

No.	Indication	Gleason	PSA value	PSMA tracer used in PET-1	Lesions finally interpreted as PSMA true-positive (reader 1/ reader 2)		Lesions finally interpreted as PSMA false-positive or unspecific or urinary activity (reader 1/ reader 2)		Verification
					PET-1	PET-2	PET-1	PET-2	
1	Differentiation of local tissue (PCa vs. rectal cancer)	n.a.	10.5	<sup>18</sup> F-JK-PSMA-7	T (RADS-4/ RADS-4)  T (RADS-5/ RADS-5)	T (RADS-4/ RADS-4)  T (RADS-5/ RADS-5)			Imaging (MRI of the pelvis)
2	Oligo-metastasis (after RT)	4+3	4.5	<sup>68</sup> Ga-PSMA-11	M (RADS-5/ RADS-5)	M (RADS-5/ RADS-5)	N (RADS-3/ RADS-1)	Negative N (RADS-1/ RADS-1)	Imaging (skeletal CT), Follow-up 16 mo including PET/CT
3	BCR	3+4	1.26	<sup>68</sup> Ga-PSMA-11	N (RADS-2/ RADS-2)*	N (RADS-4/ RADS-4)*			Histology (lymph nodes)
4	BCR	3+4	4.5	<sup>18</sup> F-JK-PSMA-7	T (RADS-4/ RADS-4)	T (RADS-4/ RADS-4)			RT, Follow-up 9 mo including PET/CT
5	BCR	3+3	1.8	<sup>18</sup> F-JK-PSMA-7	T (RADS-3/ RADS-4)	T (RADS-4/ RADS-4)			Follow-up 12 mo including PET/CT
6	Oligo-metastasis (before RT)	4+3	1.84	<sup>68</sup> Ga-PSMA-11	T (RADS-3/ RADS-3)  M (RADS-5/ RADS-5)	T (RADS-3/ RADS-4)  M (RADS-5/ RADS-5)	Bone marrow in the additional regions PSMA-negative	M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)	Skeletal MRI, skeletal RT, Follow-up 11 mo including PET/CT,

7	BCR	4+3	0.3	<sup>68</sup> Ga-PSMA-11	T (RADS-3/ RADS-2)	T (RADS-4/ RADS-4)			RT, Stable disease 6 mo
8	BCR	4+3	27.7	<sup>68</sup> Ga-PSMA-11	T (RADS-3/ RADS-4)	T (RADS-5/ RADS-5)			No follow-up data. PET/CT 7 and 15 mo before with loco-regional relapse
9	BCR	3+4	1.9	<sup>68</sup> Ga-PSMA-11	T (RADS-3/ RADS-2)	T (RADS-4/ RADS-4)			RT, Follow-up 6 mo
10	BCR	3+4	1.5	<sup>18</sup> F-DCFPyL	negative	negative			Follow-up 12 mo including serial PET/CT
11	BCR	4+5	1.9	<sup>68</sup> Ga-PSMA-11	negative	negative			Small PSMA-negative lung metastases (histologically confirmed)
12	BCR	4+3	0.6	<sup>68</sup> Ga-PSMA-11	negative	negative			Follow-up 9 mo
13	BCR	n.a.	4.3	<sup>18</sup> F-DCFPyL	T (RADS-3/ RADS-2)	T (RADS-4/ RADS-4)	Bone marrow PSMA-negative	M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)	Skeletal MRI, RT, Follow-up 6 mo,
14	BCR	4+5	1.0	<sup>18</sup> F-DCFPyL	N (RADS-2/ RADS-5)*	N (RADS-4/ RADS-4)*			Histology (lymph nodes)
15	BCR	4+5	2.1	<sup>68</sup> Ga-PSMA-11	N (RADS-3/ RADS-4)	N (RADS-4/ RADS-4)			RT, Follow-up 6 mo.

