Supplemental Data

S1: CHEMISTRY

S1.1: General information

- **Reagents and solvents**

Unless otherwise stated all chemicals were purchased from commercial suppliers and used without further purification. All solvents were HPLC grade unless otherwise stated. In the cases where dry solvents we needed, such were obtained from a Solvent Purification System (SPS).

- **Normal phase Flash Column Chromatography (CombiFlash)**

Normal phase Automated Flash Column Chromatography was performed on a CombiFlash NextGen® 300+ system supplied by TeleDyne ISCO®, equipped with RediSep silica packed columns. Detection of the compounds was carried out by means of a UV-Vis variable wavelength detector operating from 200 to 800 nm and by Evaporative Light Scattering Detector (ELS). Solvent systems for separation were particular for each compound but consisted of various mixtures of heptane, EtOAc, DCM and MeOH. Some compounds required the addition of 0.2% of acetic acid into the mobile phase for improved resolution.

- **Reversed phase Flash Column Chromatography**

Reversed phase Automated Flash Column Chromatography was performed on an Isolera® Prime system supplied by Biotage®, equipped with Biotage® Sfär Bio C18 - Duo 300 Å 20 µm column. Detection of the compounds was carried out by means of a UV variable wavelength detector operating at 214 and 280 nm. Solvent systems for separation consisted of various mixtures of water and acetonitrile with addition of 0.1 % (v/v) of trifluoroacetic acid.

- **Nuclear Magnetic Resonance Spectroscopy (NMR)**

NMR spectra were recorded at 25 °C using deuterated solvents. Residual solvent peaks were used as reference. ^{1}H NMR spectra were recorded on a 400 MHz Bruker Avance III or 600 MHz Bruker Avance III HD and ^{13}C NMR spectra on a 151 MHz Bruker Avance III HD. Data obtained was analyzed in MestreNova 12. Chemical shifts are reported in parts per million on the δ scale and coupling constants in Hertz.

- **Analytical methods – UV-HPLC, radio HPLC, radio TLC and MALDI-TOF/MS**

Analytical HPLC analyses were carried out on an UltiMate HPLC system (Thermo Scientific) equipped with a Gemini-NX C18 column (250 x 4.6 mm, 3 µm, 110Å – Phenomenex). Alternatively, HPLC analyses were carried out in an Agilent 1100 series (Agilent Technologies) equipped with a Chromolith RP-18e (100 × 4.6 mm 2 µm, 130Å – Merck) column. UV absorbance was measured at 220 or 225 nm. In all cases, analyses were performed using linear gradients of 0.1% TFA in MiliQ-H_2O (A) and 0.1% TFA, 10% MiliQ-H_2O in MeCN (B).

Radio HPLC analyses were performed on a LATEK P-402 HPLC system (Latek Labortechnik) equipped with a Chromolith RP-18e (100 × 4.6 mm 2 µm, 130Å – Merck) column and a Berthold Flowstar^2 LB514 (Berthold Technologies) radio detector. Analyses were performed using linear gradients of 0.1% TFA in MiliQ-H_2O (A) and 0.1% TFA, 10% MiliQ-H_2O in MeCN (B). Alternatively, for the ^{211}At-labeled compound analyses were carried out on a Jasco LC4000 LC (Jasco Inc.) equipped with a Phenomenex Jupiter Proteo C12 (150 x 4.6 mm, 4 µm – Merck) and a flow-thorugh sodium iodide NaI(Tl) well radiodetector. Analyses were perfomed isocratically with MeCN:H2O:TFA (20:80:0.1).

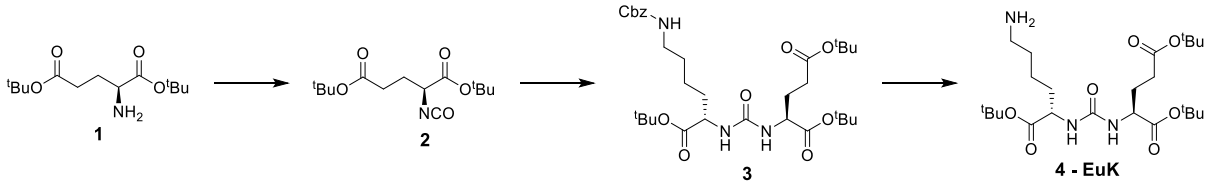
Radio TLC for ^{68}Ga-labelled compounds was performed on iTLC glass microfiber paper (iTLC-SG, Agilent) employing 0.5M $NH_4OAc_{(aq.)}$:DMF (1:1, v/v) as the eluent. For ^{211}At-labelled compounds radio TLC was performed on RP-18 modified silica gel plates using MeCN:H2O (1:1, v/v) as an eluent. In all cases TLC plates were read for 5 minutes on a miniGITA Star or miniGITA Single instrument (Elysia Raytest).

For all final products, MALDI-TOF/MS was performed on a Daltonics Microflex system (Bruker Daltonics). On a MALDI target, a droplet (1 µL) of a ~0.5 mg/mL solution of the compound was mixed with a droplet (1 µL) of a saturated α-cyano-4-hydroxycinnamic acid (ACCA) solution. The compounds were detected as $[M]^+$, $[M \pm H]^+$ and/or $[M + Na]^+$ ions.

S1.2: Solution phase peptide synthesis (SolPPS) of PSMA-ligands

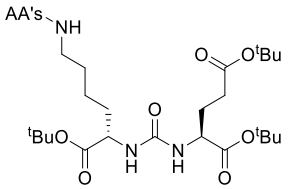
Compounds **PSGa-2, -3, -4, -5, -6, -7** were synthesized via SolPPS.

SolPPS synthesis of the PSMA-binding entity di-*tert*-butyl (((*S*)-6-amino-1-(tert-butoxy)-1-oxohexan-2-yl)carbamoyl)-*L*-glutamate (EuK - 4):



Di-*tert*-butyl *L*-glutamate hydrochloride (**1**) (2.00 g, 1.0 eq.) was suspended in DCM (24 mL) and sat. $NaHCO_{3\,(aq.)}$ (48 mL). The mixture was cooled to 0 °C and then bis(trichloromethyl) carbonate (triphosgene) (1.00 g, 0.5 eq.) was added (**OBS**: triphosgene is highly toxic and must be handled with extreme care). The reaction mixture was vigorously stirred at 0 °C for 20 minutes, then allowed to warm to room temperature, diluted with DCM (36 mL) and water (30 mL) and extracted with DCM (1 x 25 mL). The organic layers were washed with brine (1 x 20 mL), dried over Na_2SO_4 and concentrated *in vacuo*, affording the isocyanate **2** as a transparent liquid (1.92 g, 6.73 mmol, quantitative). Thereafter, a solution of **2** (1.92 g, 1.0 eq.) in dry DCM (16 mL) was added to a mixture of *tert*-butyl N^6-((benzyloxy)carbonyl)-*L*-lysinate hydrochloride (2.76 g, 1.1 eq.) and dry pyridine (596 µL, 1.1 eq.) in dry DCM (50 mL). The reaction was stirred at room temperature for 18 hours. Afterwards, the reaction was diluted with DCM (10 mL), washed with 0.1 M $HCl_{(aq.)}$ (5 x 15 mL) and brine (15 mL). The organic fraction was collected, dried over Na_2SO_4 and evaporated *in vacuo*. The crude was purified by flash chromatography (heptane:EtOAc – 100:0 to 20:80) to isolate **3** as a viscous colorless oil (2.93 g, 70%). Finally, to a flask containing **3** (1.90 g, 1.0 eq.) was added 10 wt. % Pd/C (325 mg, 0.1 eq.) and suspended in MeOH (15 mL). The reaction vessel was purged with nitrogen and hydrogen gas was bubbled through the suspension overnight at atmospheric pressure (balloon). The reaction mixture was filtered over a pad of diatomaceous earth (Celite®) and volatiles removed *in vacuo* to yield **4** (**EuK**) as a viscous oil (1.49 g, 99 %). Analytical data of the compounds was according to literature (*1*).

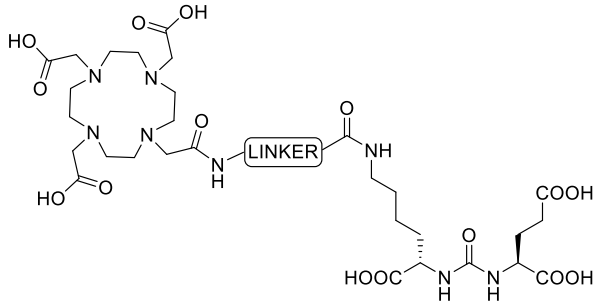
SolPPS amino acid couplings, general procedure:



N-Fmoc-amino acid (Fmoc-AA) (1.5 eq) and DIPEA (2.5 eq) were dissolved in dry DMF (1-3 mL), HATU (1.0 eq) was added to the previous solution and stirred for 15 minutes. The corresponding amine (1.0 eq) was dissolved in dry DMF (1-3 mL) and added to the previous mixture for a total volume of 2-6 mL. The reaction mixture was stirred at room temperature, until completion (5 to 24 hours). Thereafter, the Fmoc-protected *N*-terminus was deprotected by adding piperidine (50% vol. relative to DMF) and stirred for an additional 2 hours. Then, the reaction mixture was poured over water (10 mL) and extracted with DCM (2 x 15 mL). The combined organic layers were washed with

water (3 x 10 mL), dried over $MgSO_4$ and volatiles removed *in vacuo*. The crude was purified by flash chromatography (heptane:EtOAc wash followed by DCM:MeOH elution) giving the desired free amine EuK-linker construct.

SolPPS DOTA coupling, general procedure:

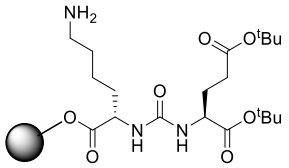


To an EuK-linker solution (1 eq.) in DCM, Et_3N (6 eq.), DOTA-mono-NHS-tris(^{t}Bu-ester) (1.2 eq.) were added and stirred overnight (~16 hours). Afterwards the reaction mixture was evaporated under reduced pressure and the resulting crude re-dissolved in 1:1 mixture of TFA/DCM (3 mL) and mechanically shaken for 3 hours. Thereafter, volatiles were removed *in vacuo* and the oily crude purified by preparatory HPLC (5% – 95% H_2O/MeCN + 0.1% TFA v/v). Fractions containing desired product were collected and lyophilized to obtain the compounds **PSGa-2, -3, -4, -5, -6, -7** as white solids.

S1.3: Solid phase peptide synthesis (SPPS) of PSMA-ligands

Compounds **PSGa-8, -9**, and precursor for astatination **PS-TMS-3** were synthesized via SPPS.

Synthesis of resin-bound PSMA-binding entity glutamate-urea-lysine (EuK):

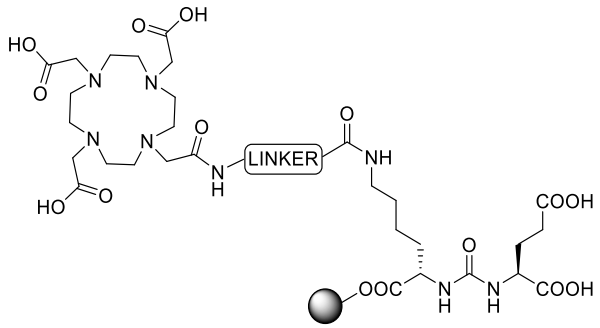


2-chlorotrytil resin was functionalized with ε-allyloxycarbonyl-*N*-Fmoc protected lysine (Fmoc-Lys(*Alloc*)-OH). To this end 2-Chlorotrityl resin (0.3 mmol, substitution capacity 1.18 mmol/g) was washed with DCM (2 x 10 mL) and pre-swollen (10 mL) for 30 min. Thereafter, the solvent was removed via vacuum and the resin re-suspended in DCM (2 mL) to which was added Fmoc-Lys(*Alloc*)-OH (1.5 eq, relative to resin), and DIPEA (4.8 eq, relative to resin) dissolved in DCM (3 mL). The mixture was shaken overnight and afterwards washed with DCM (3 x 10 mL). To block the unreacted trityl groups the resin was treated with a mixture of DCM:MeOH:DIPEA (17:2:1, 3 mL) for 30 min. Afterwards, the resin was washed with DCM (3 x 10 mL), DMF (2 x 10 mL) and the *N*-terminal Fmoc group removed by adding a solution of 20% piperidine in DMF and stirring for 10 min. Then, the lysine functionalized resin was washed with DMF, DCM, diethyl ether (3 x 10 mL respectively) and left to completely air dry. In parallel, bis(^{t}Bu)-*L*-glutamate hydrochloride (887 mg, 3 mmol) was dissolved in 20 mL of dry DCM followed by addition of an excess of DIPEA (2 mL). This solution was added dropwise over 20 min into an ice-cooled flask containing triphosgene (356 mg, 1.2 mmol) in dry DCM (5 mL). The solution was brought to r.t and left to react for 20 additional min. Finally, the previously lysine-functionalized 2-CT resin (0.3 mmol) was added into the iscocyanate solution and stirred overnight.

Finally, to functionalize the EuK structural motif the Alloc group was removed. Tetrakis(triphenylphospine)-palladium(0) (0.15 eq., 50 mg) and morpholine (15 eq., 300 uL) were added to a suspension of the functionalized resin in dry DCM (3 mL) and reacted for 1 h. The process was done twice. Thereafter, the resin was washed with DCM

and DMF (2 x 10 mL each). To remove excess of phosphine and palladium the resin was washed with 1% DIPEA in DMF and sodium diethyldithiocarbamate trihydrate (20 mg/mL) in DMF (3 x 10 mL each). Finally, the resin was washed with DMF, DCM and diethyl ether (3 x 10 mL each) and the solid dried under vacuum.

