

Supplemental Table 1. SUVmax data calculated from region of interest (ROI) analysis of mice bearing TS543 tumors ($n = 5$), and injected with $^{89}\text{Zr-Tf}$. The mean SUVmax is reported \pm one standard deviation.

Time (h)	Mean	St. Dev.
1	4.94	0.4
4	6.15	1.1
10	6.10	0.8
24	5.31	0.6
48	4.18	0.5

Supplemental Table 2. Biodistribution data for $^{89}\text{Zr-Tf}$ uptake in mice bearing subcutaneous TS543 tumors. *Ex vivo* biodistribution data for $^{89}\text{Zr-Tf}$ ($n = 5$) at multiple time points post-i.v. administration in male SCID mice bearing subcutaneous TS543 tumors in the right flank. The data are expressed as the mean %ID/g \pm one standard deviation (S.D.) Errors for the tumor-to-tissue ratios and tissue-to-muscle ratios are calculated as the geometric mean of the standard deviations.

	1 h	4 h	10 h	24 h	48 h
Blood	48.86 \pm 6.7	34.40 \pm 4.8	21.00 \pm 3.0	5.04 \pm 8.3	4.10 \pm 0.5
Tumor	10.00 \pm 1.3	16.91 \pm 2.9	11.75 \pm 5.3	10.14 \pm 7.4	9.00 \pm 1.2
Heart	11.85 \pm 1.2	10.89 \pm 1.5	8.17 \pm 1.3	2.79 \pm 4.6	3.53 \pm 0.5
Lungs	30.97 \pm 7.5	20.45 \pm 7.6	19.33 \pm 3.5	5.32 \pm 8.4	4.93 \pm 0.9
Liver	24.37 \pm 8.3	20.21 \pm 1.9	21.77 \pm 3.6	6.01 \pm 13.4	13.18 \pm 1.6
Spleen	11.00 \pm 1.2	13.52 \pm 3.2	11.89 \pm 2.8	24.83 \pm 49.82	11.68 \pm 3.3
Pancreas	3.34 \pm 0.4	3.33 \pm 0.4	2.39 \pm 0.4	1.18 \pm 1.9	1.67 \pm 0.3
Stomach	0.66 \pm 0.1	2.71 \pm 0.8	2.83 \pm 0.5	0.86 \pm 1.0	0.55 \pm 0.2
Sm. Intestine	4.11 \pm 0.7	4.65 \pm 1.0	3.59 \pm 0.7	1.52 \pm 2.1	1.59 \pm 0.3
Lg. Intestine	1.91 \pm 0.4	6.64 \pm 0.6	11.42 \pm 2.4	3.89 \pm 6.0	1.35 \pm 0.2
Kidneys	14.43 \pm 2.7	14.26 \pm 2.0	13.89 \pm 2.3	4.61 \pm 9.6	9.94 \pm 1.6
Muscle	1.00 \pm 0.2	1.58 \pm 0.4	1.66 \pm 0.2	1.26 \pm 1.2	1.29 \pm 0.3
Bone	3.05 \pm 0.3	3.96 \pm 0.77	5.01 \pm 0.7	15.4 \pm 25.5	12.69 \pm 3.8
Brain	0.92 \pm 0.2	1.84 \pm 2.8	0.53 \pm 0.1	0.27 \pm 0.04	0.19 \pm 0.02

