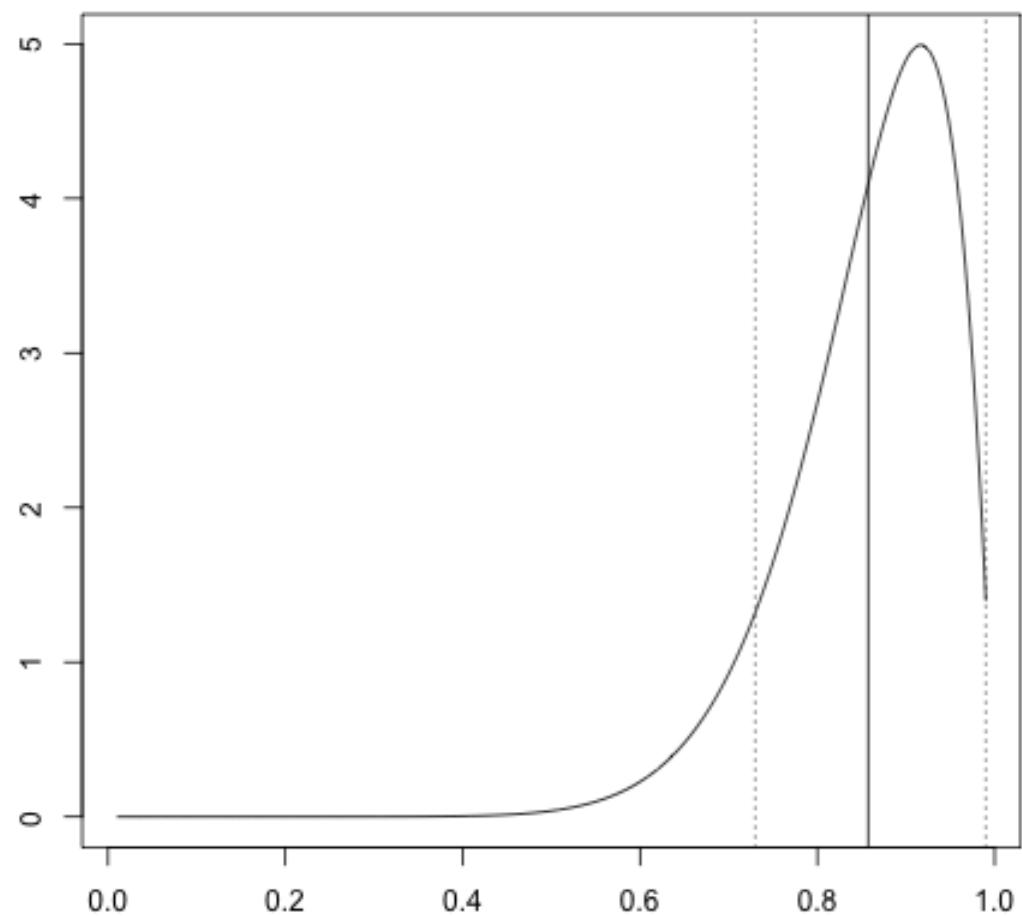


Supplemental Figure 1. Serial maximum intensity projection (MIP) images post-infusion of 186.8 MBq of ^{89}Zr -DFO-MSTP2109A. Initial images show predominant blood pool activity that decreases over time. Liver uptake decreases over time and represents a combination of blood pool and low parenchymal uptake. Spleen uptake visualized early decreases over time and probably represents blood pool contribution. Activity in bowel content is seen in 24 h images in ascending colon and is seen transiting to transverse and descending colon and sigmoid. No urinary activity is noted, although typically the patient has voided prior to scanning. Mild uptake is seen in kidney parenchyma in early and late scan. Uptake in gallbladder is seen in the initial images (not in all patients). This patient has two vertebral bone lesions not seen on <2 h image but visualized as early as 24 h in the orthogonal views (not shown) and clearly seen in MIP at 96 h and best seen in the 144 h images. All images set at the maximum scale of SUV 16.



Supplemental Figure 2. There were 504 ^{89}Zr -DFO-MSTP2109A-positive unbiopsied sites. Using Bayesian analysis, we estimate that 432 of those would be biopsy+ if they were biopsied.