SPPS couplings, general procedure:



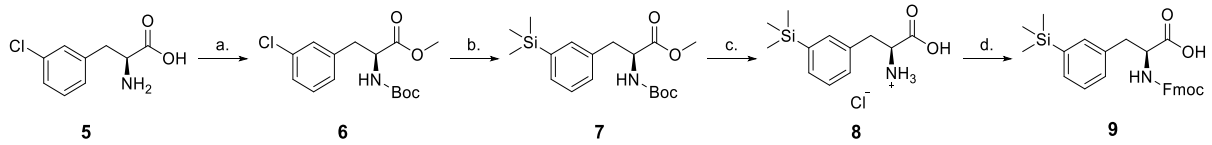
The synthesis was carried out on an automated peptide synthesizer (CS336H, CS Bio, USA), employing the previously functionalized resin (0.1 mmol) and the corresponding Fmoc-protected amino acids (2 eq. relative to resin), using HATU as the coupling reagent (1.8 eq. relative to resin) and in presence of DIPEA (4 eq. relative to resin) in DMF. Coupling sequence and times were automated to be 1 h per amino acid at a regulated temperature of 36 °C. After each coupling, the Fmoc group was removed by a 20% solution of piperidine in DMF. The last coupling always referred to the DOTA attachment, in which DOTA-*tris*(^{t}Bu)ester was employed (2 eq. relative to resin), following the same activation pattern as with the rest of the amino acids but with longer reaction times of 2.5 h. Once the syntheses finished, the resin was recovered from the automated synthesizer into a fritted syringe, in which it was washed with DCM and diethyl ether (3 x 10 mL each) and dried under vacuum.

SPPS cleavage and purification of compounds:

For non-TMS compounds: The resin containing the desired peptide was shaken in a mixture of TFA:TIPS:H_2O (94:3:3) for 2 h, after which the acidic solution was poured over cold (-20 ^oC) diethyl ether and centrifuged to recover the peptide as a white pellet. The pellet was re-dissolved in H_2O:MeCN (2:1) and purified via reverse-phase flash chromatography (0% – 55% H_2O/MeCN + 0.1% TFA v/v). Fractions containing desired product were collected and lyophilized to obtain the compounds as white solids.

For TMS-containing compound: The resin containing the desired peptide was shaken in 20% hexafluoroisopropanol (HFIP) in DCM (2 x 4 mL) for 30 min. Solvents were removed under vacuum and the resulting crude was shaken in a 4 M solution of HCl in dioxane for 2h. The solution containing the peptide was evaporated under reduced pressure to yield the crude compound as an oil. The oil was re-dissolved in H_2O:MeCN (2:1) and submitted to HPLC purification (5% – 95% H_2O/MeCN + 0.1% TFA v/v). Fractions containing desired product were collected and lyophilized to obtain the compounds as white solids.

S1.4: Synthesis of (S)-2-(Fmoc-amino)-3-(3-(trimethylsilyl)phenyl)propanoic acid (9):



A. A round-bottom flask was charged with MeOH (30 mL) cooled to 0 °C. Next, acetyl chloride (4.29 mL, 12 eq.) was added dropwise while stirring. After 10 min, (*S*)-2-amino-3-(3-chlorophenyl)propanoic acid (**5**) (1 g, 1 eq.) was added and the reaction heated to reflux for 6 h. Upon completion, the solvents were removed under reduced pressure and the corresponding hydrochloric salt was suspended in THF (30 mL), followed by addition of Et_3N (3.49 mL, 5 eq.). Thereafter, boc-anhydride (2.4 g, 2.2 eq.) was added and the reaction stirred overnight. Afterwards, volatiles were removed *in vacuo* and the residue dissolved in DCM and H_2O (20 and 50 mL respectively). The aqueous phase was extracted with DCM (3 x 20 mL) and the combined organic layers were washed with brine (70 mL), dried over $MgSO_4$, filtered and volatiles removed under reduced pressure. The resulting crude was purified via flash chromatography (heptane/EtOAc 0 – 20 % v/v) yielding methyl-(*S*)-2-((tert-butoxycarbonyl)amino)-3-(3-chlorophenyl)propanoate (**6**) as a transparent oil (1.26 g, 80%). Analytical data according to literature (*2*).

B. A sealable vial was charged with $Pd_2(dba)_3$ (29.18 mg, 0.02 eq), 1,3,5,7-tetramethyl-6-phenyl-2,4,8-trioxa-6-phosphaadamantane (^{me}CgPPh) (56mg,.12eq), compound **6** (500 mg, 1 eq) and $KHCO_3$ (1.12 g, 7 eq.). The vial was capped and flushed with Argon. Subsequently, a previously degassed solution of anhydrous DMF (8 mL), H_2O (57.4 µL, 2 eq.) and Me_6Si_2 (389 µL, 1.2 eq.) was added. The reaction mixture was then left at 100 °C under inert atmosphere for 72 h. Upon completion the vial was washed with EtOAc (3 x 5 mL) and the diluted reaction mixture filtered through a Celite® pad. The filtrate was evaporated under reduced pressure to remove EtOAc, the DMF portion was then diluted with a 10-fold excess of water. The mixture was extracted with EtOAc (4 x 20 mL), organic layers washed with brine (80 mL), dried over $MgSO_4$, filtered and solvent removed *in vacuo*. The resulting crude was purified via flash chromatography (heptane/EtOAc (0 – 10% v/v), which yielded the final product, methyl-(*S*)-2-((tert-butoxycarbonyl)amino)-3-(3-(trimethylsilyl)phenyl)propanoate (**7**) as a yellow oil (140 mg, 25 %).

Data of **7**: **^{1}H NMR (400 MHz, $CDCl_3$)** δ 7.40 (dt, J = 7.4, 1.3 Hz, 1H), 7.29 (d, J = 7.5 Hz, 1H), 7.23 (s, 1H), 7.10 (d, J = 7.9 Hz, 1H), 4.96 (d, J = 8.4 Hz, 1H), 4.60 (d, J = 8.0 Hz, 1H), 3.71 (s, 3H), 3.10 (q, J = 6.8 Hz, 2H), 1.42 (s, 9H), 0.25 (s, 9H); **^{13}C NMR (151 MHz, $CDCl_3$)** δ 172.4, 155.2, 140.9, 135.2, 134.4, 132.1, 129.9, 128.0, 80.0, 54.5, 52.3, 38.4, 28.4, -1.0; **MS (ESI) m/z:** 252.4 [M + H – Boc]+; **R_f** = 0.67 (40 % EtOAc in heptane v/v).

C. Compound **7** (180 mg, 1 eq.) was dissolved in THF/H_2O (1:1, 18 mL) and stirred for 10 min at r.t. Afterwards, $LiOH{\cdot}H_2O$ (75.21 mg, 3.5 eq.) was added to the reaction mixture and stirred at room temperature for 1.5 h. Then, the reaction was diluted with H_2O (20 mL) and the pH adjusted to 3.0 by addition of 2 M HCl. The formed precipitate was extracted with EtOAc (3 x 20 mL). Organic layers were washed with brine (60 mL), dried over $MgSO_4$ and concentrated under vacuum. The obtained oil was dissolved in 4 M HCl in dioxane (0.700 mL) and stirred at r.t for 30 min. Once the reaction reached completion, it was concentrated *in vacuo* yielding (*S*)-1-carboxy-2-(3-(trimethylsilyl)phenyl)ethan-1-aminium chloride (**8**) as a white solid (139 mg, 95%).

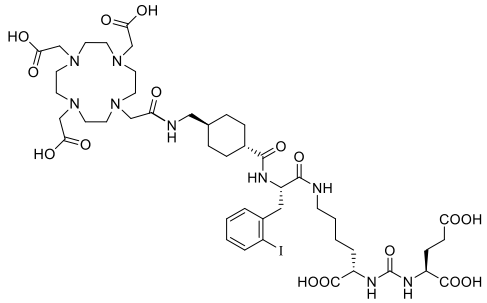
Data of **8**: **^{1}H NMR (600 MHz, DMSO-d_6)** δ 13.83 (s, 1H), 8.33 (s, 3H), 7.45 – 7.38 (m, 2H), 7.35 – 7.30 (m, 1H), 7.26 (dt, *J* = 7.8, 1.5 Hz, 1H), 4.17 (t, *J* = 6.4 Hz, 1H), 3.11 (dd, *J* = 6.4, 2.0 Hz, 2H), 0.24 (s, 9H); **^{13}C NMR (151 MHz, DMSO-d_6)** δ 170.4, 140.1, 134.3, 134.1, 132.0, 130.1, 127.9, 53.1, 35.8, -1.1; **MS (ESI) m/z**: 238.4 $[M + H]^+$

D. Compound **8** (115 mg, 1 eq.) was dissolved in a mixture of dioxane (2 mL) and 10% $NaHCO_{3(aq.)}$ (3.85 mL, 11 eq.). The mixture was stirred and cooled to 0 °C. Fmoc-Cl (217.29 mg, 2eq.) dissolved in dioxane (2 mL) was added dropwise to the reaction mixture under stirring and left to react for 4 h. Afterwards, the reaction mixture was diluted with water (10 mL) and the pH adjusted to 3 by addition of 2 M HCl. The mixture was then extracted with EtOAc (4 x 10 mL). Organic layers were washed with brine (60 mL), dried over $MgSO_4$ and concentrated under vacuum. The

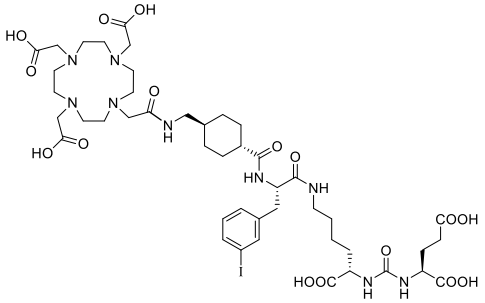
resulting crude was purified via flash chromatography (heptane/EtOAc (0 – 50% + 0.2 AcOH v/v), which yielded the final product (*S*)-2-(*Fmoc*-amino)-3-(3-(trimethylsilyl)phenyl)propanoic acid (*Fmoc*-3-TMS-Phe, **9**) as a white-to-orange semisolid (93 mg, 48 %).

Data of **9**: **^{1}H NMR (600 MHz, DMSO-d_6)** δ 12.74 (s, 1H), 7.93 – 7.84 (m, 2H), 7.73 (d, *J* = 8.5 Hz, 1H), 7.64 (dd, *J* = 16.0, 7.5 Hz, 2H), 7.45 – 7.33 (m, 4H), 7.33 – 7.21 (m, 4H), 4.27 – 4.07 (m, 4H), 3.08 (dd, *J* = 13.9, 4.3 Hz, 1H), 2.88 (dd, *J* = 13.9, 10.5 Hz, 1H), 0.21 (s, 9H); **^{13}C NMR (151 MHz, DMSO-d_6)** (rotamers) δ 173.3, 155.9, 143.7, 143.7, 140.7, 140.6, 139.5, 137.2, 133.9, 131.2, 129.6, 127.6, 127.6, 127.6, 127.0, 125.2, 125.2, 120.1, 65.6, 59.7, 55.4, 46.6, 36.4, 14.1, -1.1; **MS (ESI) m/z:** 458.5 $[M - H]^-$; **R_f =** 0.38 (50 % EtOAc in heptane + 1 % AcOH v/v).

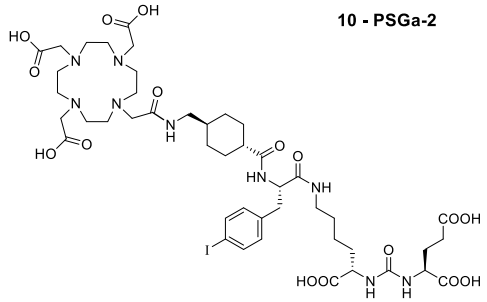
S1.5: Structural library of synthesized PSMA-targeting compounds



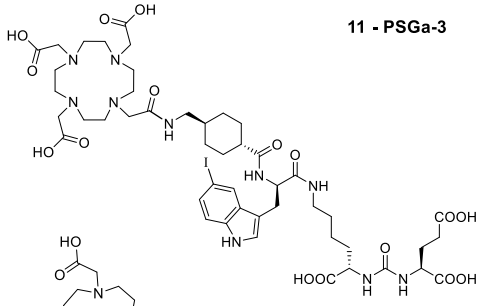
10 - PSGa-2



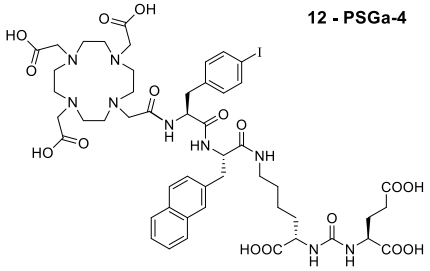
11 - PSGa-3



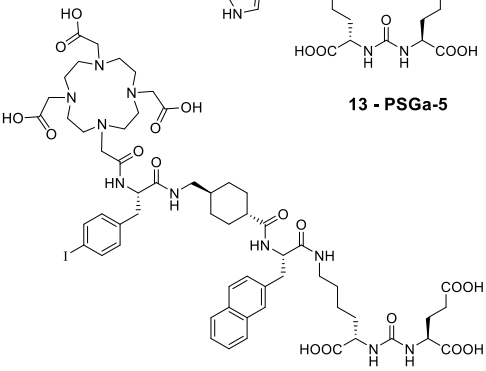
12 - PSGa-4



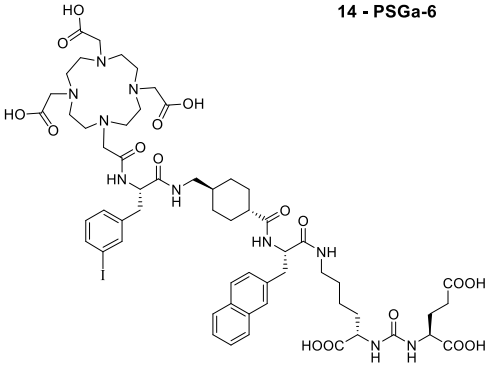
13 - PSGa-5



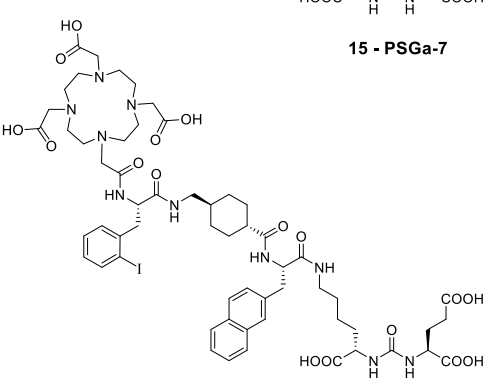
14 - PSGa-6



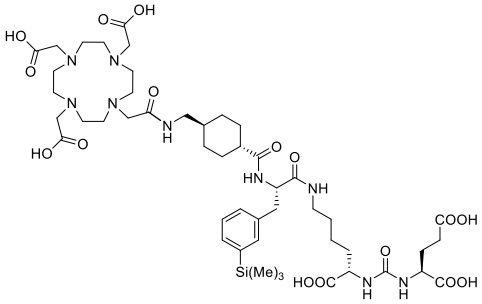
15 - PSGa-7



16 - PSGa-8



17 - PSGa-9



18 - PS-3TMS

S2. RADIOCHEMISTRY

S2.1: ^{68}Ga-labelling – general procedure

^{68}Ga was obtained as ^{68}[Ga]$GaCl_3$ in 0.1 M HCl from a ^{68}Ge/^{68}Ga generator (GalliaPharm®, Eckert & Ziegler, Germany) trapped on a SCX cartridge and eluted as ^{68}[Ga]$GaCl_3$ in 5 M NaCl/0.05 M HCl.