16	BCR	3+4	1.59	<sup>68</sup> Ga-PSMA-11	negative	negative			n.a.
17	BCR	n.a.	0.39	<sup>68</sup> Ga-PSMA-11	negative	negative			MRI negative, RT, Stable disease 6 mo
18	BCR	3+3	0.71	<sup>68</sup> Ga-PSMA-11	negative	negative			n.a.
19	BCR	4+5	7.7	<sup>18</sup> F-DCFPyL	T (RADS-3/ RADS-5)  N (RADS-3/ RADS-5)	T (RADS-5/ RADS-5)  N (RADS-5/ RADS-5)			No follow-up data. PET/CT 14, 30, and 46 mo before with loco-regional relapse
20	BCR	3+4	0.68	<sup>18</sup> F-DCFPyL	T (RADS-4/ RADS-4)*	T (RADS-4/ RADS-4)*			Biopsy (local relapse)
21	BCR	4+3	1.76	<sup>18</sup> F-JK-PSMA-7	T (RADS-3/ RADS-2)*	T (RADS-3/ RADS-3)*	Bone marrow PSMA-negative	M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)	Skeletal MRI, Biopsy, Histology (prostate)
22	Persistent PSA level after prostatectomy	4+3	3.9	<sup>68</sup> Ga-PSMA-11	T (RADS-4/ RADS-4)  M (RADS-3/ RADS-3)	T (RADS-4/ RADS-4)  M (RADS-4/ RADS-4)	Bone marrow in the additional regions PSMA-negative	M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)	Skeletal MRI, RT prostate fossa and Th6, Follow-up 4 mo

23	BCR	n.a.	4.39	<sup>18</sup> F-JK-PSMA-7	T (RADS-3/ RADS-3)  T (RADS-3/ RADS-3)	T (RADS-3/ RADS-3)  T (RADS-3/ RADS-3)	Bone marrow PSMA-negative	M (RADS-3/ RADS-3)	Skeletal MRI, RT, Follow-up 3 mo
24	BCR	4+3	0.65	<sup>68</sup> Ga-PSMA-11	N (RADS-5/ RADS-5)*	N (RADS-5/ RADS-5)*	T (RADS-3/ RADS-3)	Negative T (RADS-1/ RADS-1)	Histology (lymph nodes)
25	BCR	3+5	0.8	<sup>68</sup> Ga-PSMA-11	T (RADS-4/ RADS-4)  T (RADS-3/ RADS-3)	T (RADS-4/ RADS-4)  T (RADS-4/ RADS-4)			RT, Follow-up 3 mo
26	BCR	4+4	0.4	<sup>68</sup> Ga-PSMA-11	negative	negative			n.a.
27	BCR	4+4	0.63	<sup>18</sup> F-JK-PSMA-7	T (RADS-4/ RADS-4)  T (RADS-1/ RADS-1)  N (RADS-4/ RADS-4)  N (RADS-3/ RADS-3)  N (RADS-3/ RADS-3)	T (RADS-4/ RADS-4)  T (RADS-4/ RADS-4)  N (RADS-4/ RADS-4)  N (RADS-3/ RADS-3)  N (RADS-3/ RADS-3)	Bone marrow PSMA-negative	M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)  M (RADS-3/ RADS-3)	Skeletal MRI, RT, Follow-up 3 mo

**Supplemental Table 1.** Data from the 27 patients, differentiating between finally established PSMA true-positive lesions and unspecific PSMA-positive spots. The PSMA-RADS categories are recorded for PET-1 with  $^{68}\text{Ga}$ -PSMA-11,  $^{18}\text{F}$ -DCFPyL, or  $^{18}\text{F}$ -JK-PSMA-7 (reader 1/ reader 2) and for PET-2 with  $^{18}\text{F}$ -PSMA-1007 (reader 1/ reader 2). Each registration describes one lesion: T: prostate, prostate fossa, or seminal vesicle; N: lymph node within the pelvis; M: findings in the bone or the bone marrow. The lesions with an asterisk (\*) were histologically confirmed.

