

Supplementary Information

Potential Theranostics of Breast Cancer with Copper-64/67 Sarcophagine-trastuzumab

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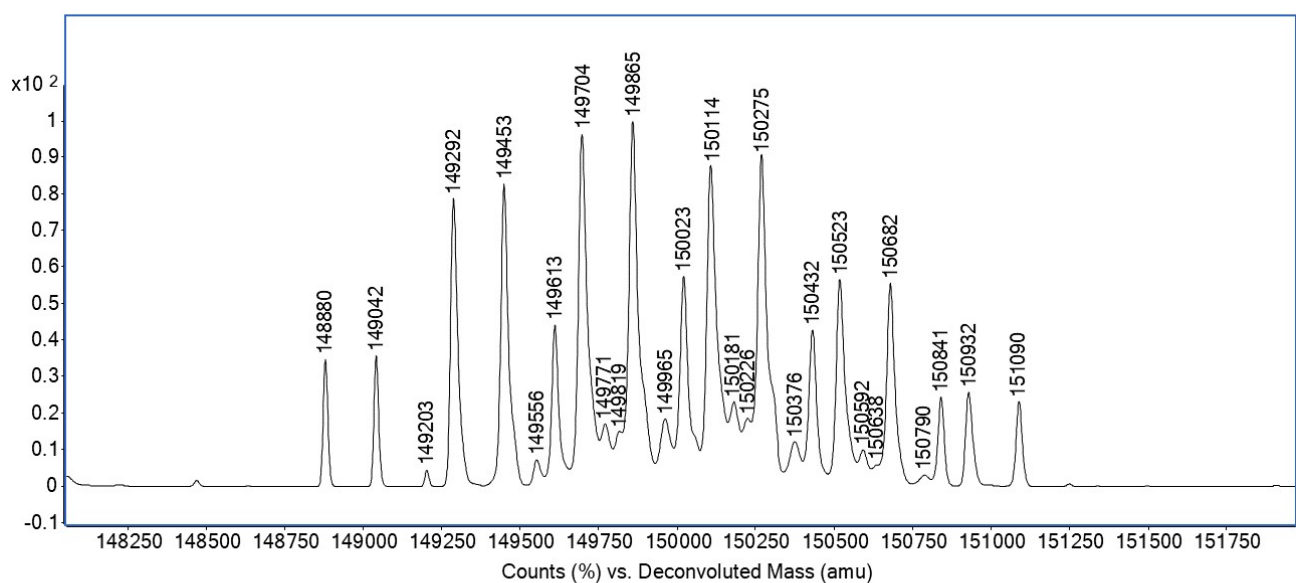
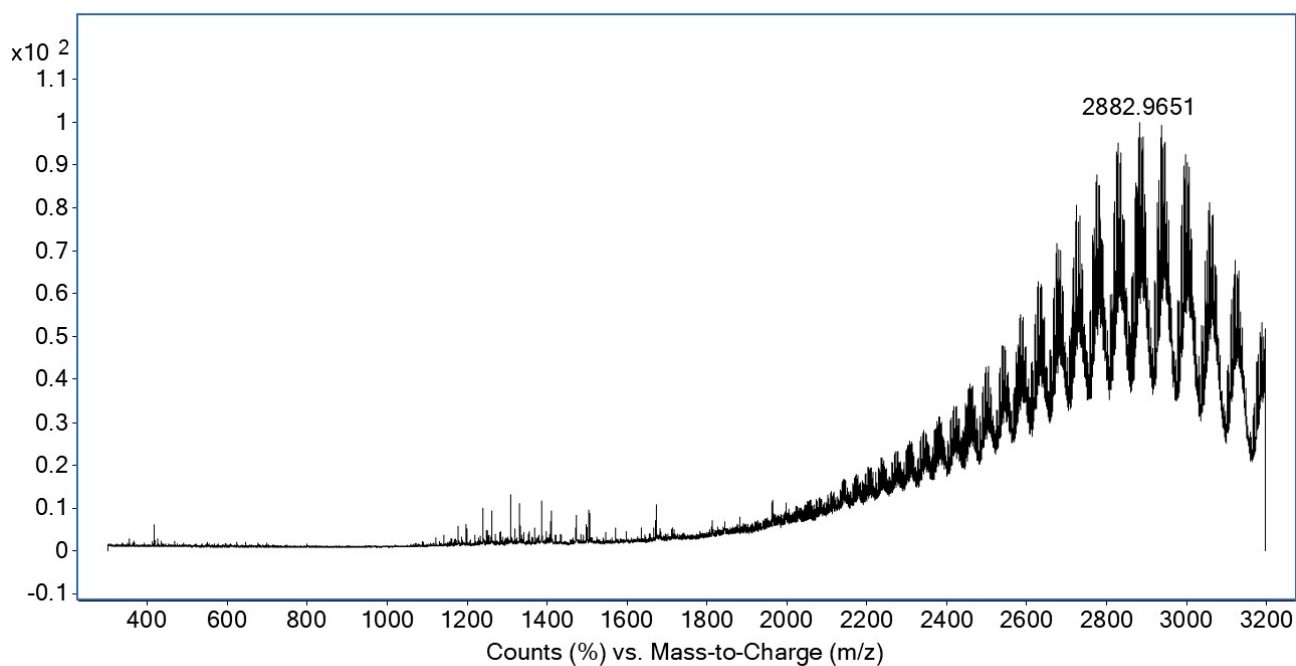
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deceased

