

## Supplementary Materials

**Table S1.** Time-uptake ratios of six PET tracers including IM/NM, IM/BL, IM/BR and IM/LI at different time (n = 3 per group, Mean  $\pm$  SD).

Tissue	Tracers	5 min	15 min	30 min	45 min	60 min
IM/NM	[ <sup>18</sup> F]-FDG	1.39 $\pm$ 0.23	1.74 $\pm$ 0.42	2.14 $\pm$ 0.59	2.75 $\pm$ 0.67	2.81 $\pm$ 0.65
	<sup>18</sup> F <sup>-</sup>	1.11 $\pm$ 0.13	1.44 $\pm$ 0.32	3.48 $\pm$ 0.88	8.74 $\pm$ 1.09	10.98 $\pm$ 1.21
	[ <sup>18</sup> F]-FCH	1.21 $\pm$ 0.25	1.46 $\pm$ 0.27	1.58 $\pm$ 0.33	1.74 $\pm$ 0.38	1.83 $\pm$ 0.43
	[ <sup>11</sup> C]-PIB	0.93 $\pm$ 0.07	0.97 $\pm$ 0.09	0.98 $\pm$ 0.05	1.02 $\pm$ 0.07	1.07 $\pm$ 0.11
	[ <sup>11</sup> C]-DPA-Zn <sup>2+</sup>	1.02 $\pm$ 0.08	1.13 $\pm$ 0.12	1.24 $\pm$ 0.15	1.44 $\pm$ 0.20	1.73 $\pm$ 0.13
	[ <sup>11</sup> C]-DMCYS	1.13 $\pm$ 0.20	1.33 $\pm$ 0.13	1.45 $\pm$ 0.21	1.78 $\pm$ 0.13	1.27 $\pm$ 0.09
IM/BL	[ <sup>18</sup> F]-FDG	0.98 $\pm$ 0.21	1.69 $\pm$ 0.32	2.31 $\pm$ 0.43	2.87 $\pm$ 0.26	3.63 $\pm$ 0.51
	<sup>18</sup> F <sup>-</sup>	0.14 $\pm$ 0.01	0.31 $\pm$ 0.04	2.80 $\pm$ 0.31	4.92 $\pm$ 0.51	8.17 $\pm$ 0.69
	[ <sup>18</sup> F]-FCH	5.29 $\pm$ 0.61	3.28 $\pm$ 0.43	1.73 $\pm$ 0.14	1.52 $\pm$ 0.09	1.45 $\pm$ 0.12
	[ <sup>11</sup> C]-PIB	0.86 $\pm$ 0.09	0.97 $\pm$ 0.06	1.19 $\pm$ 0.10	1.38 $\pm$ 0.14	1.57 $\pm$ 0.25
	[ <sup>11</sup> C]-DPA-Zn <sup>2+</sup>	2.01 $\pm$ 0.36	1.32 $\pm$ 0.23	1.19 $\pm$ 0.12	1.05 $\pm$ 0.11	1.24 $\pm$ 0.27
	[ <sup>11</sup> C]-DMCYS	3.68 $\pm$ 0.33	2.6 $\pm$ 0.32	2.05 $\pm$ 0.24	1.58 $\pm$ 0.18	0.96 $\pm$ 0.09
IM/BR	[ <sup>18</sup> F]-FDG	0.32 $\pm$ 0.01	0.45 $\pm$ 0.04	0.56 $\pm$ 0.07	0.69 $\pm$ 0.08	0.78 $\pm$ 0.11
	<sup>18</sup> F <sup>-</sup>	14.23 $\pm$ 1.42	12.22 $\pm$ 1.09	8.32 $\pm$ 0.95	7.92 $\pm$ 0.54	25.64 $\pm$ 2.58
	[ <sup>18</sup> F]-FCH	8.32 $\pm$ 0.96	7.04 $\pm$ 0.89	5.33 $\pm$ 0.64	5.30 $\pm$ 0.54	5.27 $\pm$ 0.48
	[ <sup>11</sup> C]-PIB	0.88 $\pm$ 0.11	1.00 $\pm$ 0.14	1.07 $\pm$ 0.12	1.21 $\pm$ 0.23	1.32 $\pm$ 0.22
	[ <sup>11</sup> C]-DPA-Zn <sup>2+</sup>	1.43 $\pm$ 0.28	1.32 $\pm$ 0.20	1.27 $\pm$ 0.17	1.09 $\pm$ 0.15	0.9 $\pm$ 0.06
	[ <sup>11</sup> C]-DMCYS	3.51 $\pm$ 0.38	2.33 $\pm$ 0.19	1.72 $\pm$ 0.12	1.32 $\pm$ 0.11	1.11 $\pm$ 0.07
IM/LI	[ <sup>18</sup> F]-FDG	0.12 $\pm$ 0.01	0.97 $\pm$ 0.10	1.28 $\pm$ 0.13	1.96 $\pm$ 0.21	2.12 $\pm$ 0.27
	<sup>18</sup> F <sup>-</sup>	0.89 $\pm$ 0.04	1.40 $\pm$ 0.21	2.77 $\pm$ 0.28	7.62 $\pm$ 0.62	12.76 $\pm$ 1.10
	[ <sup>18</sup> F]-FCH	0.12 $\pm$ 0.02	0.07 $\pm$ 0.01	0.08 $\pm$ 0.01	0.08 $\pm$ 0.01	0.08 $\pm$ 0.01
	[ <sup>11</sup> C]-PIB	0.70 $\pm$ 0.10	0.72 $\pm$ 0.08	0.80 $\pm$ 0.11	0.87 $\pm$ 0.13	0.91 $\pm$ 0.09
	[ <sup>11</sup> C]-DPA-Zn <sup>2+</sup>	0.86 $\pm$ 0.11	0.73 $\pm$ 0.08	0.54 $\pm$ 0.06	0.38 $\pm$ 0.02	0.26 $\pm$ 0.03
	[ <sup>11</sup> C]-DMCYS	0.13 $\pm$ 0.01	0.56 $\pm$ 0.13	1.24 $\pm$ 0.22	1.65 $\pm$ 0.27	1.42 $\pm$ 0.28