Labelling with ^{68}Ga was carried out by mixing equal amounts (40 – 150 µL) of 1.0 M HEPES (4-(2-hydroxyethyl)-1-piper-azineethanesulfonic acid; pH 4.0) and [^{68}Ga]Ga^{3+} eluate (40 – 150 µL, 30 – 100 MBq, depending on the purpose of the labelling), the pH was checked and adjusted to 4.0 whenever needed with 10% $NaOH_{(aq.)}$. Subsequently, 1.5 – 5 µL of a 1 mM solution of precursor (1.5 – 5 nmol) in dimethyl sulfoxide (DMSO) was added. This mixture was heated to 95 °C for 5 min. The labelled compound was always used without further purification and only when the amount of free ionic and colloidal ^{68}Ga (determined by HPLC and TLC, see S4.2) was < 2%. For *in vivo* applications, the labelling was diluted to the required concentration with 0.9% NaCl and adjusted to pH ~7 with 30% $NaOH_{(aq.)}$.

S3: *IN VITRO* ASSAYS

S3.1: Lipophilicity ($logD_{oct/PBS}$)

For the determination of the $logD_{oct/PBS}$ the compounds were labelled with ^{68}Ga (apparent molar activity 1 GBq/µmol). Thereafter an aliquot of 5 µL was taken and added into a 1:1 mixture of PBS:*n*-octanol (500 µL total volume). After thorough shaking and centrifugation for 10 min at 9000 rpm, a 20 µL fraction of each phase was collected and analyzed in a gamma counter (Wizard2, Perkin Elmer, Germany). Thereafter the counts of each phase were used to calculate the partition coefficient.

S3.2: Plasma protein binding

For the determination of plasma protein binding the compounds were labelled with ^{68}Ga (apparent molar activity 1 GBq/µmol). Thereafter, 10 µL of the labelling mixture were taken into 100 µL of mouse or human plasma (BioIVT, United Kingdom). The mixture was left for 15 min at room temperature. Afterwards, the plasma was loaded into an ultrafiltration device (Amicon Ultra 0.5ml - 30 kDa, Merck, Germany) and centrifuged at 800 rcf for 30 min at r.t. The filtrate and the membrane were measured in a gamma counter (Wizard2, Perkin Elmer, Germany). The amount of plasma-bound compound was calculated based on the counts in the filtrate relative to the total counts (filtrate + membrane).

S3.3: Internalization assay

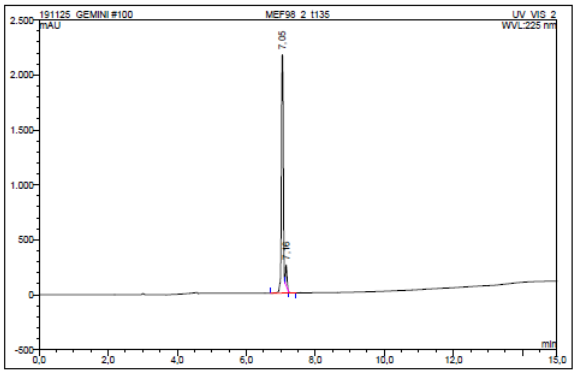
The day before the experiment, 10^5 LNCaP cells/well were added into a poly-*L*-lysine coated 24-well plate. The cells were incubated at 37 °C with the ^{68}Ga-labelled compound (apparent molar activity 2 GBq/µmol) in 250 µL growth medium for 45 min (*c* = 32 nM). For the determination of specific uptake, 2-PMPA was added into half of the wells in an excess concentration of 500 µM/well. After incubation, the cells were washed with ice-cold PBS (3 x 1 mL). The surface bound radioactivity was removed by washing with 50 mM glycine (pH 2.8, 2 x 500 µL). Finally, the internalized fraction was determined by lysis of the cells with 0.3 M NaOH (1 x 500 µL). Fractions collected from the surface bound activity and lysates were collected and measured in a gamma counter (Wizard2, Perkin Elmer, Germany). All counts were normalized to the starting activity and specific surface binding as well as specific internalization were determined by subtracting the non-specific binding obtained from the wells treated with 2-PMPA. Results were calculated and expressed as %AA/10^5 cells (% applied activity/10^5 cells)

S3.4: Binding affinity (K_i)

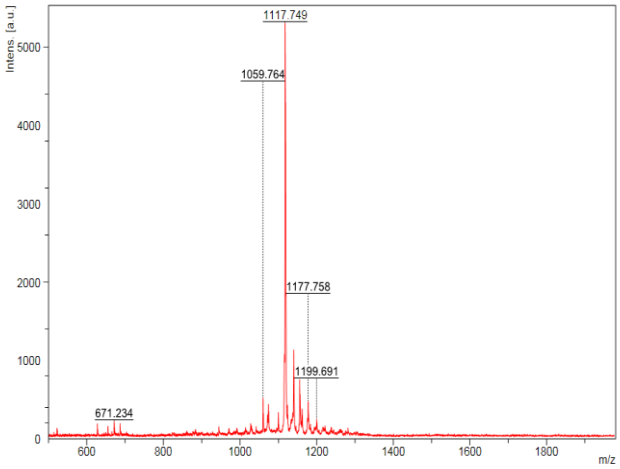
Binding affinity was determined via competitive binding assay using ^{68}[Ga]Ga-PSMA-10 as the reference. The compounds were incubated for 45 min at 37 °C, in a 96-well plate, with 0.75 nM of ^{68}[Ga]Ga-PSMA-10 (apparent molar activity 2 GBq/µmol) at 12 different concentrations (0, 0.5, 1, 2.5, 5, 10, 25, 50, 100, 500, 100 and 5000 nM) with 10^5 LNCaP cells/well. After incubation, the wells were washed with ice-cold PBS (3 x 200 uL) and vacuum dried. Thereafter, the wells were perforated and measured in a gamma counter (Wizard2, Perkin Elmer, Germany). The counts were fitted into a non-linear regression to calculate the IC_{50} values. K_i values were determined using the Cheng-Prusoff equation with a determined K_d for PSMA-10 of 3.8 ± 1.8 nM.

S4: SUPPLEMENTAL FIGURES

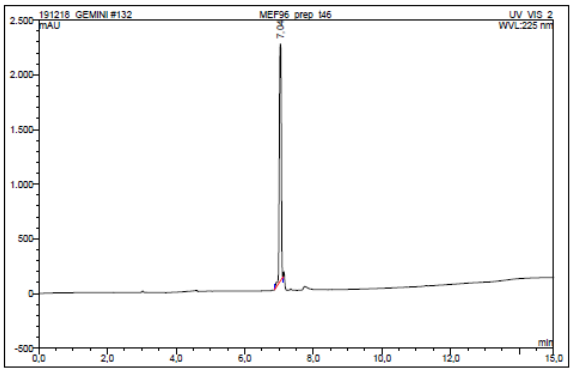
S4.1: Supplemental Figures 1 to 9. HPLC chromatograms and MALDI spectra of synthesized iodinated ^{68}Ga precursors:



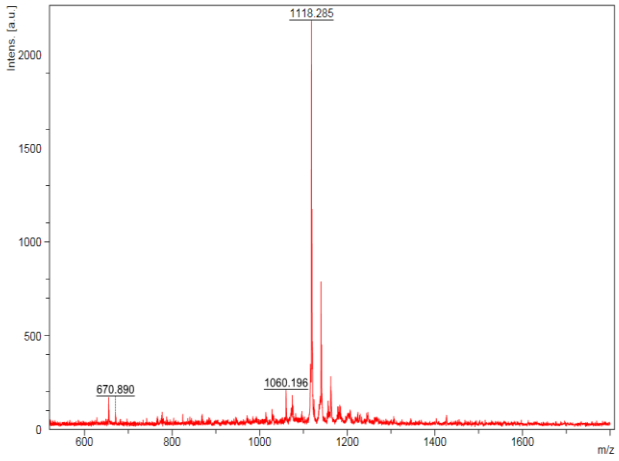
No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Resolution(EP)
1	7,05	n.a.	2189,472	151,091	94,29	n.a.	n.a.
2	7,16	n.a.	188,077	9,151	5,71	n.a.	n.a.
Total:			2357,549	160,243	100,00	0,000	



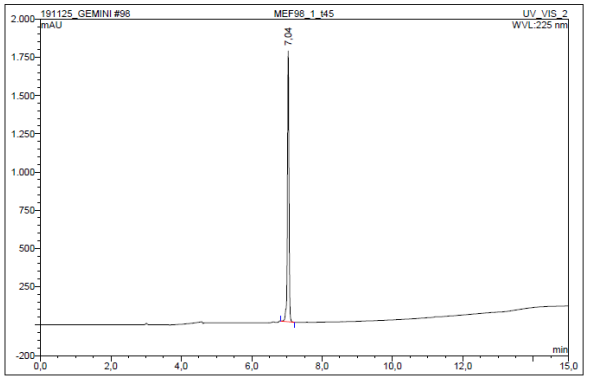
Supplemental Figure 1: HPLC chromatogram and MALDI spectrum of PSGa-2



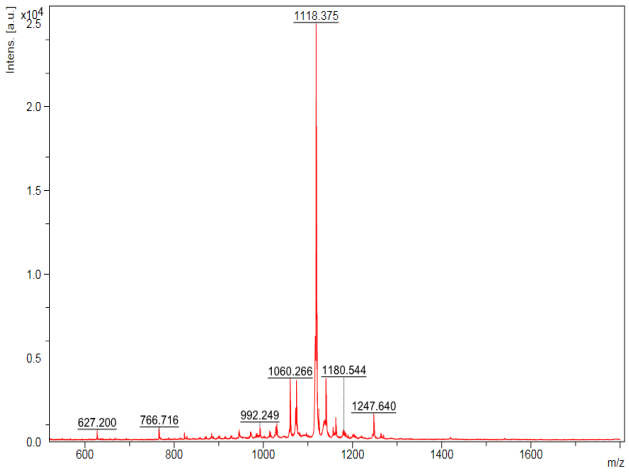
No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Resolution(EP)
1	7,04	n.a.	2166,200	151,294	100,00	n.a.	n.a.
Total:			2166,200	151,294	100,00	0,000	



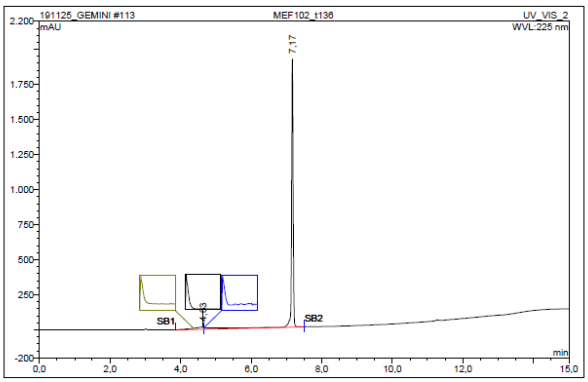
Supplemental Figure 2: HPLC chromatogram and MALDI spectrum of PSGa-3



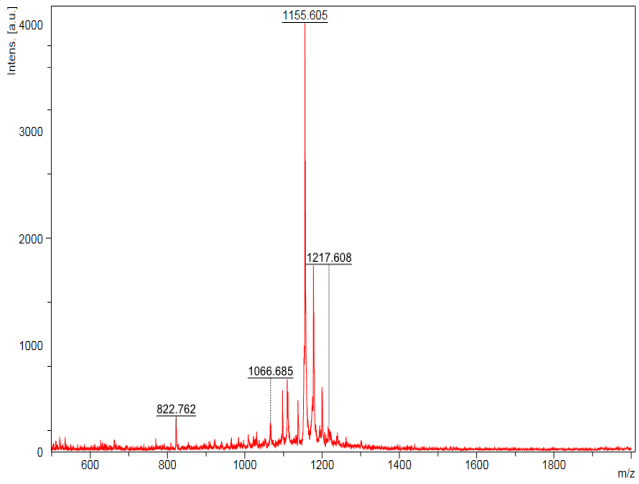
No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Resolution(EP)
1	7,04	n.a.	1770,076	95,317	100,00	n.a.	n.a.
Total:			1770,076	95,317	100,00	0,000	



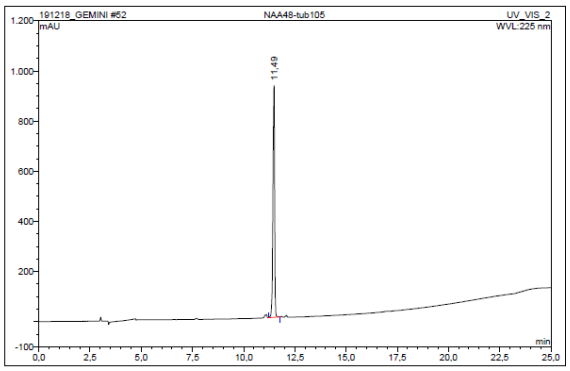
Supplemental Figure 3: HPLC chromatogram and MALDI spectrum of PSGa-4



