966 ± 1.924	5.302 ± 0.921	5.989 ± 0.732	5.351 ± 0.451

Supplemental Figure 1

Relative body weight (%) of EBC-1 xenograft mouse model in treatment study

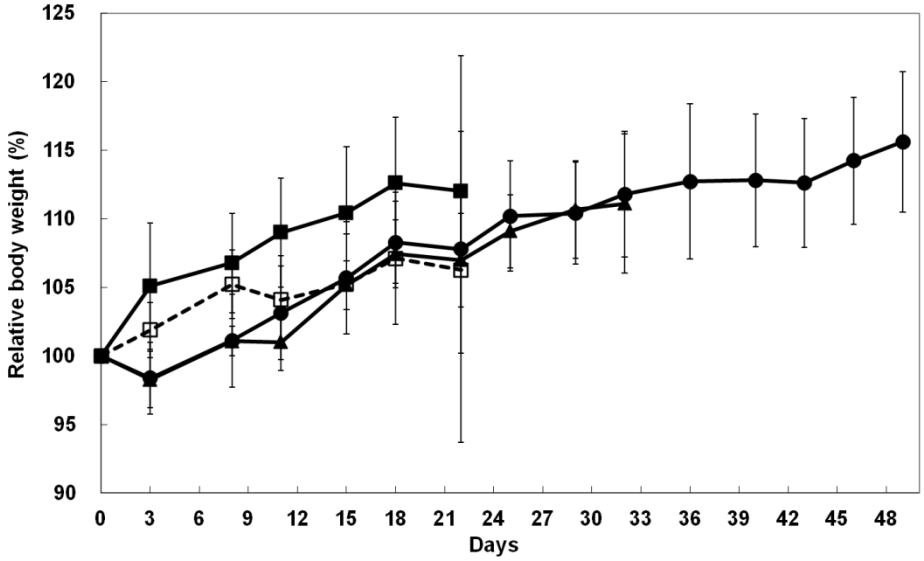
(□: PBS, ■: PPMX2032, ▲: ^{90}Y-hIgG, ●: ^{90}Y-FF-21101)



Supplemental Figure 2

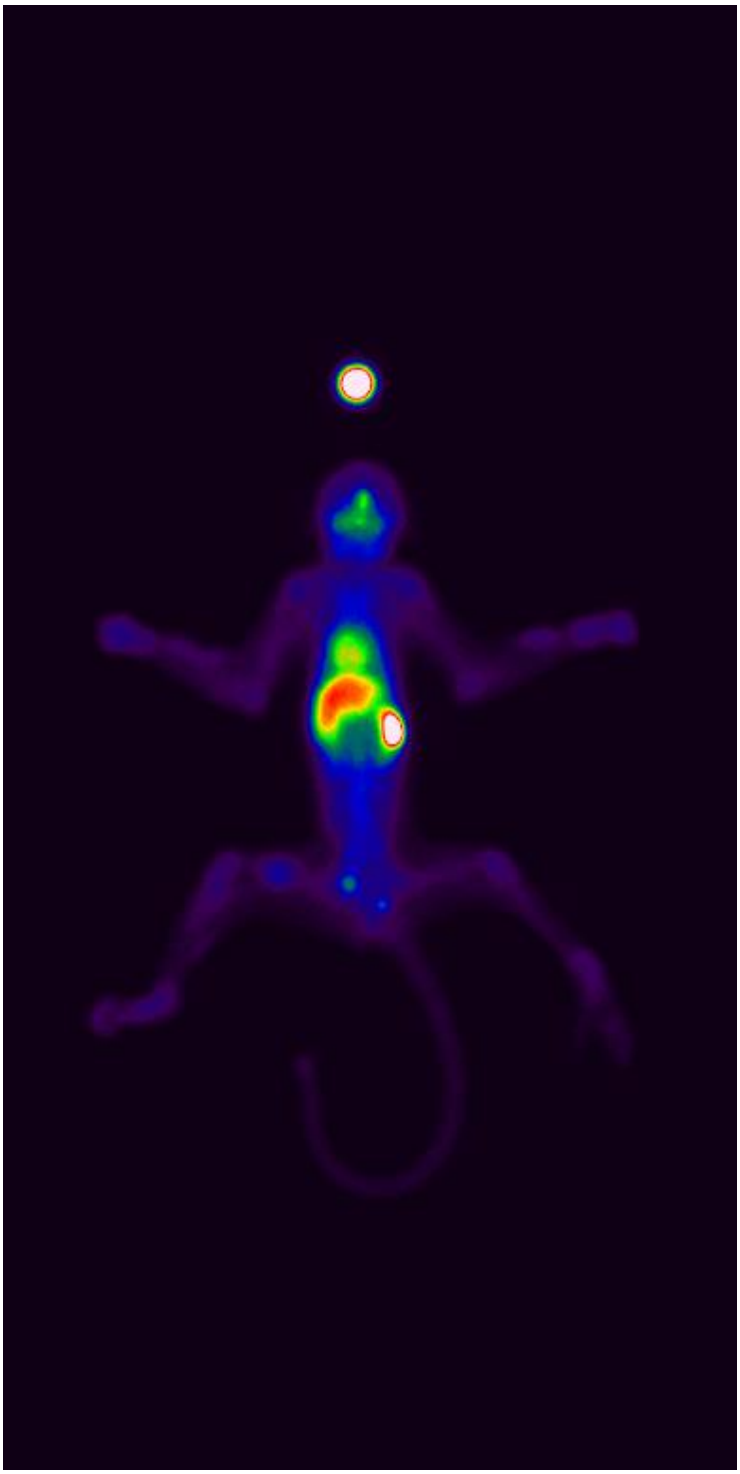
Relative body weight (%) of NCI-H1373 xenograft mouse model in treatment study