Note: IM refers to inflammatory thigh muscle; NM refers to normal uninflammatory thigh muscle; BL refers to blood; BR refers to brain; and LI refers to liver.

Because [<sup>18</sup>F]FCH and [<sup>11</sup>C]DMCYS showed lower accumulation in inflammatory tissue than [<sup>18</sup>F]FDG, we compared the target-to-nontarget ratios of [<sup>18</sup>F]FDG, [<sup>18</sup>F]FCH, [<sup>11</sup>C]DMCYS in the S180 fibrosarcoma-bearing and inflammatory mice (in the same animals) at 60 min after injection of the tracers (%ID/g, n = 3 per group), as shown in Supplemental Table 2.

**Table S2.** The target-to-nontarget ratios of [<sup>18</sup>F]FDG, [<sup>18</sup>F]FCH, [<sup>11</sup>C]DMCYS in S180 fibrosarcoma-bearing and inflammatory mice at 60 min after injection (%ID/g, n = 3 per group, Mean  $\pm$  SD).

Tissue	[ <sup>18</sup> F]FDG	[ <sup>18</sup> F]FCH	[ <sup>11</sup> C]DMCYS
IM/NM <sup>a</sup>	2.93 $\pm$ 0.31	1.83 $\pm$ 0.51	1.32 $\pm$ 0.25
T/NM <sup>b</sup>	5.60 $\pm$ 2.82	4.52 $\pm$ 1.68	8.43 $\pm$ 1.23

Notes: <sup>a</sup> The uptake ratio of radioactivity for inflammation to normal muscle; <sup>b</sup> The uptake ratio of radioactivity for tumor to normal muscle.

### ***In Vitro* Stability**

Two samples of [ $^{11}\text{C}$ ]DPA- $\text{Zn}^{2+}$  and [ $^{11}\text{C}$ ]DMCYS (1.48 MBq, 20  $\mu\text{L}$  respectively) dissolved in normal saline were added to 200  $\mu\text{L}$  of mice serum and incubated at 37  $^{\circ}\text{C}$ . A respective aliquot of the serum sample (20  $\mu\text{L}$ ) was injected into an HPLC column at 1 h to analyze their stability in mice serum. The experiment was performed using three separate samples for each tracer, respectively. According to the HPLC analysis, [ $^{11}\text{C}$ ]DPA- $\text{Zn}^{2+}$  and [ $^{11}\text{C}$ ]DMCYS were proved to be stable *in vitro* and no degradation of the tracers was observed in mice serum at 37  $^{\circ}\text{C}$  for 1 h.

### ***In Vivo* Stability**

Two female normal Kunming mice were anesthetized with 10% chloral hydrate solution (3 mL/kg) and injected with a dose of approximately 10.0 MBq (270  $\mu\text{Ci}$ ) of [ $^{11}\text{C}$ ]DPA- $\text{Zn}^{2+}$  and [ $^{11}\text{C}$ ]DMCYS, respectively, in 200  $\mu\text{L}$  of normal saline via the tail vein. The mice were sacrificed at 20 min (for  $^{11}\text{C}$  labeled compounds) after injection, and then the respective urine was carefully collected and filtered through a 0.22  $\mu\text{m}$  Millipore filter into a tube. Respective aliquots of the urine sample (20  $\mu\text{L}$ ) were injected into an HPLC column to analyze the *in vivo* stability in the mice. Blood was obtained through the eyeball and centrifuged (6,000 rpm, 4 min), then filtered through a 0.22  $\mu\text{m}$  Millipore filter to analyze by HPLC. In the *in vivo* stability, the radioactivities were approximately 20% of [ $^{11}\text{C}$ ]DMCYS and 80% of its metabolic product in urine and most metabolites of [ $^{11}\text{C}$ ]DMCYS existed in blood 20 min after injection. However, [ $^{11}\text{C}$ ]DPA- $\text{Zn}^{2+}$  was stable *in vivo* and no metabolites were found in urine or blood.