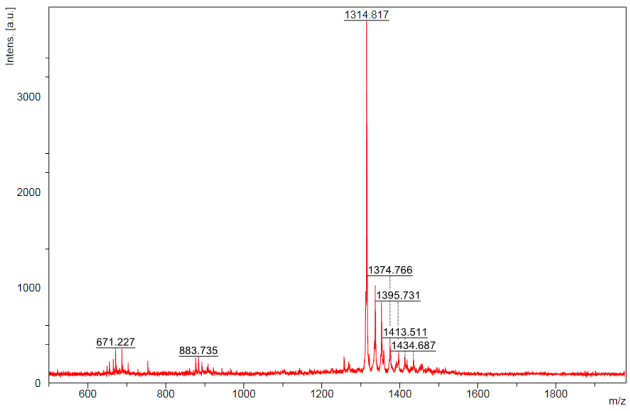
No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Resolution(EP)
1	4,63	n.a.	17,561	6,029	5,25	n.a.	8,91
2	7,17	n.a.	1911,160	108,871	94,75	n.a.	n.a.
Total:			1928,721	114,900	100,00	0,000	



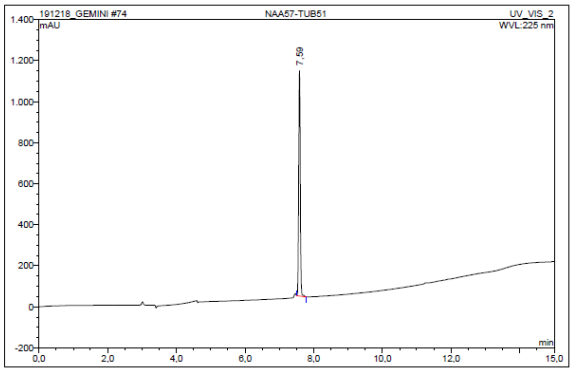
Supplemental Figure 4: HPLC chromatogram and MALDI spectrum of PSGa-5

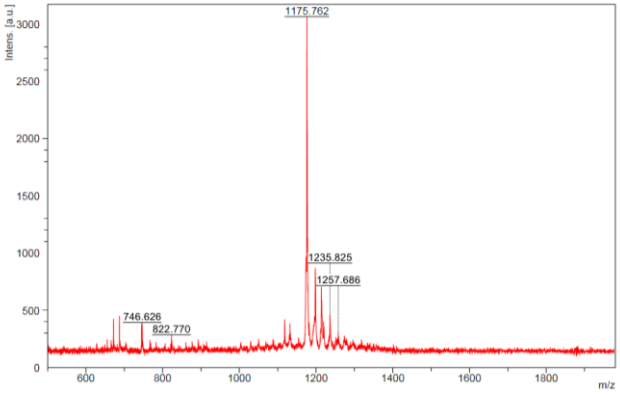


No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Resolution(EP)
1	11,49	n.a.	924,853	90,731	100,00	n.a.	n.a.
Total:			924,853	90,731	100,00	0,000	



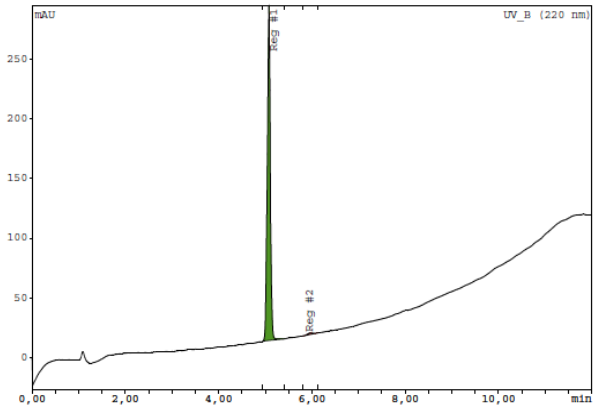
Supplemental Figure 5: HPLC chromatogram and MALDI spectrum of PSGa-6

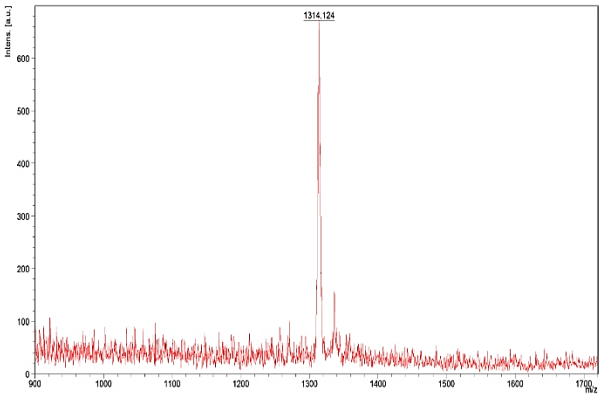




No.	Ret.Time min	Peak Name	Height mAU	Area mAU*min	Rel.Area %	Amount	Resolution(EP)
1	7,59	n.a.	1099,527	60,430	100,00	n.a.	n.a.
Total:			1099,527	60,430	100,00	0,000	

Supplemental Figure 6: HPLC chromatogram and MALDI spectrum of PSGa-7





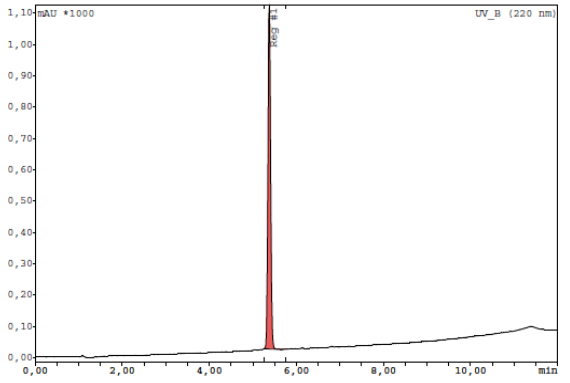
:	Moka
Measurement:	220222_EuK-Nal-Tr-3I-DOTA_t23, injection : 22.02.2022 14:59
Method:	ACB_analytik_5_100_ from: 17.11.2021 08:28
flash column - tube 23	
Radio detector: raytest Ramona Star	Serial Nr.: #26585 raytest GINA star 20.04.09 Firmware V4.8

UV_B (220 nm)

Substance	R/T min	Type	Area mAU*min	%Area %
Reg #1	5,07	BB(M	1226,961	99,41
Reg #2	5,98	BB(M	7,296	0,59
Sum in ROI			1234,257	

Supplemental Figure 7: HPLC chromatogram and MALDI spectrum of PSGa-8

PSGa-9



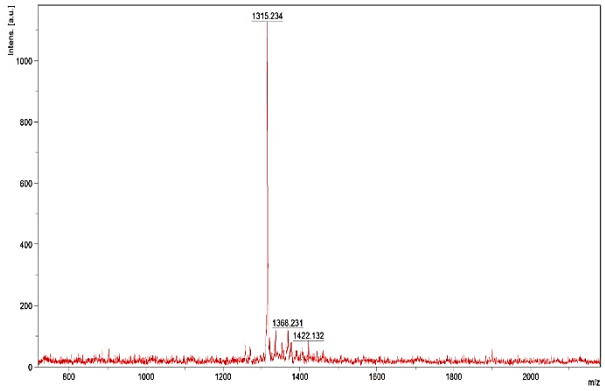
:	Moha
Measurement:	20220531_mef104_combi_t5, injection : 31.05.2022 17:37
Method:	MEF_anal_5_100_280n from: 04.03.2022 10:51
combi1 - t5	
Radio detector: raytest Ramona Star	Serial Nr.: #26585 raytest GINA star 20.04.09 Firmware V4.8

UV_A (280 nm)

Substance	R/T min	Type	Area mAU*min	%Area %
Reg #1	5,37	BB(M	283,4916	100,00
Sum in ROI			283,4916	

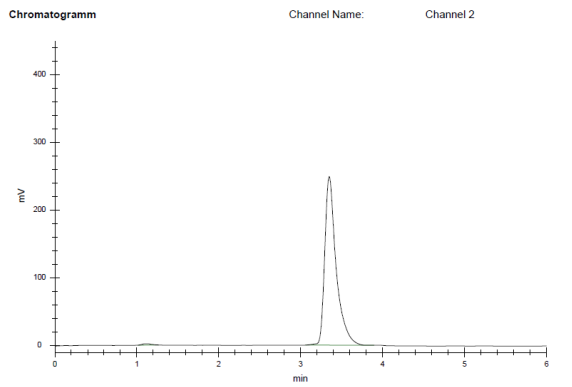
UV_B (220 nm)

Substance	R/T min	Type	Area mAU*min	%Area %
Reg #1	5,38	BB(M	4573,517	100,00
Sum in ROI			4573,517	



Supplemental Figure 8: HPLC chromatogram and MALDI spectrum of PSGa-9

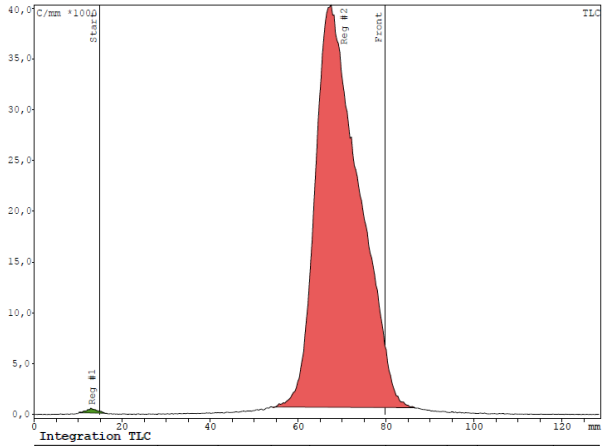
S4.2: Supplemental Figures 9 to 17. Radio HPLC and radio TLC chromatograms of ^{68}Ga-labeled compounds:



Ergebnistabelle

Berechnungsmethode: Prozent

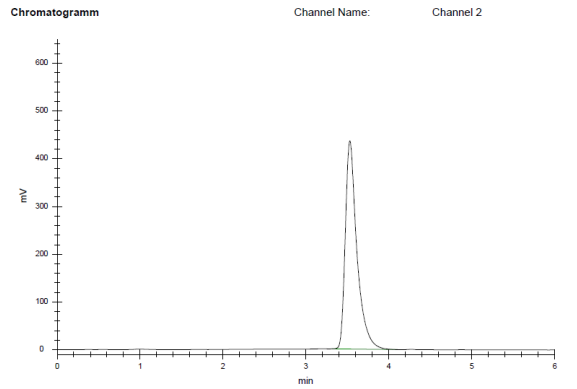
Nr.	Peak-Start (min)	Peak-Ende (min)	Ret. Zeit (min)	Fläche	Höhe (mV)	Prozent	Name	Response
1	1.014	1.264	1.115	16154.4	2.09	0.667		
2	3.061	3.893	3.348	2405201.0	249.03	99.333		



Integration TLC

Substanz	R/F	%Total %	Typ	Fläche Counts	%Fläche %	Kan	S/N ratio	Aufl
Reg #1	-0,030	0,25	BB(	1250,4	0,27	TLC	31,5	-
Reg #2	0,807	92,18	BB(	453714,0	99,73	TLC	485,9	4,85
Summe in ROI				454964,4	100,00			

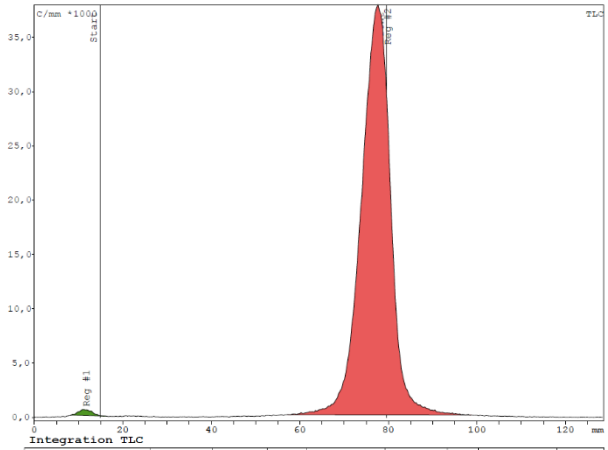
Supplemental Figure 9: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSGa-2



Ergebnistabelle

Berechnungsmethode: Prozent

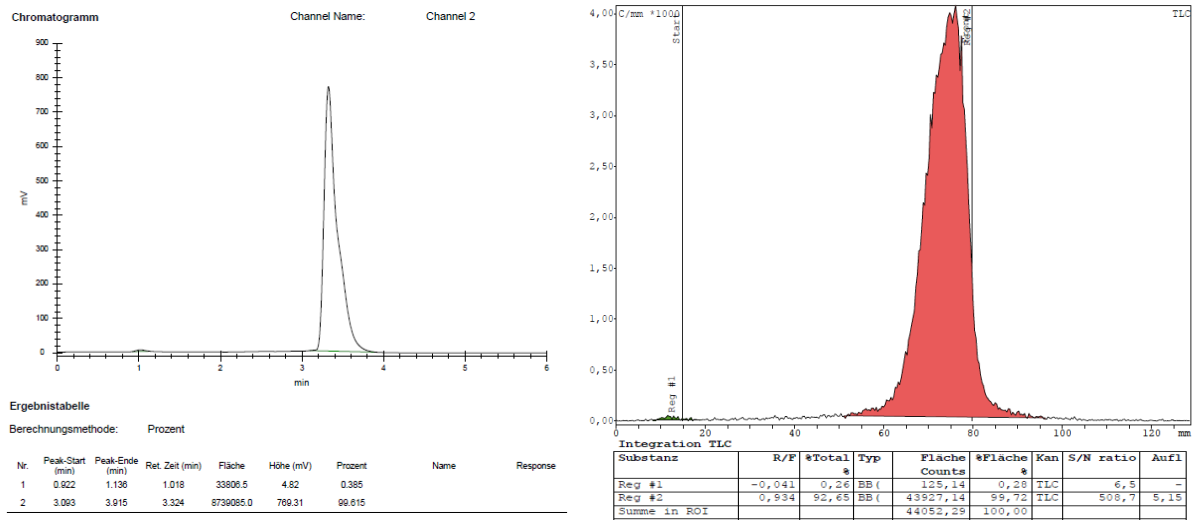
Nr.	Peak-Start (min)	Peak-Ende (min)	Ret. Zeit (min)	Fläche	Höhe (mV)	Prozent	Name	Response
1	3.312	4.133	3.530	4231752.0	435.90	100.000		