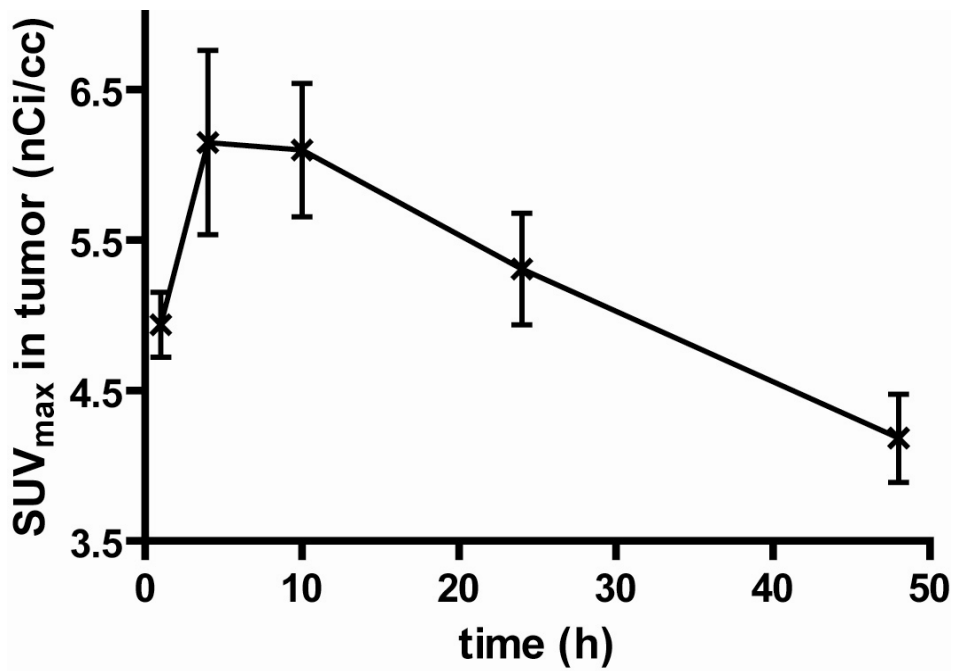
Supplemental Table 3. Biodistribution data for ^{89}Zr -Tf uptake in mice bearing intracranial TS543 tumors. *Ex vivo* biodistribution data for ^{89}Zr -Tf ($n = 5$) at 24 h post-i.v. administration in male SCID mice bearing intracranial TS543 tumors in the right hemisphere. The data are expressed as the mean %ID/g \pm one standard deviation (S.D.) Errors for the tumor-to-tissue ratios and tissue-to-muscle ratios are calculated as the geometric mean of the standard deviations.

	Left (Normal)	Right (Tumor-bearing)
Mouse 1	0.07	0.28
Mouse 2	0.74	2.41
Mouse 3	0.32	1.66
Mouse 4	0.88	2.42
Mean	0.50	1.70
St. Dev.	0.4	1.0