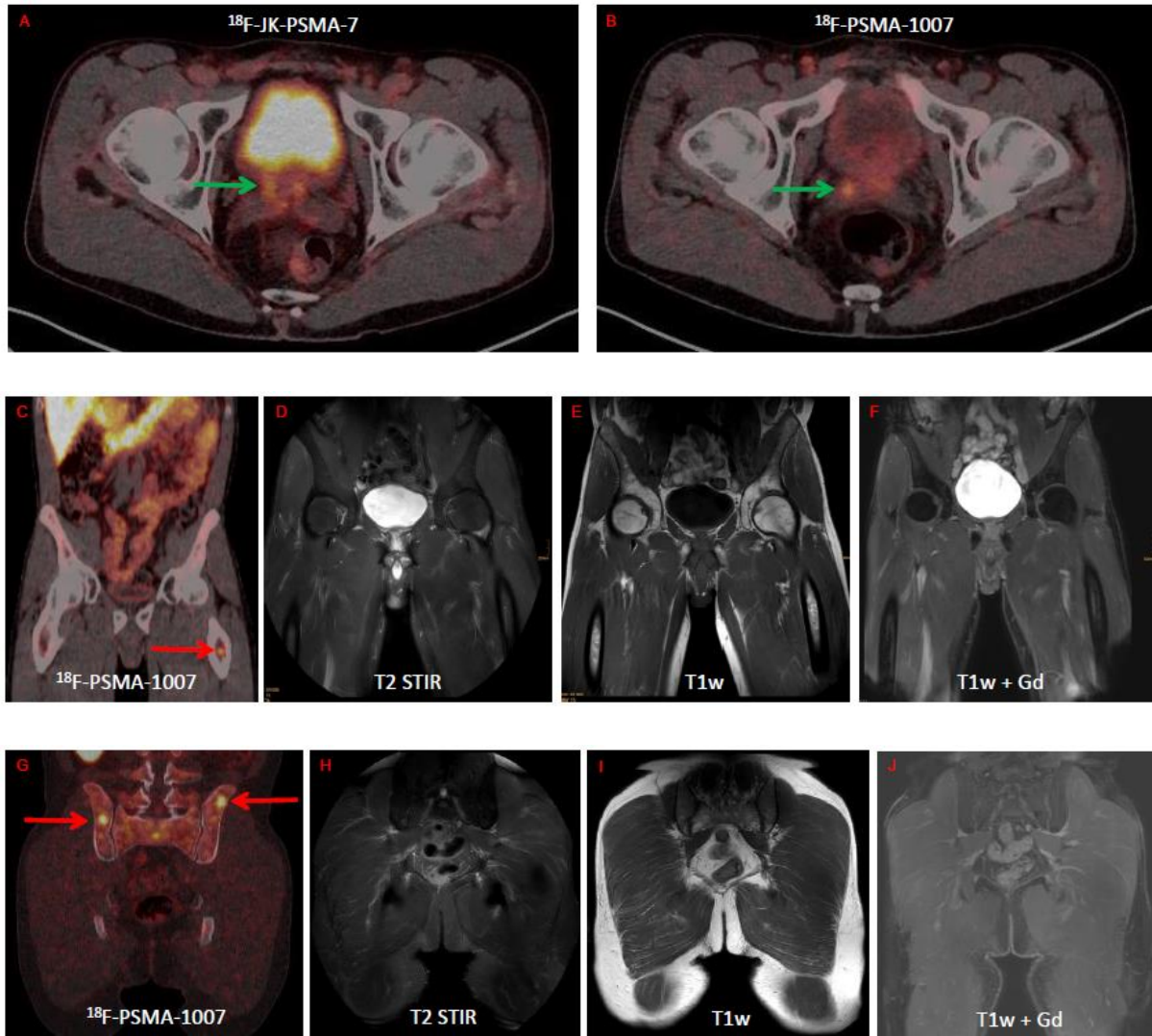
Abbreviations: BCR, biochemical recurrence; n.a., non-available; PCa, prostate cancer; RADS, reporting and data systems; RT, radiotherapy

PET-1	Reader 2			
Reader 1	PSMA-RADS	RADS 1 / 2	RADS 3	RADS 4 / 5
	1 / 2	2	0	1
	3	4	6	5
	4 / 5	0	0	9

PET-2 ( <sup>18</sup> F-PSMA-1007)	Reader 2			
Reader 1	PSMA-RADS	RADS 1 / 2	RADS 3	RADS 4 / 5
	RADS 1 / 2	0	0	0
	RADS 3	0	5	1
	RADS 4 / 5	0	0	21