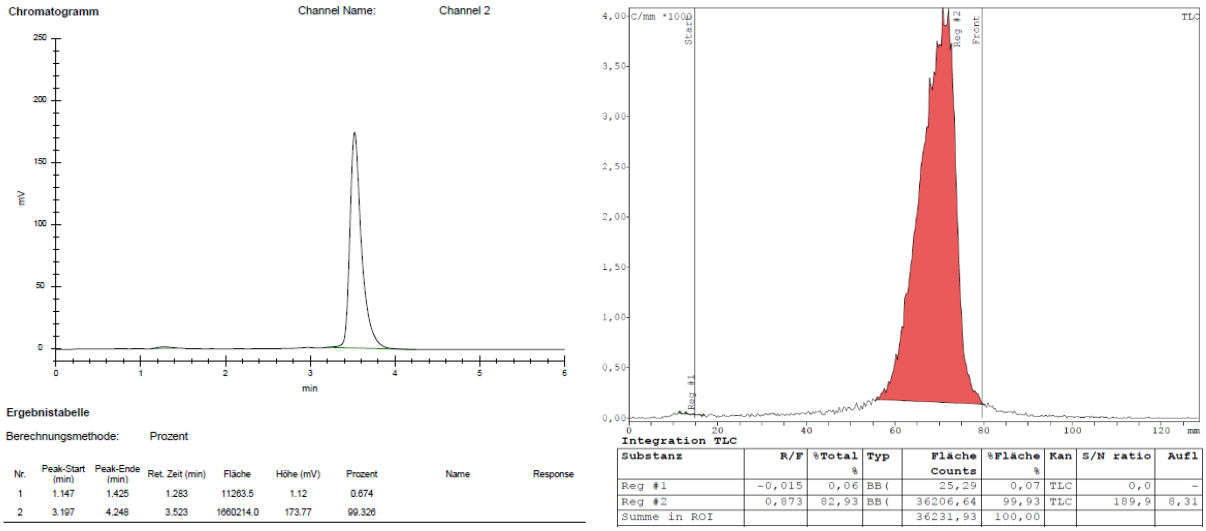
Integration TLC

Substanz	R/F	%Total %	Typ	Fläche Counts	%Fläche %	Kan	S/N ratio	Aufl
Reg #1	-0,051	0,64	BB(	1973,1	0,68	TLC	22,9	-
Reg #2	0,970	93,98	BB(	289926,0	99,32	TLC	1891,6	7,29
Summe in ROI				291899,1	100,00			

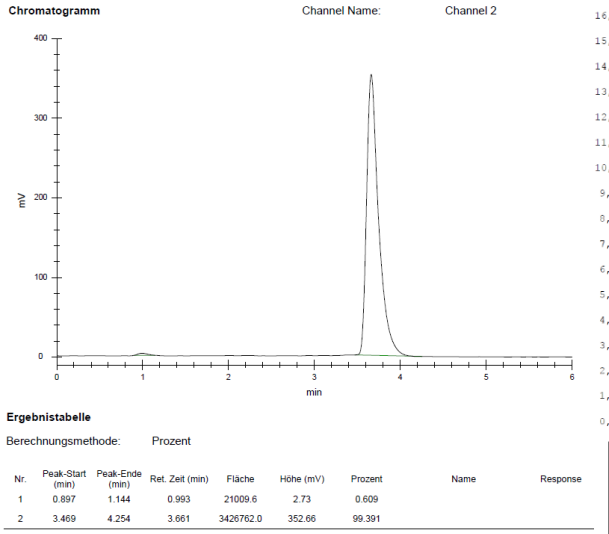
Supplemental Figure 10: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSGa-3



Supplemental Figure 11: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSGa-4



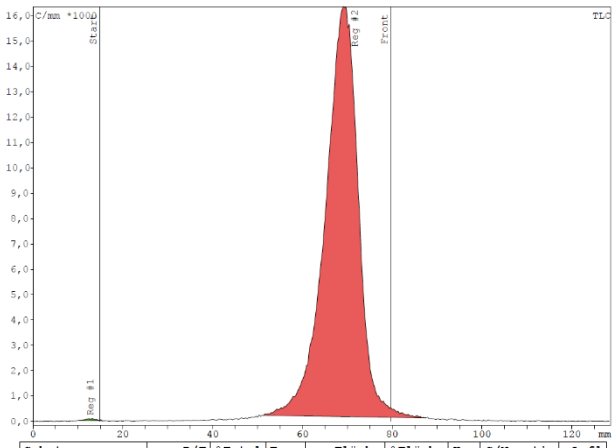
Supplemental Figure 12: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSGa-5



Ergebnistabelle

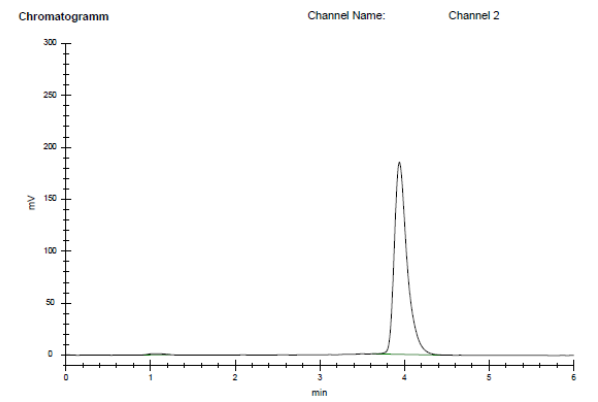
Berechnungsmethode: Prozent

Nr.	Peak-Start (min)	Peak-Ende (min)	Ret. Zeit (min)	Fläche	Höhe (mV)	Prozent	Name	Response
1	0.897	1.144	0.993	21009.6	2.73	0.609		
2	3.469	4.254	3.661	3426762.0	352.66	99.391		



Substanz	R/F	%Total %	Typ	Fläche Counts	%Fläche %	Kan	S/N ratio	Aufl
Reg #1	-0,036	0,13	BB(	198,7	0,14	TLC	8,9	-
Reg #2	0,838	92,71	BB(	138400,1	99,86	TLC	577,8	6,95
Summe in ROI				138598,8	100,00			

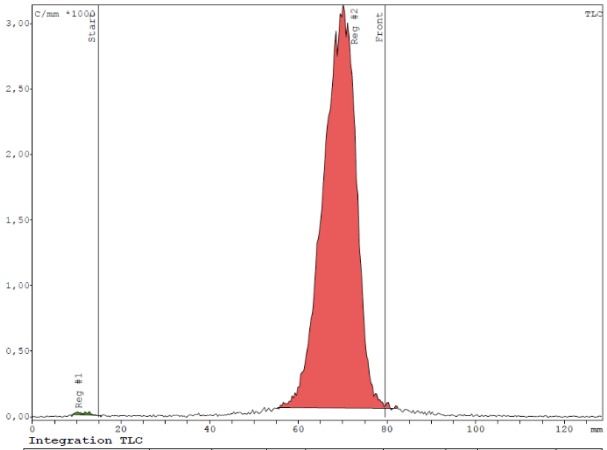
Supplemental Figure 13: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSGa-6



Ergebnistabelle

Berechnungsmethode: Prozent

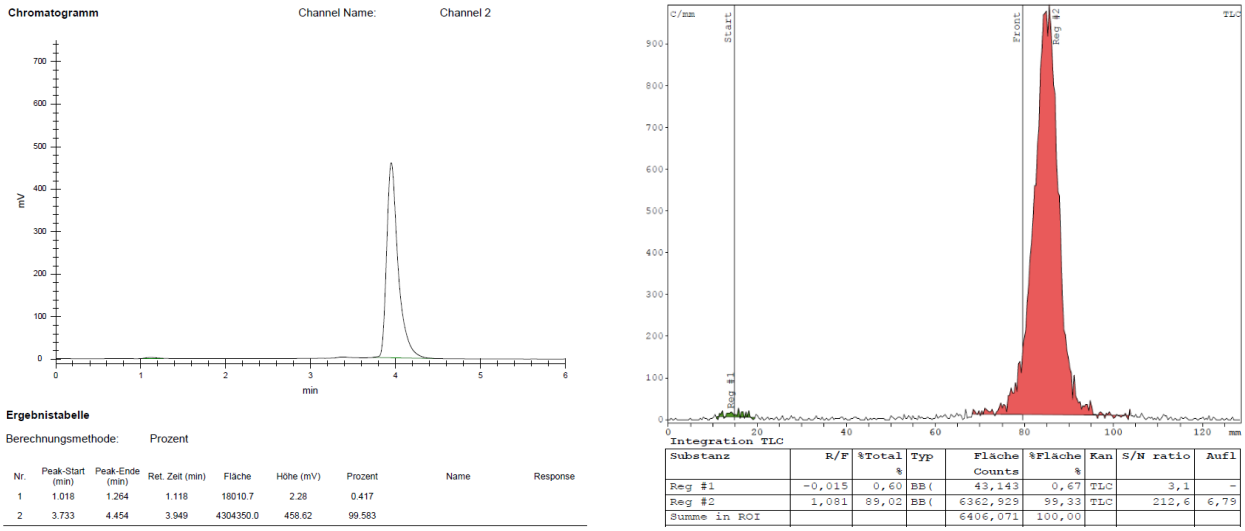
Nr.	Peak-Start (min)	Peak-Ende (min)	Ret. Zeit (min)	Fläche	Höhe (mV)	Prozent	Name	Response
1	0.911	1.233	1.024	12869.3	1.02	0.658		
2	3.622	4.490	3.942	1943626.0	184.90	99.342		



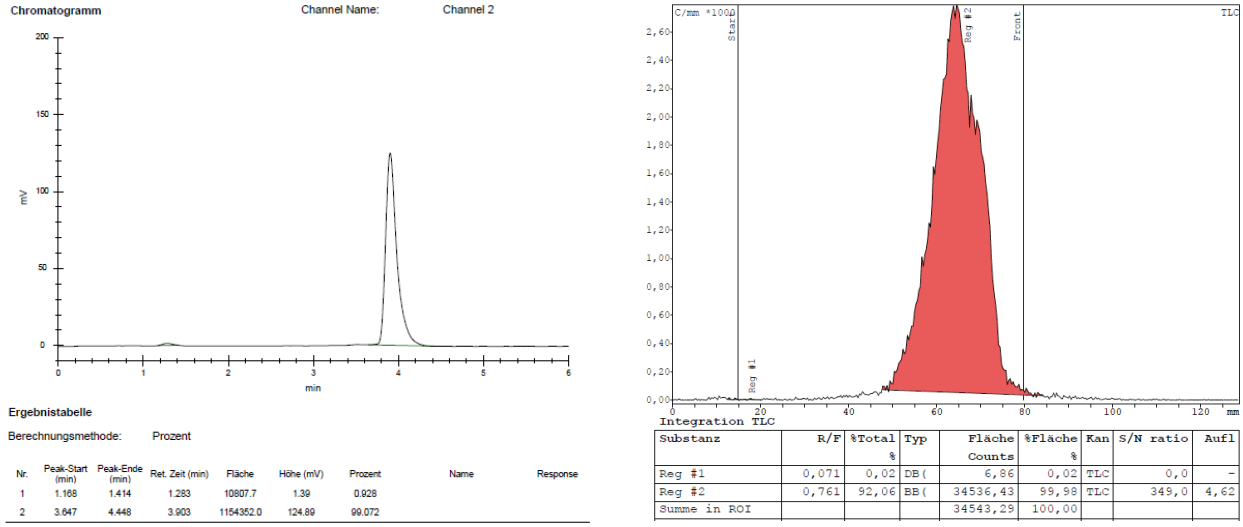
Integration TLC

Substanz	R/F	%Total %	Typ	Fläche Counts	%Fläche %	Kan	S/N ratio	Aufl
Reg #1	-0,071	0,22	BB(	64,57	0,24	TLC	6,9	-
Reg #2	0,848	89,44	BB(	26620,86	99,76	TLC	288,1	5,81
Summe in ROI				26685,43	100,00			

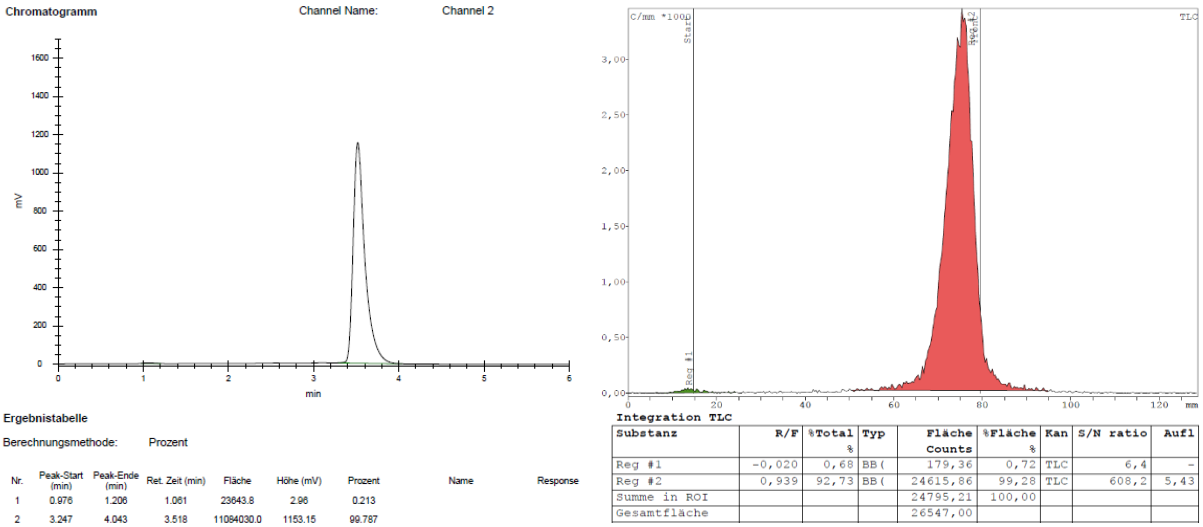
Supplemental Figure 14: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSGa-7