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Supplementary Figure 1. (Top) m/z and (bottom) deconvoluted ESI mass spectra of the MeCOSar-trastuzumab conjugate.

deconvoluted mass (amu) abundance

148880	11883.37
149042	12186.11
149203	1522.96
149292	26834.63
149453	28214.01
149556	2488.38
149613	15046.97
149704	32812.84
149771	5845.24
149819	5024.63
149865	34129.11
149965	6289.76
150023	19647.52
150114	29860.18
150181	7903.86
150226	6286.45
150275	31029.15
150376	4176.64
150432	14613.89
150523	19318.11
150592	3407.94
150638	1992.58
150682	18981.05
150790	1082.31
150841	8337.58
150932	8780.71
151090	7929.07

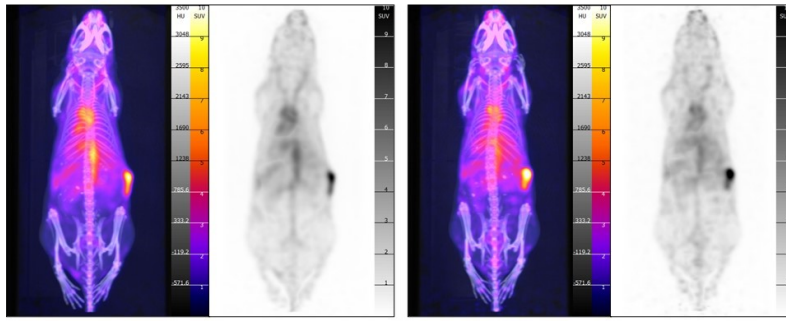
Supplementary Table 1. Mass and observed abundance of each signal from the deconvoluted ESI mass spectra of the MeCOSar-trastuzumab conjugate.

Isotope	Study	Dose range (MBq)	Mean Dose (MBq)
⁶⁴ Cu	Imaging in NSG mice (3 MBq cohort)	2.75-2.95	2.85
⁶⁴ Cu	Imaging in balb/c nu/nu mice (10 MBq cohort)	7.95-10.95	10.11
⁶⁷ Cu	Biodistribution in balb/c nu/nu mice (4.5 MBq cohort)	4.40-4.94	4.73
⁶⁷ Cu	Efficacy in balb/c nu/nu mice (4.5 MBq cohort)	4.15-4.57	4.36
⁶⁷ Cu	Efficacy in balb/c nu/nu mice (6.7 MBq cohort)	6.29-6.77	6.63
⁶⁷ Cu	Efficacy in balb/c nu/nu mice (9.0 MBq cohort)	8.60-9.26	9.04

Supplementary Table 2. Range and mean doses of activity administered to mouse cohorts for each study.