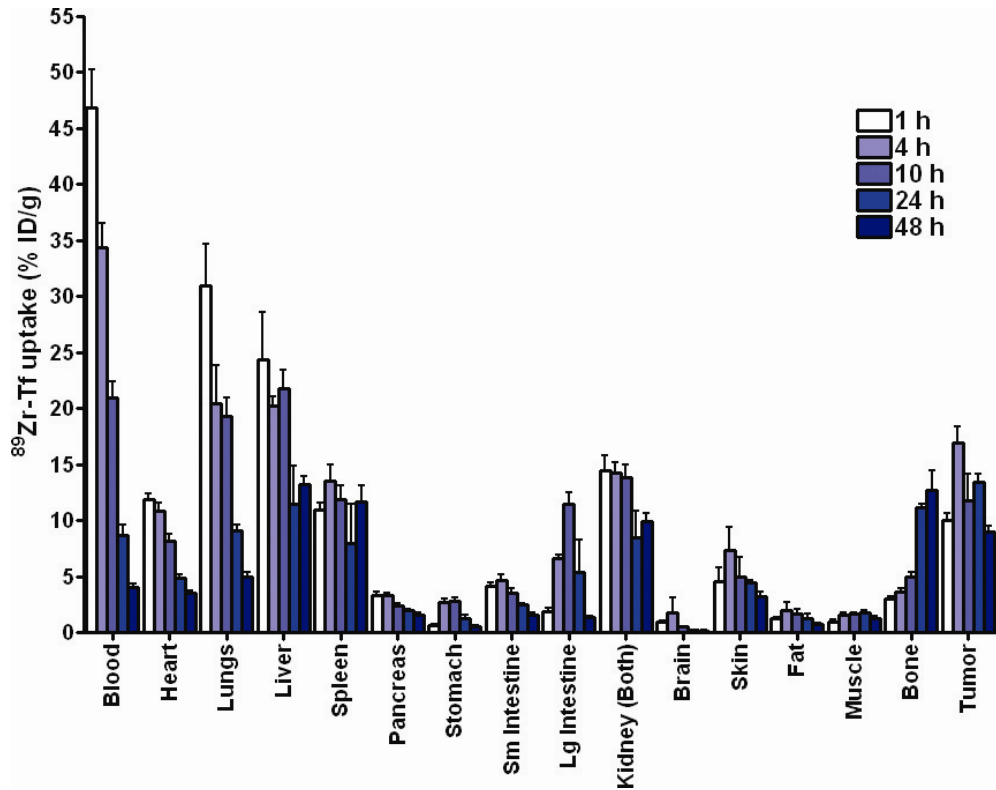
Supplemental Table 4. Selected biodistribution data from tumor-bearing animals injected with ^{18}F -FDG or ^{89}Zr -Tf. *Ex vivo* biodistribution data for ^{18}F -FDG or ^{89}Zr -Tf ($n = 5$) at 1 h and 24 h post-i.v. administration, respectively, in male SCID mice bearing the indicated subcutaneous tumor. The data are expressed as the mean %ID/g \pm one standard deviation (S.D.) Errors for the tumor-to-tissue ratios and tissue-to-muscle ratios are calculated as the geometric mean of the standard deviations.

	^{18}F -FDG				^{89}Zr -Tf			
	U87	SF268	LN-18	TS543	U87MG	SF269	LN-18	TS543
Tumor	8.33 \pm 3.6	2.94 \pm 0.5	1.19 \pm 0.2	4.00 \pm 1.3	3.56 \pm 1.1	2.66 \pm 1.4	6.49 \pm 1.7	13.44 \pm 1.4
Muscle	2.56 \pm 0.6	3.24 \pm 0.9	1.28 \pm 0.3	1.30 \pm 0.3	0.39 \pm 0.2	0.30 \pm 0.1	0.91 \pm 0.3	1.81 \pm 0.3
Brain	9.99 \pm 3.8	18.22 \pm 2.2	4.64 \pm 0.6	5.44 \pm 1.6	0.21 \pm 0.1	0.16 \pm 0.2	0.37 \pm 0.1	0.27 \pm 0.04
Tumor:Muscle	3.30 \pm 1.6	0.9 \pm 0.3	0.9 \pm 0.3	3.08 \pm 1.3	9.20 \pm 5.5	8.70 \pm 5.4	7.2 \pm 3.3	7.40 \pm 1.6
Tumor:Brain	0.8 \pm 0.5	0.2 \pm 0.0	0.3 \pm 0.1	0.73 \pm 0.3	17.20 \pm 9.5	16.10 \pm 22.2	17.50 \pm 8.0	49.30 \pm 8.5