Supplemental Figure 15: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSGa-8



Supplemental Figure 16: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSGa-9



Ergebnistabelle

Berechnungsmethode: Prozent

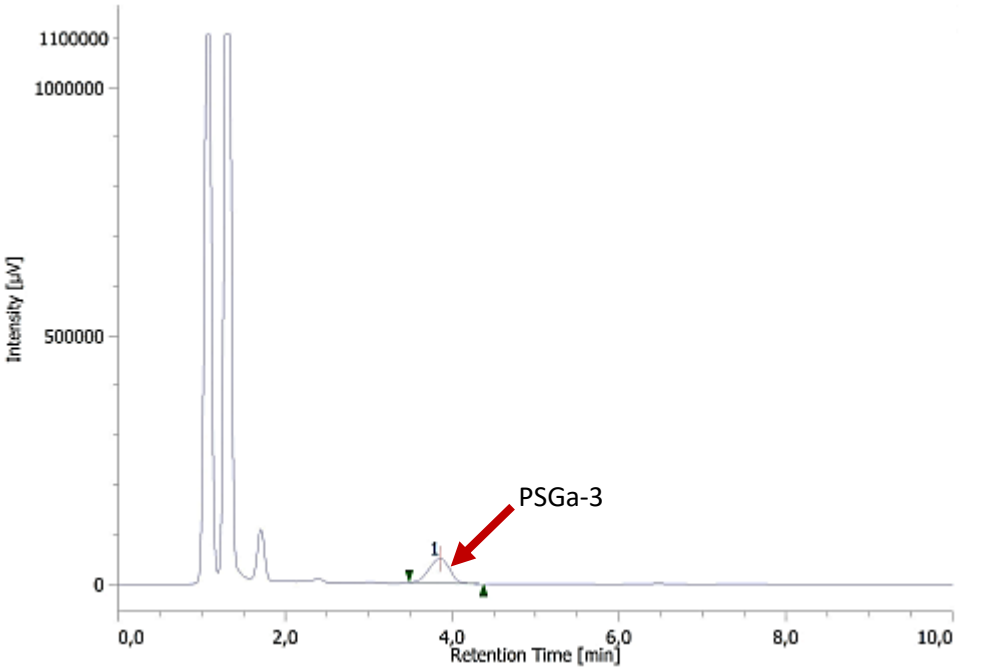
Nr.	Peak-Start (min)	Peak-Ende (min)	Ret. Zeit (min)	Fläche	Höhe (mV)	Prozent	Name	Response
1	0.976	1.206	1.061	23643.8	2.96	0.213		
2	3.247	4.043	3.518	11084030.0	1153.15	99.787		

Integration TLC

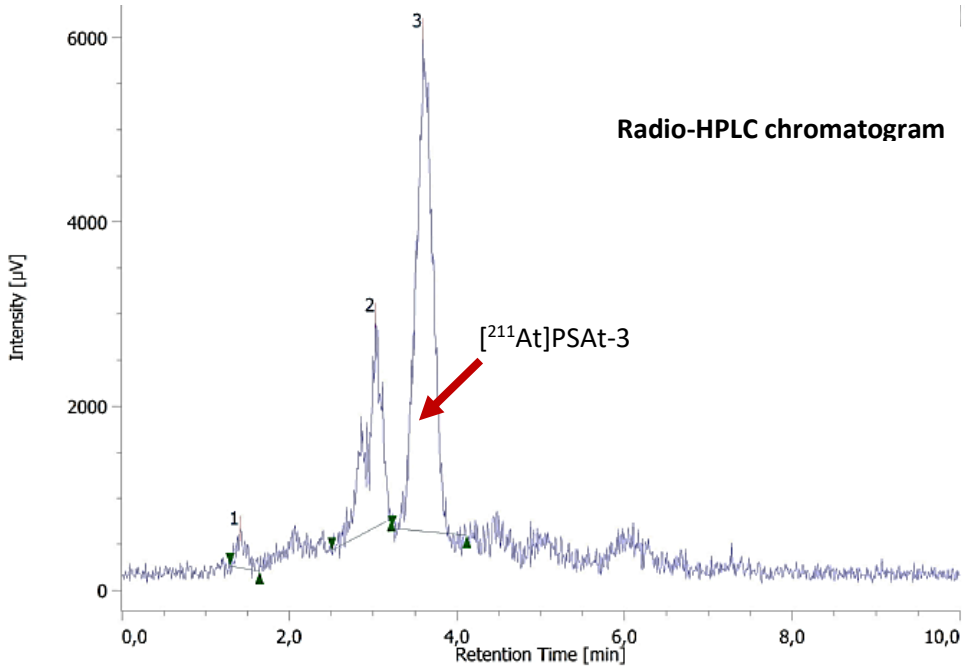
Substanz	R/F	%Total %	Typ	Fläche Counts	%Fläche %	Kan	S/N ratio	Aufl
Reg #1	-0,020	0,68	BB(	179,36	0,72	TLC	6,4	-
Reg #2	0,939	92,73	BB(	24615,86	99,28	TLC	608,2	5,43
Summe in ROI				24795,21	100,00			
Gesamtfläche				26547,00				

Supplemental Figure 17: Radio HPLC and TLC chromatograms of ^{68}[Ga]Ga-PSMA-617

S4.3: Supplemental Figures 18 to 20. HPLC and TLC chromatograms of [^{211}At]PSAt-3 and [^{211}At]PSAt-3-Ga:

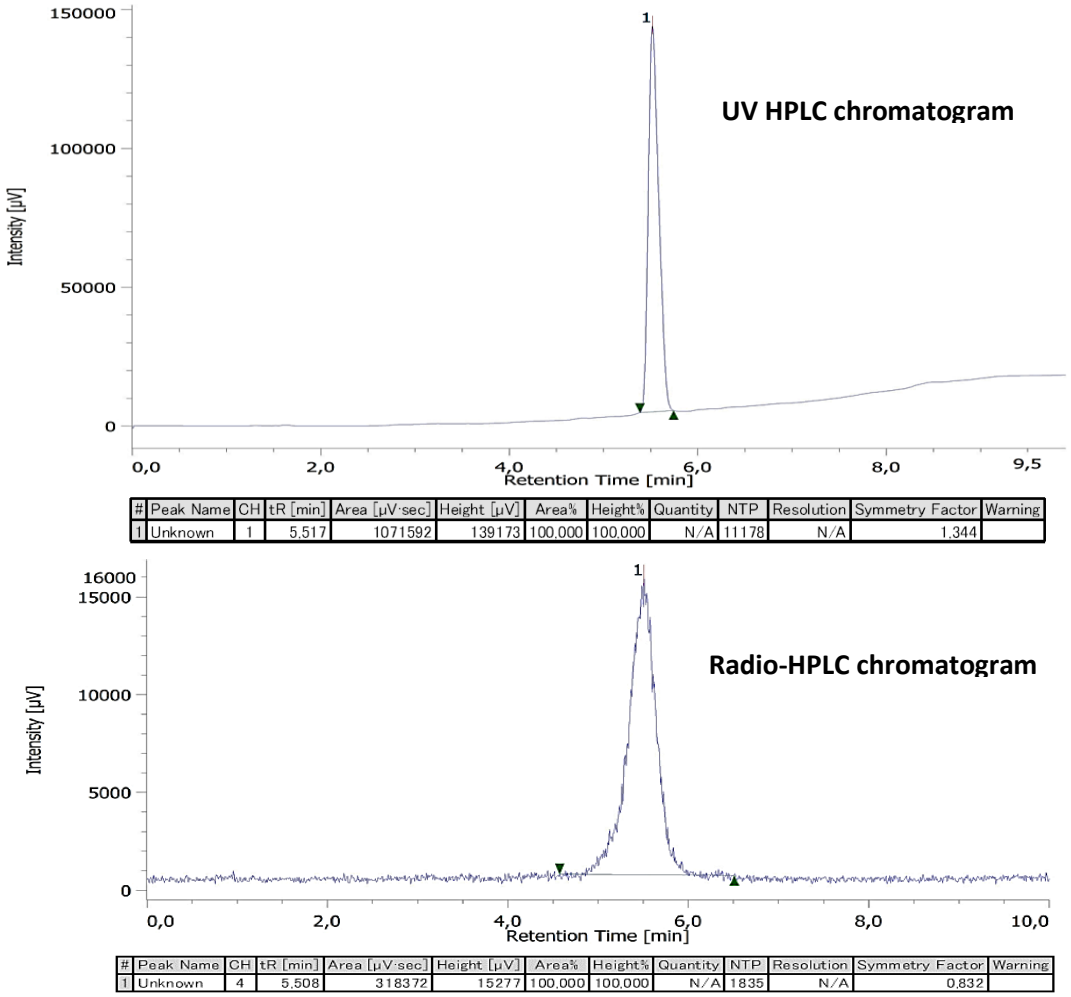


#	Peak Name	CH	tR [min]	Area [μV sec]	Height [μV]	Area%	Height%	Quantity	NTP	Resolution	Symmetry Factor	Warning
1	Unknown	1	3.858	839664	48940	100.000	100.000	N/A	1098	N/A	0.901	



#	Peak Name	CH	tR [min]	Area [µV*sec]	Height [µV]	Area%	Height%	Quantity	NTP	Resolution	Symmetry Factor	Warning
1	Unknown	4	1,408	3207	423	3,055	5,191	N/A	314	4,219	1,681	
2	Unknown	4	3,025	28090	2298	26,762	28,197	N/A	722	1,367	0,675	
3	Unknown	4	3,592	73663	5428	70,182	66,613	N/A	1421	N/A	1,037	

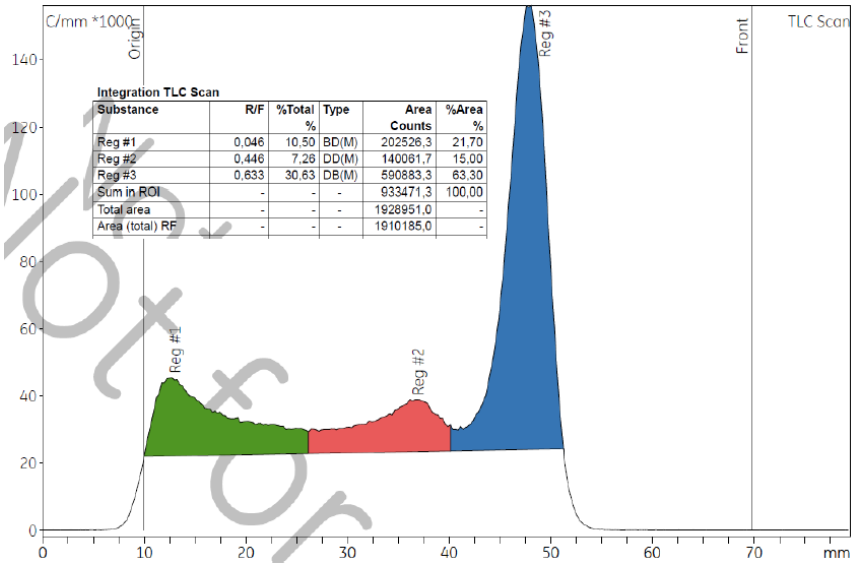
Supplemental Figure 18: UV and radio HPLC chromatograms of crude reaction mixture of [^{211}At]PSAt-3 spiked with PSGa-3 (reference)



#	Peak Name	CH	tR [min]	Area [μV·sec]	Height [μV]	Area%	Height%	Quantity	NTP	Resolution	Symmetry Factor	Warning
1	Unknown	1	5.517	1071592	139173	100.000	100.000	N/A	11178	N/A	1.344	

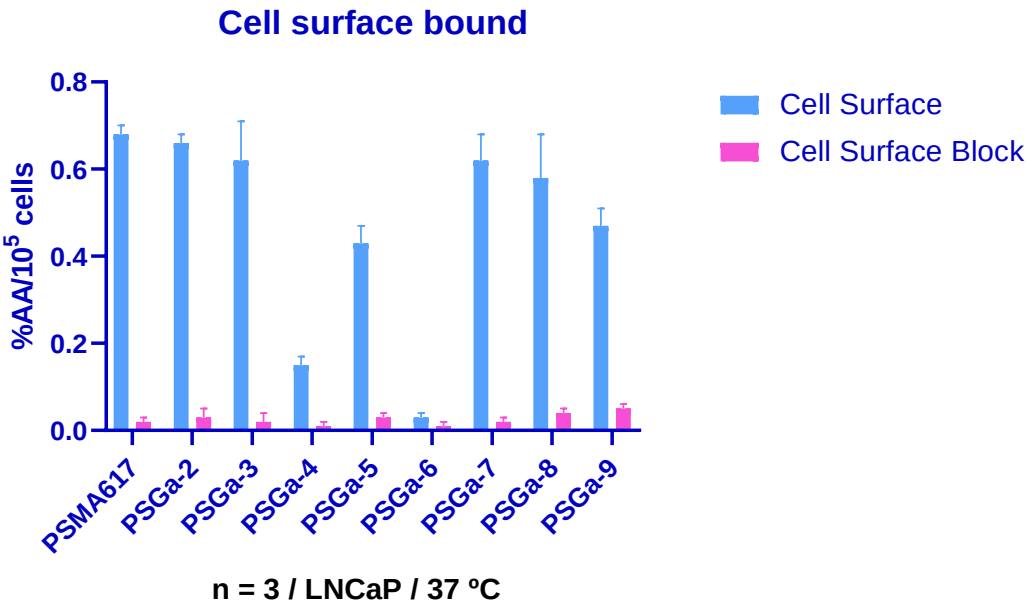
#	Peak Name	CH	tR [min]	Area [μV·sec]	Height [μV]	Area%	Height%	Quantity	NTP	Resolution	Symmetry Factor	Warning
1	Unknown	4	5.508	318372	15277	100.000	100.000	N/A	1835	N/A	0.832	

Supplemental Figure 19: UV chromatogram of reference PSGa3-Ga (chelated) and radio HPLC chromatograms of purified and formulated [^{211}At]PSAt-3-Ga