Mouse # 17

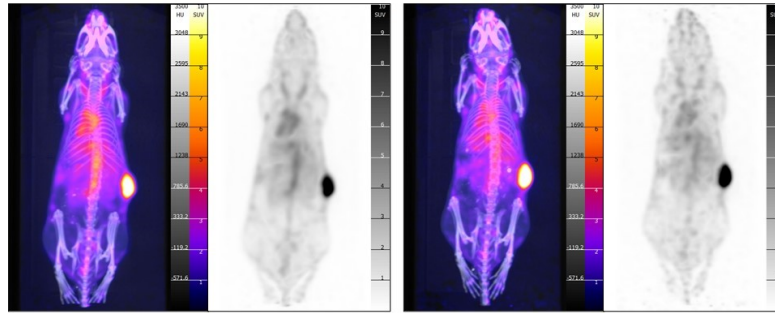
Tumour volume 118 mm³



24 hr		48 hr	
SUV _{max}	10.3	SUV _{max}	13.7
Tumour:Bkg Ratio	11.4	Tumour:Bkg Ratio	13.4
Tumour:Kidney Ratio	4.54	Tumour:Kidney Ratio	6.07
Tumour:Liver Ratio	3.25	Tumour:Liver Ratio	4.65
Tumour:Bone Ratio	9.19	Tumour:Bone Ratio	11.9

Mouse # 33

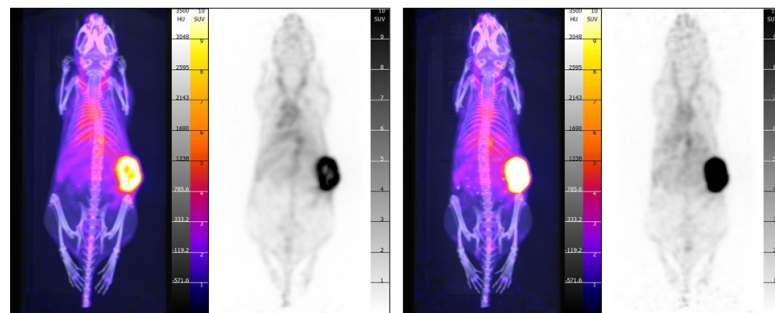
Tumour volume 190 mm³



24 hr		48 hr	
SUV _{max}	18.0	SUV _{max}	24.4
Tumour:Bkg Ratio	21.4	Tumour:Bkg Ratio	30.9
Tumour:Kidney Ratio	8.31	Tumour:Kidney Ratio	12.4
Tumour:Liver Ratio	7.04	Tumour:Liver Ratio	8.72
Tumour:Bone Ratio	17.1	Tumour:Bone Ratio	24.3

Mouse # 35

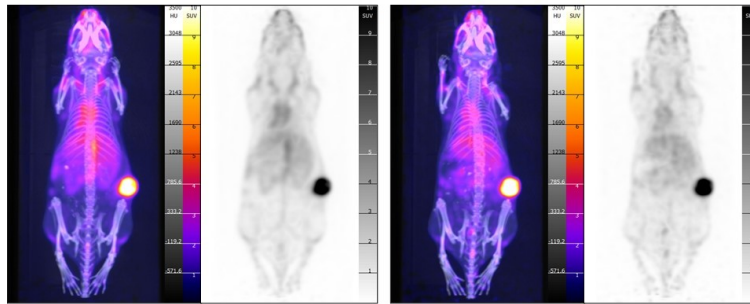
Tumour volume 399 mm³



24 hr		48 hr	
SUV _{max}	13.8	SUV _{max}	20.8
Tumour:Bkg Ratio	18.1	Tumour:Bkg Ratio	33.3
Tumour:Kidney Ratio	6.57	Tumour:Kidney Ratio	9.07
Tumour:Liver Ratio	4.93	Tumour:Liver Ratio	8.46
Tumour:Bone Ratio	13.7	Tumour:Bone Ratio	22.2