Supplemental Table 1. Contemporaneous biopsy data and highest SUV max data in bone and soft tissues

Patient #	Site of contemporaneous biopsy	Biopsy histology results	SUVmax of recent biopsy site	Days from ^{89}Zr -DFO-MSTP2109A injection to recent biopsy (-before, +after)	IHC* contemporaneous/archival	^{89}Zr -DFO-MSTP2109A imaging of contemporaneous Bone scan/CT imaging of contemporaneous biopsy	^{89}Zr -DFO-MSTP2109A most intense bone lesion (SUVmax)	^{89}Zr -DFO-MSTP2109A most intense soft tissue lesion (SUVmax)
1	10th R rib	Pos	3.19	+13	ND/2+	-	+/-	20.99
2	L4	Pos	8.89	+7	3+/2+	+	+/-	20.21
3	L femoral head	Pos	10.38	+71	ND/2+	+	+/-	25.86
4	None	NA	NA	NA	NA/1+	NA	NA	4.39
5	T9	False Neg** pos**	24.78 NA	-28 +220	ND/1+ ND	+	+/- ND	24.78 NA
6	R ischium	Pos	11.10	+7	2+/2+	+	+/-	19.13
7	None	NA	NA	NA	NA/2+			59.28
8	L humeral head	Pos	18.43	-28	ND/2+	+	+/-	19.75
9	L iliac bone	Pos	3.04	+7	ND/2+	+	+/-	30.24
10	None	NA	NA	NA	NA/1+	NA	NA	14.37
11	L RP node L PE node R iliac bone	pos pos pos	10.87 16.39 15.54	-30 +33 +33	3+/1+ ND/1+ ND/1+	+	NA/+ NA/+ +/-	40.87
12	L sacrum	pos	12.48	+21	ND/1+	+	+/-	12.32
13	L axillary node	pos	5.98	+27	3+/1+	+	NA/-	20.01
14	R iliac node	pos	16.98	+19	2+/1+	+	NA/-	16.98

15	R sternum	pos	8.82	-11	2+/1+	+	+/+	8.82	None
16	L ischium	pos	9.93	+5	ND/3+	+	+/+	22.60	None
17	L external iliac node	pos	11.94	+53	ND/3+	+	NA/-	8.72 fp	15.85
18	T12	pos	14.51	-35	ND/2+	+	+/+	22.07	None
19	None	ND	ND	ND	NA/3+	+	+/+	38.59	16.21

*IHC scoring: 1+, 2+, 3+

**Biopsied lesion negative but subsequent biopsy positive believed to be sampling error on review of guided biopsy

Abbreviations: NA, not applicable; ND, not done; fp, probably false positive (negative on long-term follow-up); RP, retroperitoneal; PE, perinephric

Supplemental Table 2. Data used for correlation with tumor uptake (SUVmax)

Patient #	SUVmax tumor (bone or soft tissue)	PSA value prior to injection (0-10 d) ng/mL	Maximal % change in PSA from baseline while on treatment with DSTP3086S ADC **	Highest IHC Grade 1-3 (archival or fresh tissue)	Time from ⁸⁹ Zr MStP2109A injection to death (d)	Days on DSTP3086S ADC study (d)	Total DSTP3086S ADC injections (n=)	Reason for stopping DSTP3086S ADC
1	20.99	17.99	45	2	133	78	3	PD
2	20.21	420.22	-42	3	557	122	5	PD
3	25.86	128.66		2	125	none	none	NA
4	4.39	0.96	21	1	87	9	1	PD
5	24.78	10.09	10	1	1307	221	21	PD
6	19.13	15.8	34	2	576	92	4	PD
7	59.28	30.5		2	375	none	none	NA
8	19.75	45.06	-69	2	1352	249	12	PD
9	30.24	1806.13		2	208	none	none	NA
10	16.79	57.36	32	1	744	92	11	PD
11	40.87	315.01	-78	3	788	352	14	AE
12	12.32	7.94	135	1	528	80	3	AE
13	20.01	21.55	-47	3	503	182	7	AE
14	18.93	46.38	44	2	967	94	4	PD
15	8.82	506.55	-11	2	949	165	7	PD
16	22.6	7.27	-60	3	917	338	14	AE
17	15.85	57.5	-1	3	490	64	3	AE
18	22.07	10.18	-96	2	609	140	5	AE
19	38.59	8.28		3	269	none	none	NA

*PD, progressive disease; NA, not available; AE, adverse events

**Positive numbers represent percent % PSA increase from pre-ADC treatment and negative number represent the % PSA decrease from pre-treatment PSA following ADC