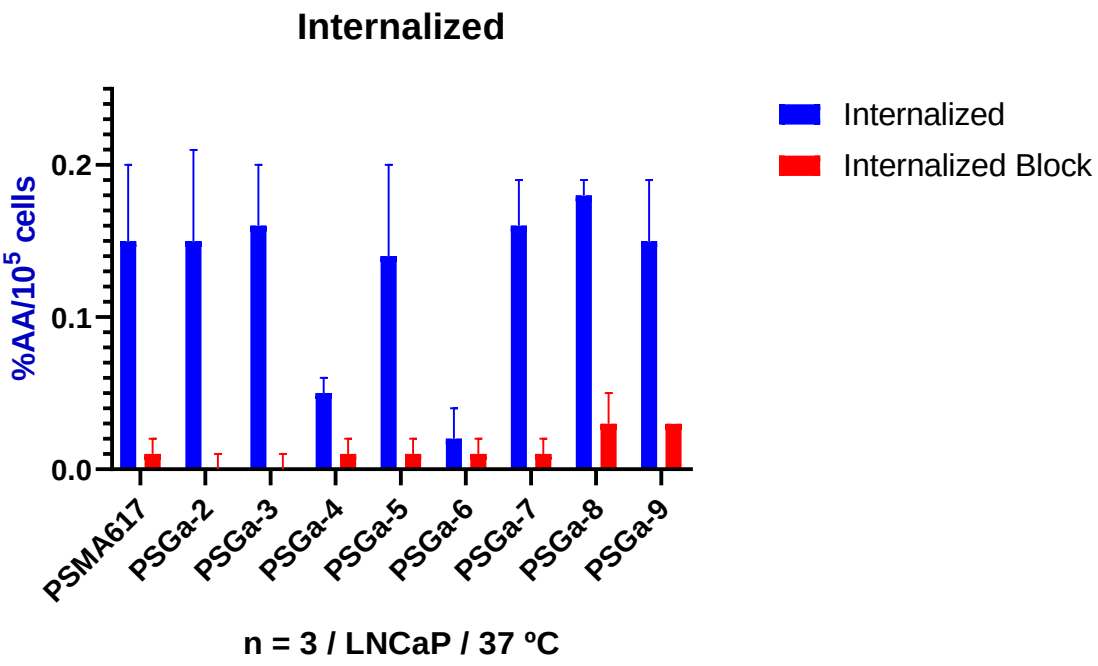


Supplemental Figure 20: Radio TLC of crude [^{211}At]PSAt-3 reaction mixture: exemplary radio TLC performed on RP-18 modified silica gel plates. MeCN:H2O (1:1) as an eluent. Region 3 (blue) corresponds to [^{211}At]PSAt-3, RCC = 63.3 %

S4.4: Supplemental Figures 21 and 22. Cell surface binding and internalization of ^{68}Ga-labeled compounds:

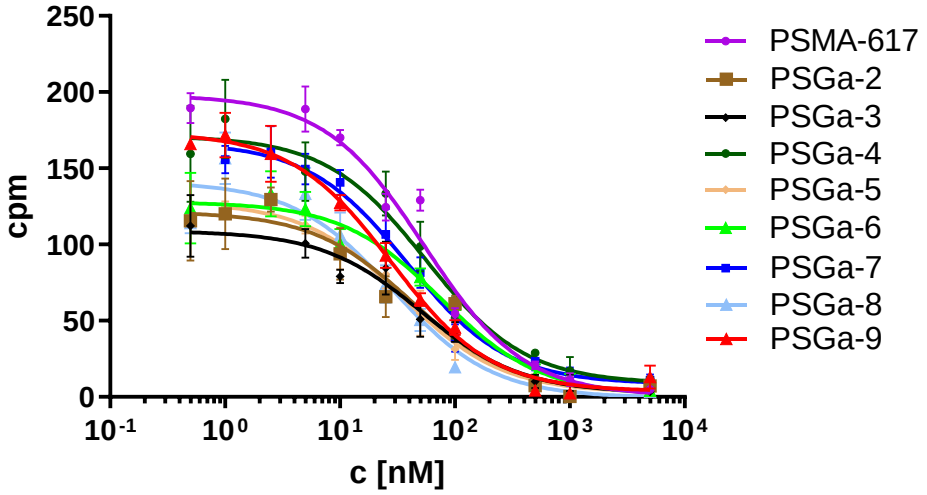


Supplemental Figure 21: Cell surface binding of the investigated compounds. %AA stands for % applied activity. Specificity of cell surface binding was determined by blocking with 2-PMPA (500 uM). Data is represented as % applied activity (AA)/10^5 cells and show mean ± SD (*n* =3)



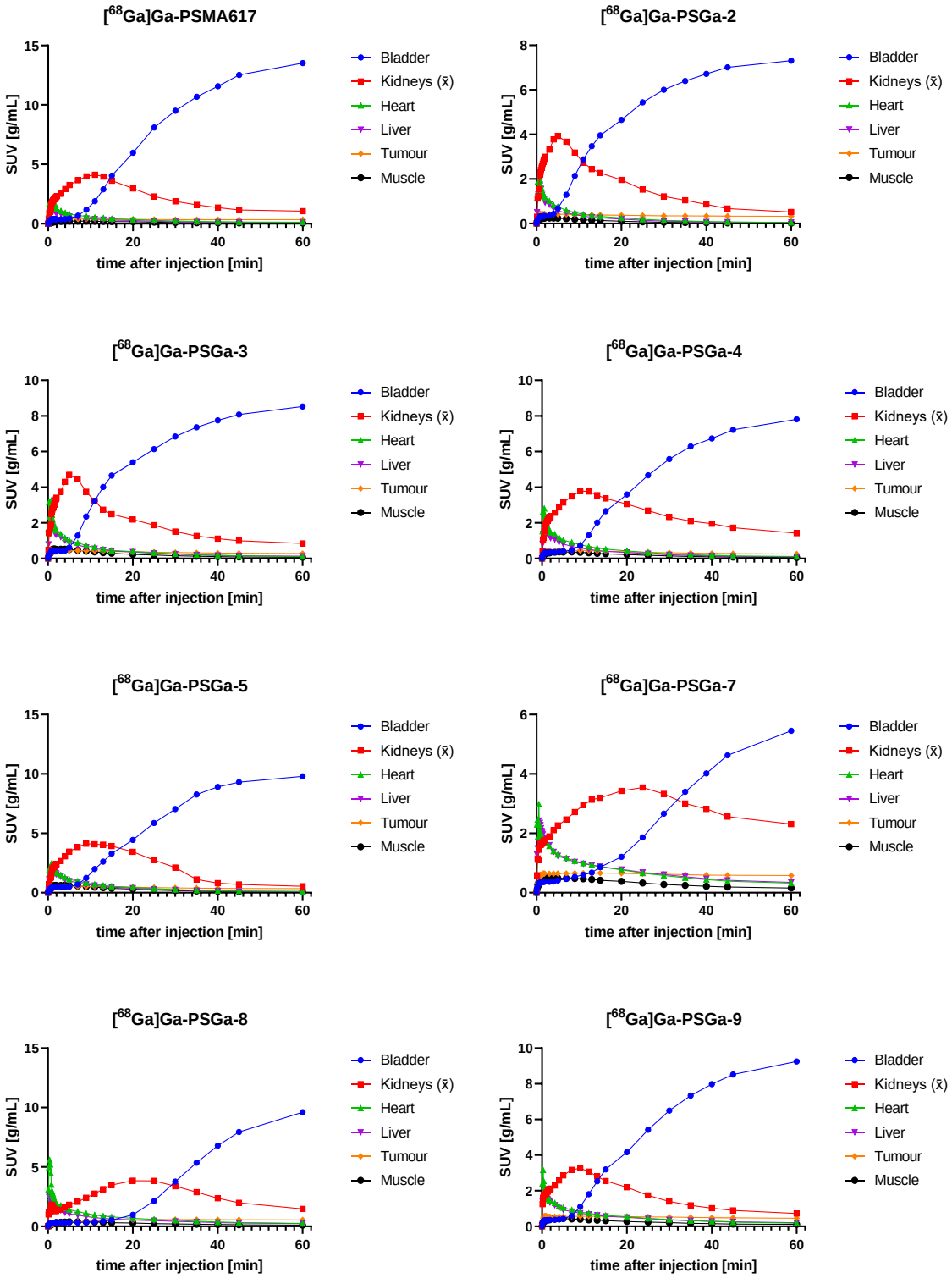
Supplemental Figure 22. Internalization ratios of the investigated compounds. Specificity of internalization was determined by blocking with 2-PMPA (500 uM). Data is represented as % applied activity (AA)/10^5 cells and show mean ± SD (*n* =3)

S4.5: Supplemental Figure 23. Competitive assay, determination of binding affinity:



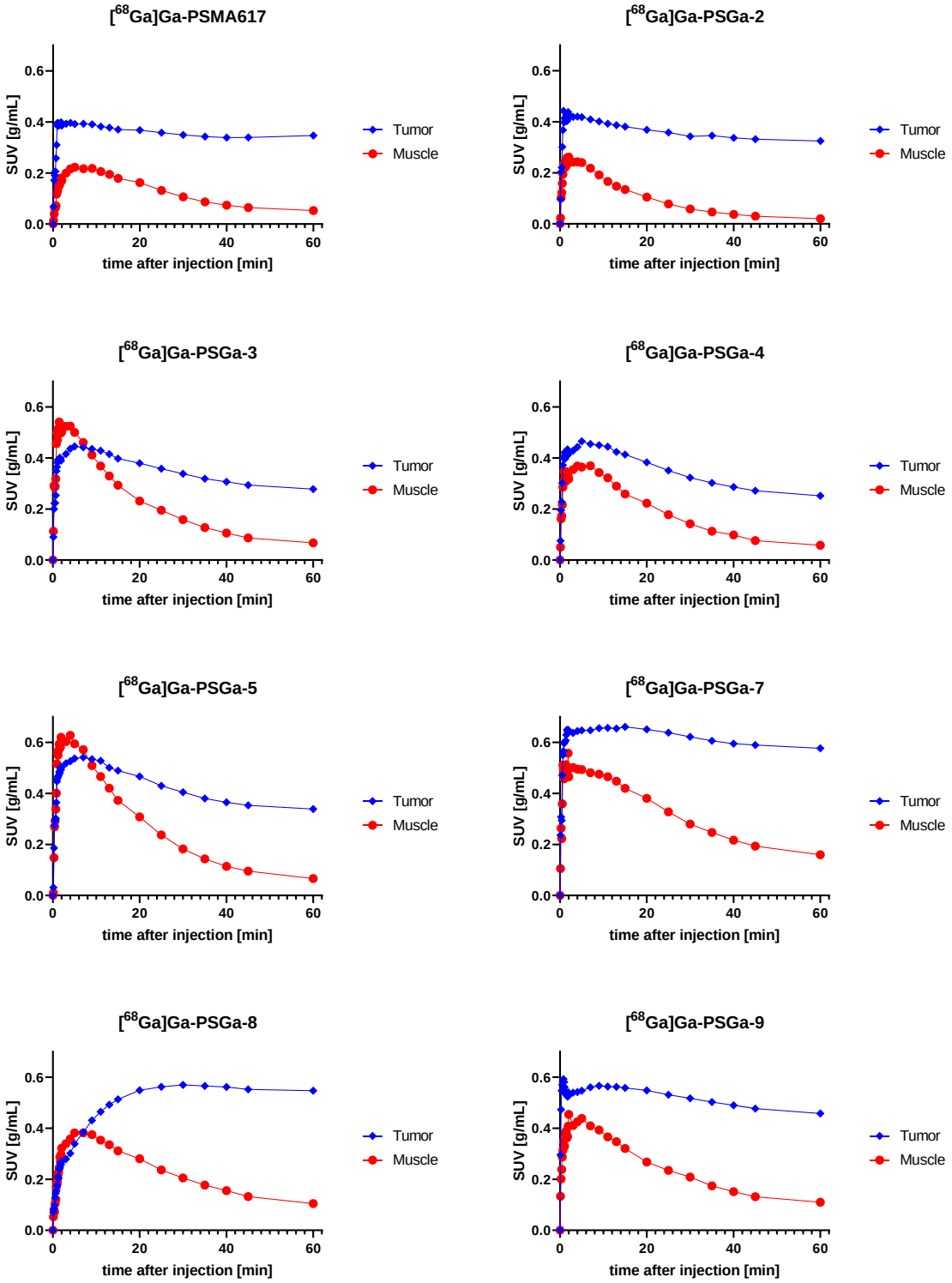
Supplemental Figure 23. Exemplary competitive binding curves for the compound series. IC_{50} was determined on LNCaP cells employing [^{68}Ga]Ga-PSMA-10 as the radioligand (c = 0.75 nM). Data was plotted using a nonlinear regression algorithm (Prism 8.0.1) to determine the IC_{50}.

S4.6: Supplemental Figure 24. Time-activity curves (0 – 60 min) of PET scans from ^{68}Ga-labeled compounds:



Supplemental Figure 24. Time-activity curves (0 – 60 min) of PET scans from ^{68}Ga-labeled compounds showing accumulations in organs of interest.

S4.7: Supplemental Figure 25. Detailed time-activity curves (0 – 60 min) of PET scans from ^{68}Ga-labeled compounds:



Supplemental Figure 25. Detailed muscle vs. tumor time-activity curves (0 – 60 min) of PET scans from ^{68}Ga-labeled compounds.