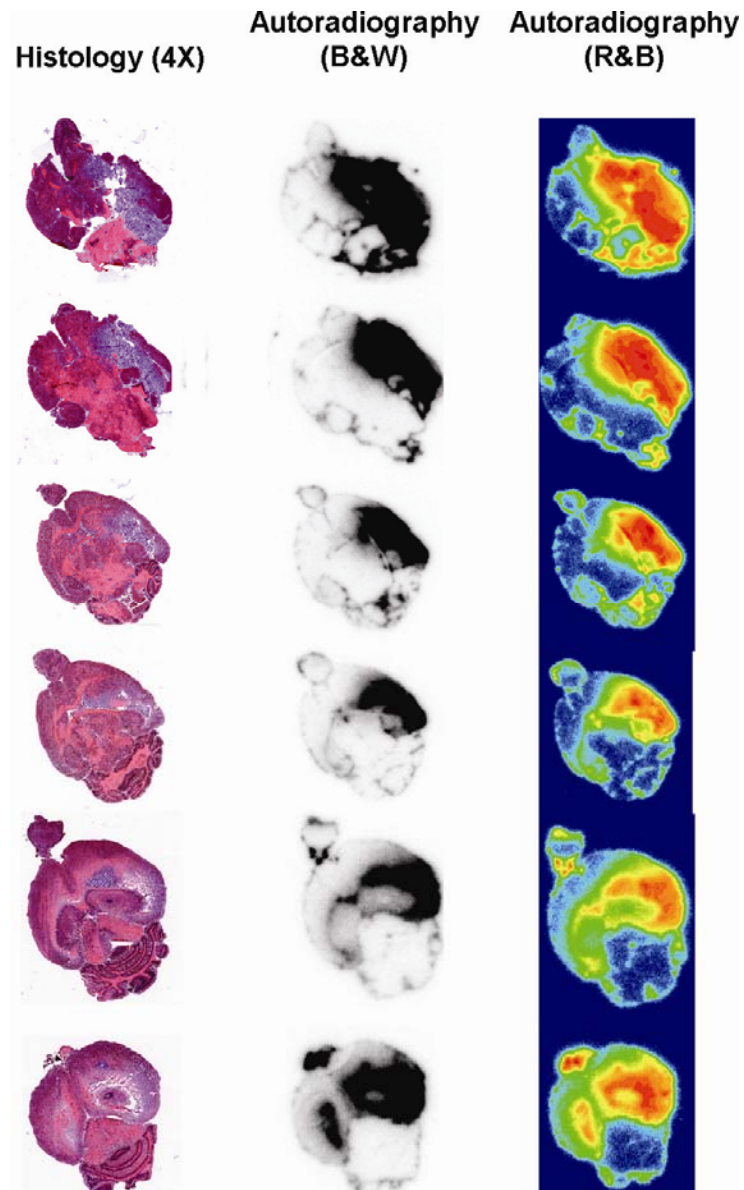
Supplemental Figure 1. A time activity curve for ^{89}Zr -Tf uptake in TS543 xenografts over time. Two-dimensional regions of interest were drawn by hand over a coronal slice to determine the SUV_{max} for ^{89}Zr -Tf in the TS543 tumor over time. The data is presented as the mean SUV_{max} for the cohort ($n = 5$) \pm one standard deviation.



Supplemental Figure 2. Comprehensive biodistribution plot of SCID mice bearing subcutaneous TS543 xenografts after injection with ^{89}Zr -Tf. Tumor-bearing mice ($n = 5$) were treated with ^{89}Zr -Tf, and at the indicated time post injection, were sacrificed and blood and tissues were harvested for biodistribution studies. Data are reported as mean %ID/g \pm one standard deviation.



Supplemental Figure 3. Histology and autoradiography of a murine brain bearing a TS543 tumor in right hemisphere, after treatment with ^{89}Zr -Tf for 24 h in vivo. Shown are representative, consecutive coronal slices of the brain. Tumor tissue was distinguished by visual inspection of histology (defined by H&E staining) by a blinded observer. The magnification is 4X. The color intensities are semi-quantitative and unitless. B&W = black and white scale, R&B = red and blue scale



Supplemental Figure 4. A photograph and representative PET image of a surgically excised and bisected brain. At left is a depiction of the murine brain after surgical removal. The right hemisphere of the brain bears the most substantial tumor burden. At right is a coronal slice of a PET scan of the tumor lobes. Consistent with the whole body images, high uptake of $^{89}\text{Zr-Tf}$ was observed in the right lobe, while comparatively little uptake was observed in the left lobe.