Mouse # 61

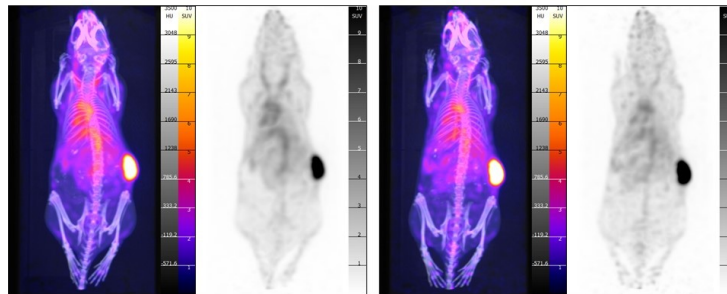
Tumour volume 148 mm³



24 hr		48 hr	
SUV _{max}	14.9	SUV _{max}	17.8
Tumour:Bkg Ratio	18.8	Tumour:Bkg Ratio	21.1
Tumour:Kidney Ratio	7.84	Tumour:Kidney Ratio	10.4
Tumour:Liver Ratio	5.70	Tumour:Liver Ratio	7.34
Tumour:Bone Ratio	14.6	Tumour:Bone Ratio	20.1

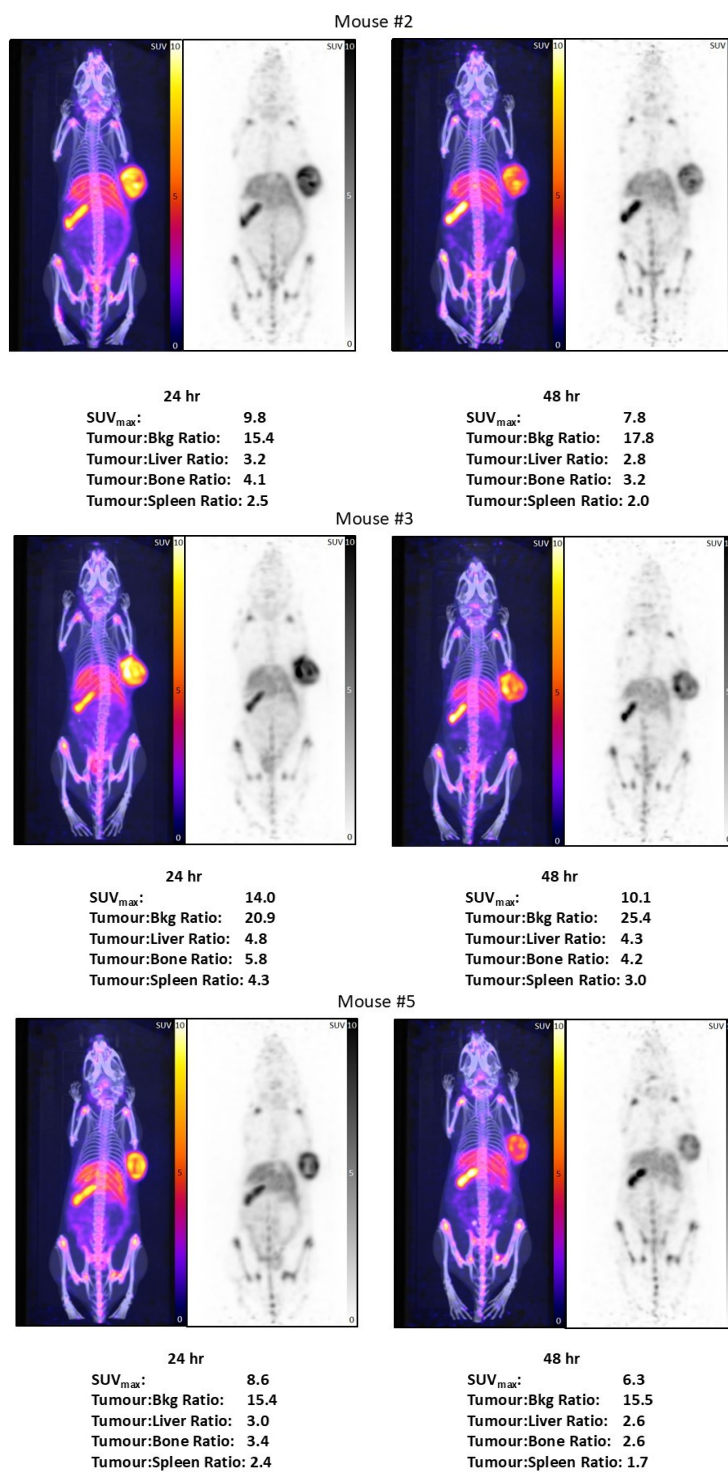
Mouse # 63

Tumour volume 206 mm³

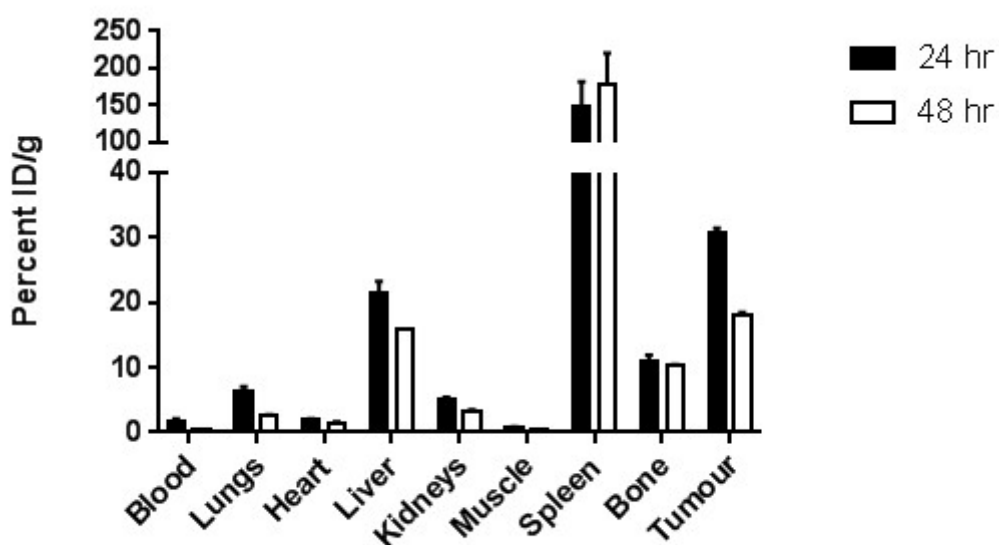


24 hr		48 hr	
SUV _{max}	18.8	SUV _{max}	28.3
Tumour:Bkg Ratio	19.0	Tumour:Bkg Ratio	33.3
Tumour:Kidney Ratio	9.12	Tumour:Kidney Ratio	14.2
Tumour:Liver Ratio	6.50	Tumour:Liver Ratio	9.80
Tumour:Bone Ratio	17.3	Tumour:Bone Ratio	27.6

Supplementary Figure 2. PET/CT (MIP) images of SKOV-3 tumour-bearing Balb/c nu/nu mice administered with [⁶⁴Cu]Sar-trastuzumab at 24 or 48 hours after administration and corresponding image quantitation.



Supplementary Figure 3. PET/CT (MIP) images of SKOV-3 tumour-bearing NSG mice administered with [⁶⁴Cu]Sar-trastuzumab at 24 or 48 hours after administration and corresponding image quantitation.