S5: Detailed biodistribution values of [^{211}At]PSAt3-Ga:

Supplemental Table 1. Biodistribution values of [^{211}At]PSAt-3-Ga (in %ID/g)									
	2 h p.i.			**6 h p.i.**			**24 h p.i.**		
	Mean	**SD**	**n***	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**
Tumour	18,86	8,18	4	10,3	5,21	6	7,66	2,9	6
Blood	0,35	0,08	4	0,12	0,02	6	0,04	0,01	6
Heart	0,71	0,21	4	0,13	0,02	6	0,04	0,01	6
Lung	1,79	0,53	4	0,43	0,28	6	0,13	0,04	6
Liver	0,7	0,16	4	0,25	0,03	6	0,12	0,02	6
Spleen	3,09	0,6	4	1,12	0,43	6	0,23	0,12	6
Kidneys (x̄)	82,11	14,82	4	44,17	7,88	6	7,97	4,21	6
Muscle	0,4	0,18	4	0,07	0,03	6	0,02	0,02	6
Salivary gland	1,96	0,74	4	0,96	0,39	6	0,41	0,14	6
Thyroid (trachea)	1,61	1,1	4	3,63	0,77	6	1,35	0,84	6
Tail	0,94	0,19	4	0,33	0,11	6	0,08	0,02	6
Intestine	1,07	0,81	4	0,15	0,02	6	0,09	0,08	6
Stomach	1,63	0,37	4	0,63	0,21	6	0,31	0,19	6

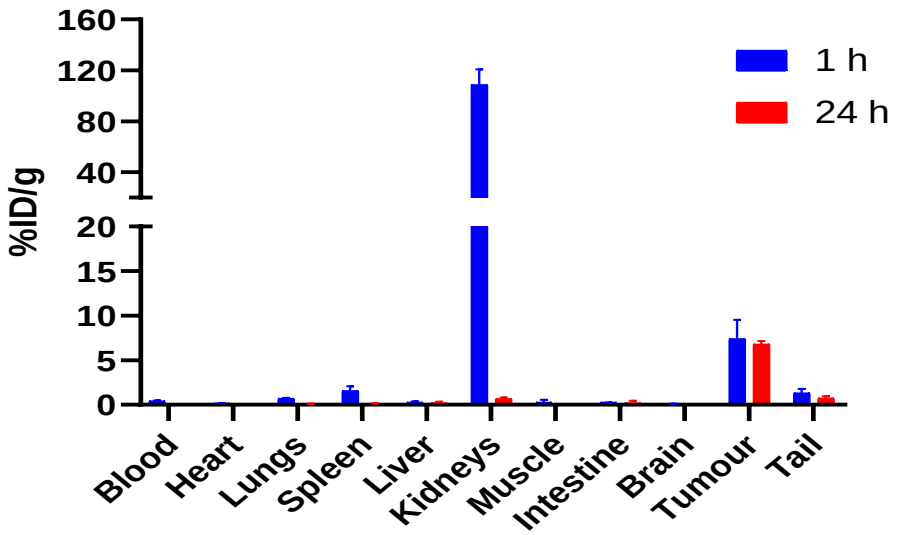
** Initially planned with n = 6, two mice were lost during the execution of the experiment*

Supplemental Table 2. Tumor-to-organ ratios of organs of interest of [^{211}At]PSAt-3-Ga									
	2 h p.i.			**6 h p.i.**			**24 h p.i.**		
	Mean	**SD**	**n***	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**
Blood	52,18	11,37	4	88,52	35,78	6	212,76	92,90	6
Liver	26,12	5,18	4	40,47	15,69	6	70,01	43,27	6
Spleen	6,36	3,12	4	10,25	6,03	6	45,25	34,28	6
Muscle	52,68	21,56	4	169,00	82,98	6	417,17	39,60	6
Kidneys	0,23	0,06	4	0,24	0,11	6	1,18	0,65	6
Salivary gland	9,63	1,32	4	11,66	6,58	6	20,43	8,04	6
Thyroid (trachea)	15,50	8,68	4	2,84	1,18	6	7,89	5,55	6
Stomach	11,36	2,74	4	16,75	6,01	6	44,24	51,81	6

** Initially planned with n = 6, two mice were lost during the execution of the experiment*

S6: Biodistribution values of [^{177}Lu]Lu-PSMA-617:

Values were determined at 1 and 24 h p.i. after injection of 60 pmol of ^{177}Lu-labeled compound.



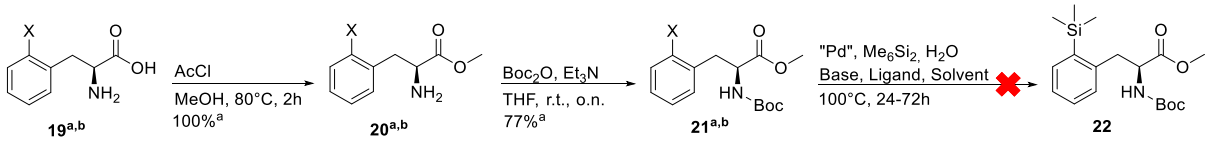
Supplemental Figure 26. Biodisrtibution (in %ID/g) of [^{177}Lu]Lu-PSMA-617 in dissected organs

Supplemental Table 3. Biodistribution values of [^{177}Lu]Lu-PSMA-617 (in %ID/g)						
	2 h p.i.			**24h p.i.**		
	Mean	**SD**	**n***	**Mean**	**SD**	**n**
Blood	0,42	0,08	3	0	0	3
Heart	0,18	0,03	3	0,02	0,01	3
Lungs	0,71	0,08	3	0,07	0,05	3
Spleen	1,57	0,49	3	0,12	0,06	3
Liver	0,27	0,11	3	0,21	0,15	3
Kidneys	108,64	12,14	6	0,67	0,13	6
Muscle	0,28	0,28	3	0,02	0,01	3
Intestine	0,26	0,01	3	0,19	0,27	3

S7: Description of unsuccessful chemical efforts for precursors:

S7.1: Approaches for PSAt-2 precursor

Following the same logic as for PSTMS-3, the potential precursor for PSAt-2 (PSTMS-2) was based on the synthesis of a silyl-bearing amino acid, and a consequent SPPS approach. Nevertheless, the attempts to obtain the silyl-bearing amino acid were, in our hands, not successful and are summarized below:

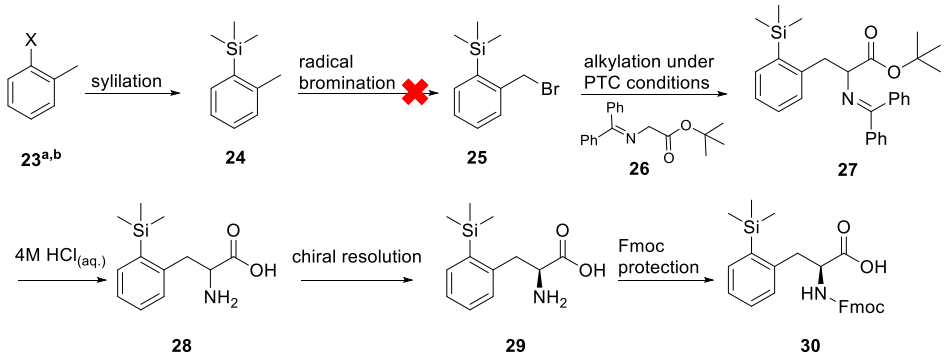


Supplemental Figure 27. Synthetic pathway involving a Pd-catlayzed silylation reaction. [a]X=Cl, [b]X=I

The last step in the synthetic procedure did not furnish the desired compound, the screening performed was the following:

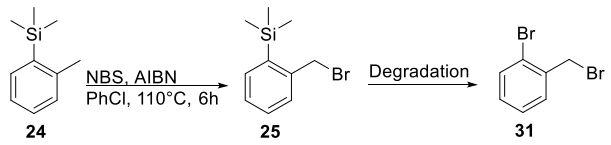
Supplemental Table 4. Summary of tested reactions for compound **22**					
Pd-source	**Ligand**	**Base**	**Solvent**	**Time**	**Conversion**
$Pd_2(dba)_3$	^{me}CgPPh	$KHCO_3$	DMF	72 h	0 %
$Pd_2(dba)_3$	^{me}CgPPh	$KHCO_3$	DMF	72 h	0 %
$Pd_2(dba)_3$	^{me}CgPPh	K_2CO_3	DMF	48 h	0 %
$Pd_2(dba)_3$	^{me}CgPPh	KF	DMF	48 h	0 %
$Pd(OAc)_2$	^{me}CgPPh	LiOAc	DMF	48 h	0 %
$Pd(PPh_3)_4$	$P(Ph)_3$	$KHCO_3$	DMF	48 h	0 %
$Pd(PPh_3)_4$	$P(Ph)_3$	$KHCO_3$	Dioxane	24 h	0 %

It was concluded that the steric hindrance of the '*ortho*' position made it not possible to obtain the silyl-bearing amino acid via this pathway. It was eventually decided to approach the total synthesis of the amino acid, through various pathways that resulted in negative outcomes:



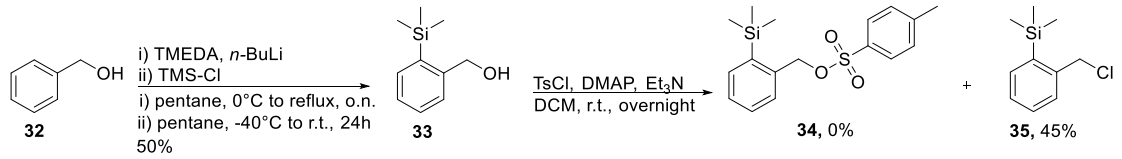
Supplemental Figure 28. Illustrative concept behind the total synthesis of the silyl-bearing amino acid **30**. [a]X=Cl, [b]X=I

The synthesis started with the silylation of **23[a]**, which was successful. However, the radical bromination of **24** led to the formation of the aromatic bromide instead, through a possible degradation of the desired material during the course of the reaction:



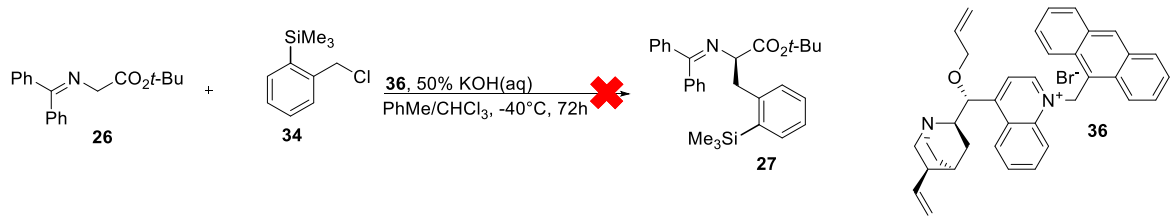
Supplemental Figure 29. Bromination of **24** and subsequent degradation to compound **31**.

Therefore, the approach was modified in order to furnish a tosylate derivative, which is comparable in reactivity to a bromide, instead of the bromide **25** in the PTC alkylation, the reaction however also did not furnish the desired product, but the chloride **35:**



Supplemental Figure 30. Alternative pathway for obtaining the tosyl-bearing derivative **34**.

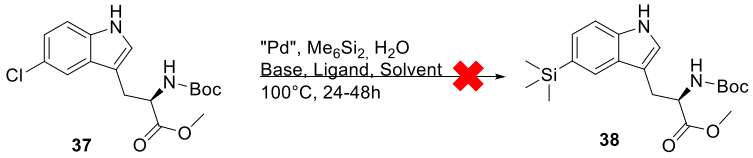
Compound **34** was then thought to be a good alternative to the desired **34**, so it was included in the synthetic pathway (Supplemental Figure 28) instead of **25**. However, also in this case, the reaction showed no converstion whatsoever, and the total synthesis of the silyl amino acid was deemed not possible.



Supplemental Figure 31. General approach for the final asymmetric synthesis of the amino acid under PTC conditions.

S7.2: Approaches for PSAt-5 precursor

In a similar attempt to obtain a silyl-derivative for SPPS and subsequent obtainment of a precursor for PSAt-5 the following extensive screening was performed:



Supplemental Figure 32. Synthetic pathway involving a Pd-catlayzed silylation reaction for obtaining **38**.

Supplemental Table 4. Summary of tested reactions for compound **38**					
Pd-source	**Ligand**	**Base**	**Solvent**	**Time**	**Conversion**
$Pd_2(dba)_3$	^{me}CgPPh	$KHCO_3$	DMF	48 h	0 %
$Pd_2(dba)_3$	CyJohnPhos	KF	Dioxane	24 h	0 %
$Pd_2(dba)_3$	CyJohnPhos	LiOAc	Dioxane	24 h	0 %
$Pd_2(dba)_3$	CyJohnPhos	$KHCO_3$	Dioxane	24 h	0 %
$Pd_2(dba)_3$	CyJohnPhos	K_2CO_3	Dioxane	24 h	0 %
$Pd_2(dba)_3$	JohnPhos	KF	Dioxane	24 h	0 %
$Pd_2(dba)_3$	Adamantane	KF	Dioxane	24 h	< 10 %
$Pd_2(dba)_3$	*t*-BuDavePhos	KF	Dioxane	24 h	< 5 %
$Pd(OAc)_2$	CyJohnPhos	KF	Dioxane	24 h	0 %
$Pd_2(dba)_3$	^{me}CgPPh	KF	DMF	24 h	0 %
$Pd_2(dba)_3$	*t*-BuDavePhos	KF	DMF	24 h	0 %
$Pd_2(dba)_3$	^{me}CgPPh	LiOAc	Dioxane	24 h	0 %
Pd G3	*t*-BuXPhos	KF	Dioxane	24 h	0 %
Pd G3	SPhos	KF	Dioxane	24 h	< 10 %
Pd G3	*t*-BuDavePhos	KF	Dioxane	24 h	< 10 %
$Pd_2(dba)_3$	*t*-BuDavePhos	Cs_2CO_3	Dioxane	24 h	0 %
$Pd_2(dba)_3$	*t*-BuDavePhos	CsF	Dioxane	24 h	0 %

Regarding the reactions which showed a low conversion, an upscaling was performed resulting in poorer outcomes and in reaction mixtures that were not possible to be purified due to the overlap between the target compound and some of the ligands employed. Further synthetic pathways resembling the total synthesis of 2-trimethylsiylyl-*L*-phenylalanine were not tested due to the previous unsuccessful trials with simpler substrates.

Supplemental references:

1. Lowe PT, Dall'Angelo S, Fleming IN, Piras M, Zanda M, O'Hagan D. Enzymatic radiosynthesis of a ^{18}F-Glu-Ureido-Lys ligand for the prostate-specific membrane antigen (PSMA). *Org Biomol Chem*. 2019;17:1480-1486.

2. Meyer FM, Liras S, Guzman-Perez A, Perreault C, Bian J, James K. Functionalization of aromatic amino acids via direct C-H activation: Generation of versatile building blocks for accessing novel peptide space. *Org Lett*. 2010;12:3870-3873.