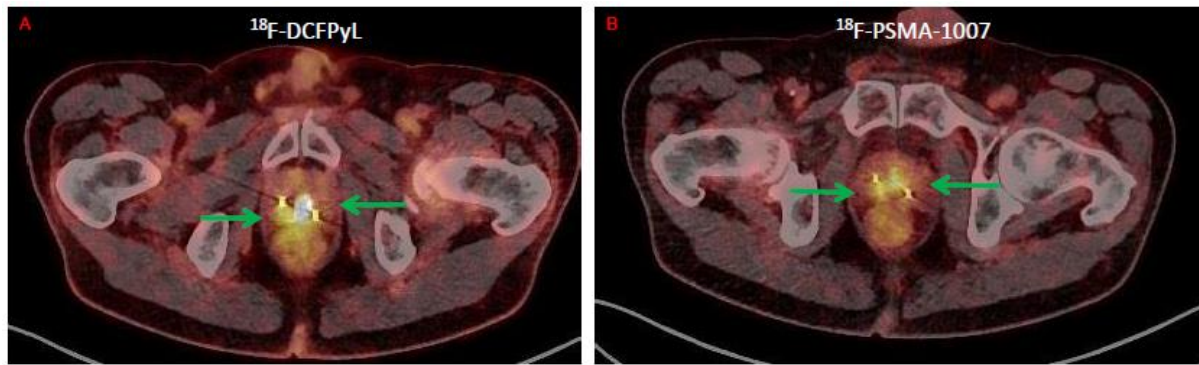
**Supplemental Table 2.** Each of the two tables includes 27 lesions that were confirmed as PSMA true-positive loco-regional relapses. PET-1 (table above) and PET-2 (table below) were scored by two readers, who expressed their confidence in interpreting the PSMA-positive lesions as a local tumor relapse on a 5-point scale (PSMA-RADS). The interpretation of the <sup>18</sup>F-PSMA-1007 PET scans (PET-2) resulted in an almost perfect agreement,  $\kappa = 0.95$  (weighted Cohen's kappa), while the interpretation of PET-1 led to a moderate agreement,  $\kappa = 0.49$  (weighted Cohen's kappa).

Abbreviations: RADS, reporting and data system for imaging; PET-1; PET scan with <sup>68</sup>Ga-PSMA-11 or <sup>18</sup>F-DCFPyL or <sup>18</sup>F-JK-PSMA-7

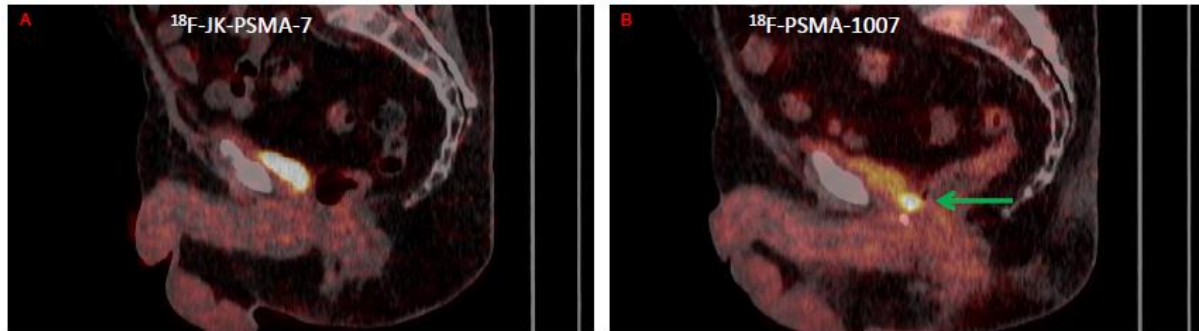


**Supplemental Figure 1.** (A)  $^{18}\text{F}$ -JK-PSMA-7 PET/low-dose CT on the left and (B)  $^{18}\text{F}$ -PSMA-1007 PET/low-dose CT on the right of patient No. 21 with BCR (same patient as in Fig. 1). The histologically confirmed PSMA-positive lesion in the right seminal vesicle is visible with both  $^{18}\text{F}$ -JK-PSMA-7 and  $^{18}\text{F}$ -PSMA-1007 (green arrows). The osteo-medullary spots with  $^{18}\text{F}$ -PSMA-1007 in the left femur (red arrow in C), in the left Os ilium (red arrow in G), and right Os ilium (red arrows in G) did not have any correlate on the MRI scans (D-F and H-J).