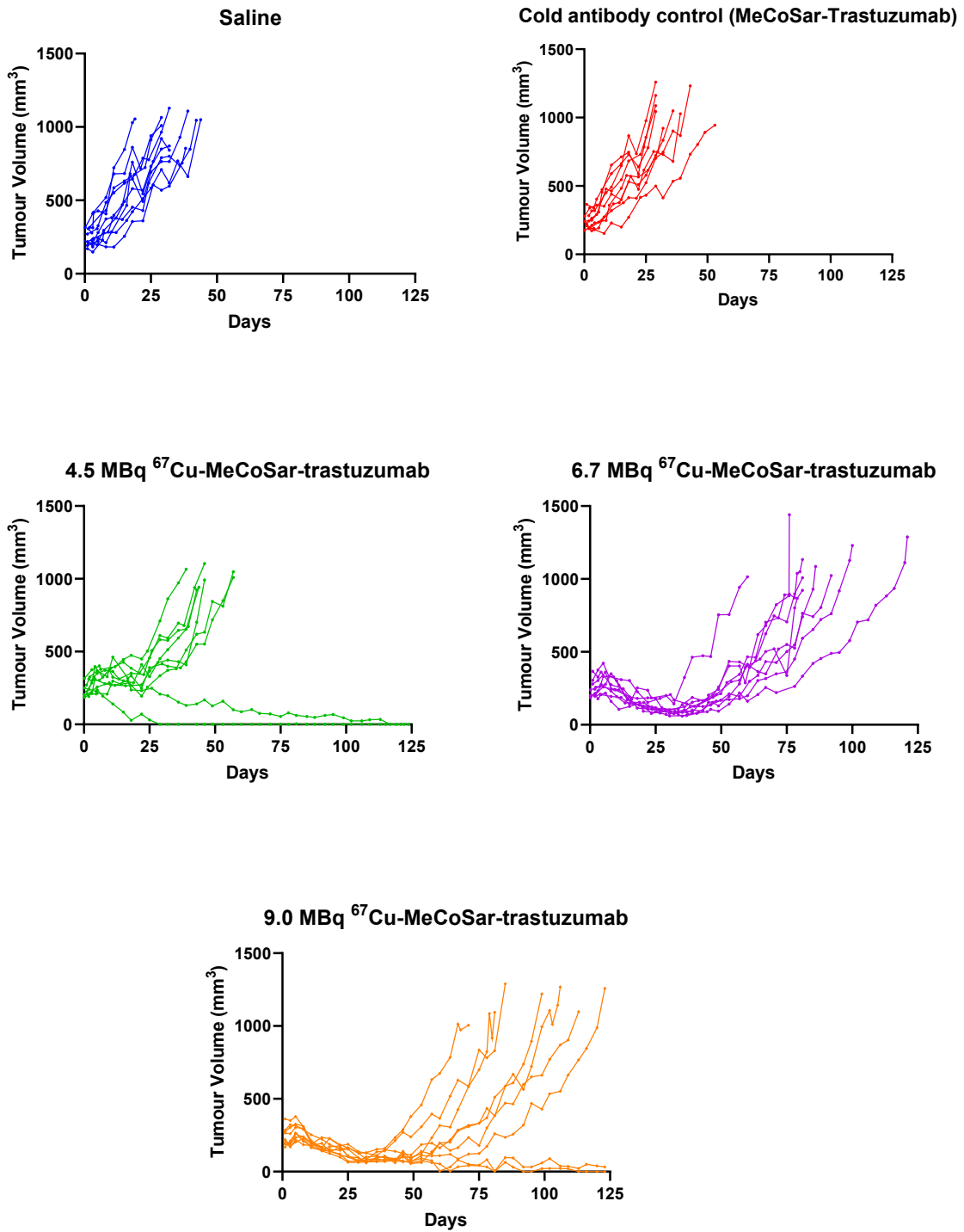
Supplementary Figure 4. Ex vivo biodistribution of SKOV-3 tumour-bearing NSG mice administered with [⁶⁴Cu]Sar-trastuzumab at 24 or 48 hours after administration. Data shown as mean ± SEM, n=3.

	24 h					48 h				
Mouse ID#	6	29	32	71	76	17	33	35	61	63
Blood	22.37%	25.55%	17.85%	21.15%	22.35%	21.26%	17.07%	16.18%	13.28%	16.02%
Lungs	10.11%	9.28%	6.40%	8.86%	8.14%	10.44%	8.97%	7.47%	6.59%	7.81%
Heart	5.47%	6.43%	5.65%	5.49%	6.68%	6.94%	4.96%	5.37%	4.92%	5.49%
Liver	4.67%	7.30%	6.07%	5.64%	5.78%	8.98%	8.43%	7.44%	7.38%	6.96%
Kidney	9.99%	9.49%	6.70%	7.98%	9.43%	8.84%	9.82%	7.52%	7.57%	8.89%
Muscle	1.48%	1.93%	1.31%	1.63%	1.64%	2.19%	1.42%	1.47%	1.22%	1.61%
Spleen	7.19%	10.42%	7.81%	6.41%	9.37%	9.43%	7.83%	8.75%	6.43%	7.51%
Bone	2.67%	3.70%	2.40%	2.62%	2.92%	2.99%	2.70%	2.52%	1.81%	2.37%
Tumour	47.98%	55.94%	44.35%	63.76%	50.67%	45.83%	78.77%	54.71%	54.42%	68.86%