(□: PBS, ■: PPMX2032, ▲: ^{90}Y-hIgG, ●: ^{90}Y-FF-21101)



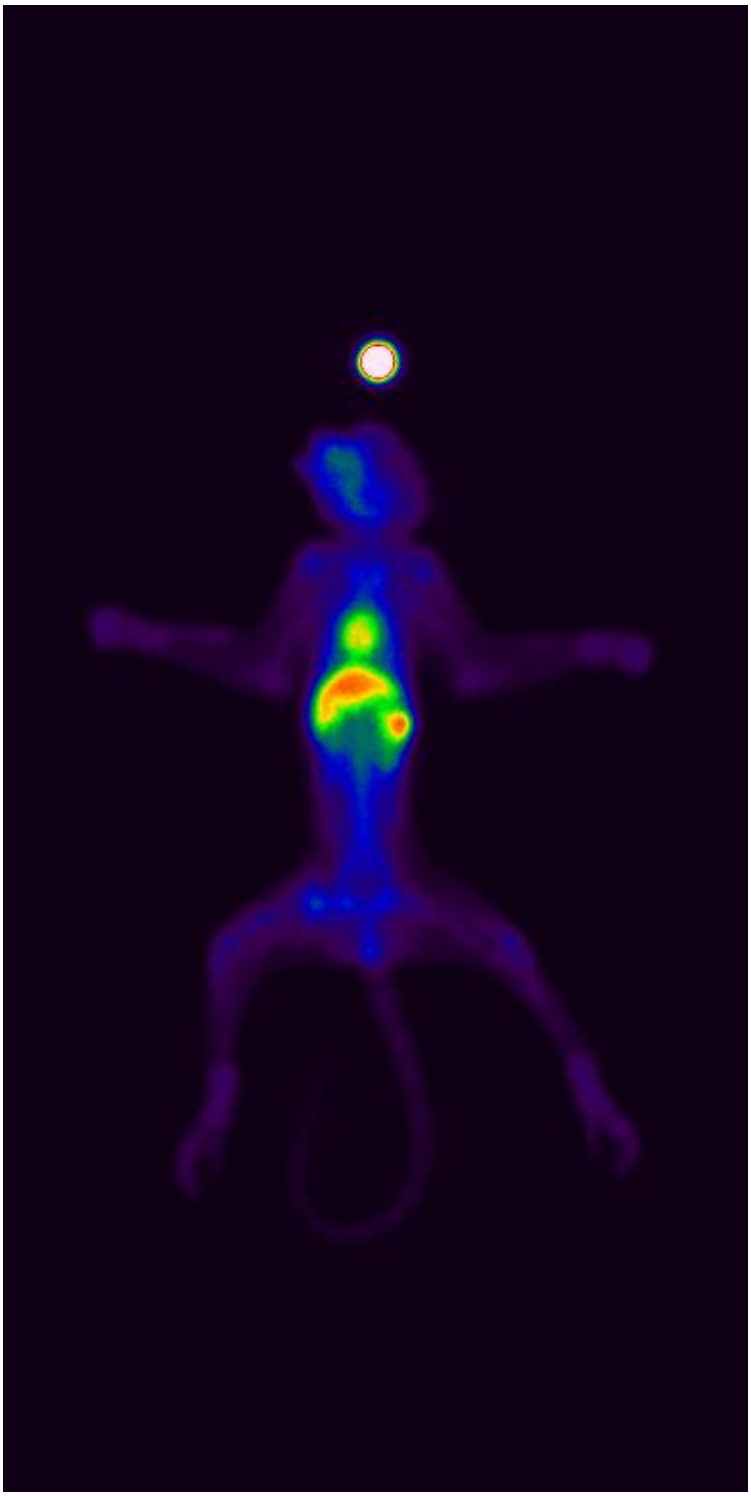
Supplemental Figure 3

Full-field-of-view image of planar imaging of cynomorgus monkey (0.04 mg/kg) 48 h after administration



Supplemental Figure 4

Full-field-of-view image of planar imaging of cynomorgus monkey (0.4 mg/kg) 48 h after administration



Supplemental Figure 5

Full-field-of-view image of planar imaging of cynomorgus monkey (4 mg/kg) 48 h after administration

Reference for Supplemental Information

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