Abbreviations: Gd, Gadolinium; T2 STIR, short T2 inversion recovery

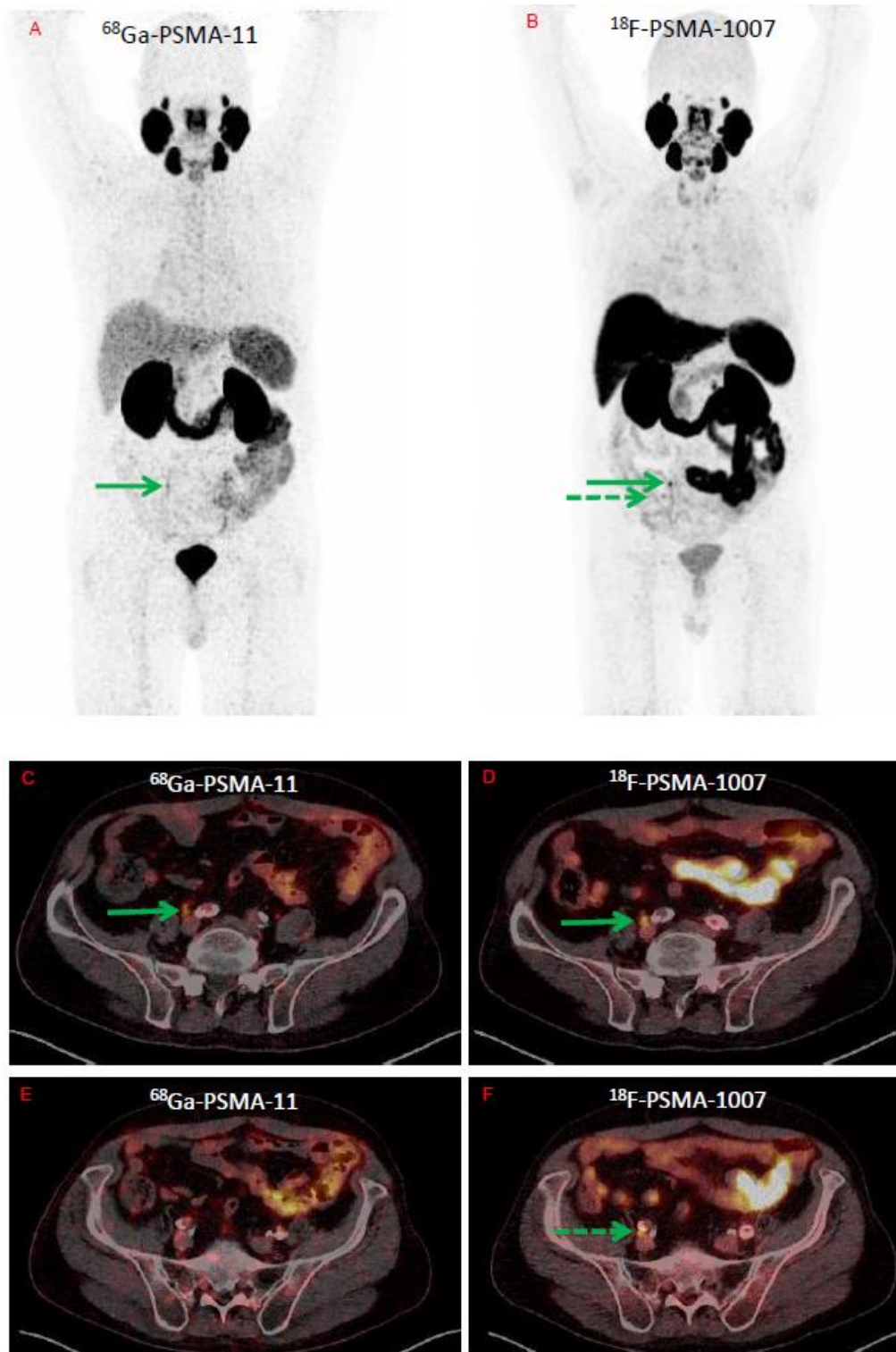


**Supplemental Figure 2.** (A)  $^{18}\text{F}$ -DCFPyL PET/low-dose CT on the left and (B)  $^{18}\text{F}$ -PSMA-1007 PET/low-dose CT on the right of patient No. 13 with BCR (same patient as in Fig. 2). PSMA-positive intraprostatic lesions in the left and the right lobe of the prostate, visible with both  $^{18}\text{F}$ -DCFPyL and  $^{18}\text{F}$ -PSMA-1007 (green arrows in A,B).



**Supplemental Figure 3.** (A)  $^{18}\text{F}$ -JK-PSMA-7 PET/low-dose CT on the left and (B)  $^{18}\text{F}$ -PSMA-1007 PET/low-dose CT on the right of patient No. 27 with BCR (same patient as in Fig. 3). The  $^{18}\text{F}$ -PSMA-1007 PET scan (B) shows a further relapse localization at the junction between the bladder and the urethra.





**Supplemental Figure 4.** (A,C,E)  $^{68}\text{Ga}$ -PSMA-11 PET/low-dose CT on the left and (B,D,F)  $^{18}\text{F}$ -PSMA-1007 PET/low-dose CT on the right of patient No. 3 with BCR. Two PSMA-positive lymph nodes very close to the right ureter (green arrows in A,B,C,D,F), the differentiation between a physiologic and a pathologic finding was difficult with the  $^{68}\text{Ga}$ -PSMA-11 PET scan, but unequivocal with the  $^{18}\text{F}$ -PSMA-1007 PET scan. Salvage lymphadenectomy, 3/7 histologically proven lymph node metastases.