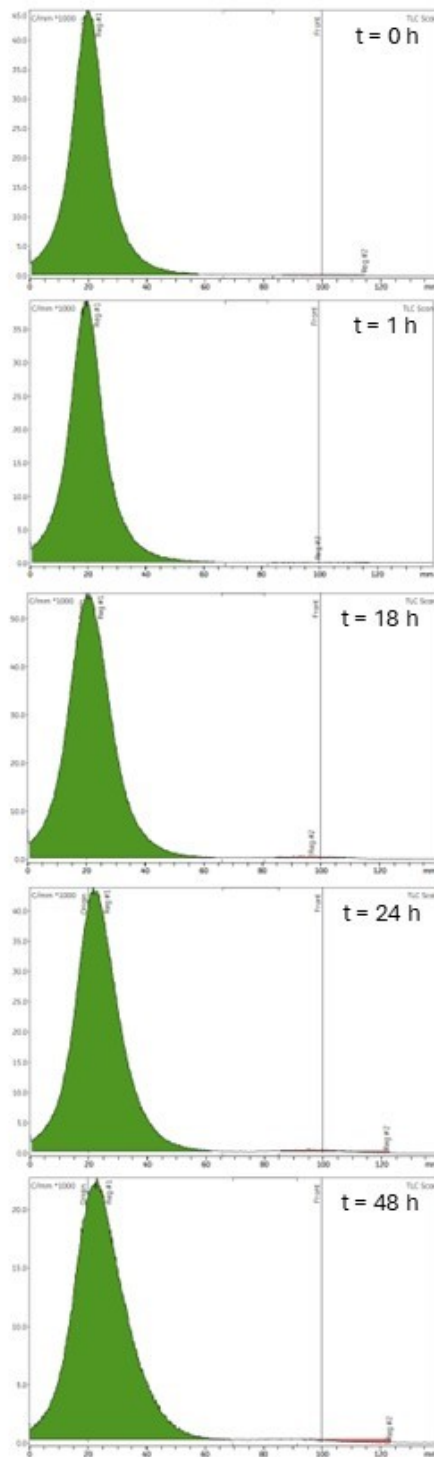
Supplementary Table 3. Ex vivo biodistribution results of SKOV-3 tumour-bearing Balb/c nu/nu mice administered with [⁶⁴Cu]Sar-trastuzumab. All values are expressed as % IA/g.

	48 h				
Mouse ID#	28	34	45	54	82
Blood	17.63%	18.73%	22.34%	18.65%	19.74%
Lungs	9.40%	6.86%	9.71%	8.24%	11.62%
Heart	7.26%	5.69%	5.98%	5.97%	6.04%
Liver	7.04%	5.30%	5.93%	6.00%	6.41%
Kidney	8.92%	8.05%	8.06%	7.22%	9.12%
Muscle	1.46%	1.58%	1.93%	1.94%	1.60%
Spleen	7.81%	8.42%	10.25%	7.32%	8.53%
Bone	1.91%	2.18%	3.02%	3.20%	3.27%
Tumour	74.85%	76.42%	46.52%	44.32%	55.25%

Supplementary Table 4. Ex vivo biodistribution results of SKOV-3 tumour-bearing Balb/c nu/nu mice administered with [⁶⁷Cu]Sar-trastuzumab. All values are expressed as % IA/g.



Supplementary Figure 5. Tumour volumes over time of individual mice per cohort following administration of either saline, cold antibody control (20 ug of unlabelled Sar-trastuzumab), or 20 ug of labelled [⁶⁷Cu]Sar-trastuzumab with either 4.5, 6.7 or 9.0 MBq doses.



Supplementary Figure 6. Radio-iTLC analysis of [^{64}Cu]CuSar-trastuzumab following incubation in human serum at 37°C for 0-48 hours.