Electronic Supplementary Material (ESI) for Chemical Communications.

Supplementary information

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Materials and methods

1. Chemical reagents and instrumentation

Fmoc-Rink amide MBHA resin, Fmoc-Sieber-PS resin and Fmoc-L-amino acids were purchased from Iris Biotech GmbH (Marktredwitz, Germany) and Novabiochem – Merck KGaA (Darmstadt, Germany). Fmoc-L-DOPA(acetonide)-OH was obtained from Bachem (Bubendorf, Switzerland). Coupling reagents and additives were obtained from Sigma-Aldrich (St Louis, MO, USA), Medalchemy (Alicante, Spain), Luxembourg Industries Ltd. (Tel Aviv, Israel) and Alfa Aesar (Karlsruhe, Germany). All other chemicals and solvents were acquired from Sigma-Aldrich, Alfa Aesar and Carlo Erba (Sabadell, Spain).

Reversed-phase analytical high-performance liquid chromatography (RP-HPLC) was performed using a Shimadzu Prominence XR equipped with a LC-20AD pump, a SIL-20AC cooling autosampler, a CTO-10AS column oven and a SPD-M20A photodiode array detector (Shimadzu, Kyoto, Japan). A reversed-phase XBridge (Waters) C18 column (4.6 mm ×100 mm, 3.5 µm) column was used. The system was run at a flow rate of 1.0 mL/min over 8 min at room temperature (RT) using water (0.045% trifluoroacetic acid (TFA), v/v) and acetonitrile (ACN) (0.036% TFA, v/v) as mobile phases.

Semi-analytical HPLC purification was carried out using the same instrument on a Jupiter Proteo semipreparative column (250 × 10 mm, 10 µm). The system was run at a flow rate of 3 mL/min over 15 min at either 25 ^{o}C or 60 ^{o}C. Water (0.045% TFA), v/v) and ACN (0.036% TFA, v/v) were used as eluents.

High-resolution mass spectrometry (HRMS) was acquired on an Agilent 1100 LC/MS-TOF instrument.

NMR spectra were recorded at 25 ^{o}C in a 400 MHz spectrometer (Bruker) using the deuterated solvent as an internal deuterium lock. The residual protic signal of DMSO was used as a reference in ^{1}H and ^{13}C NMR spectra recorded in DMSO-d_6. Chemical shifts are reported in part per million (ppm) in the δ scale, coupling constants in Hz and multiplicity as follows: s (singlet), d (doublet) and m (multiplet).

2. Peptide synthesis and characterization

- **(Ac-R(Pbf)GD(OtBu)S(tBu)-Ahx$_2$)(Ac-D(OtBu)W(Boc)IVA-Ahx$_2$)-K-K(N$_3$)-bound resin (1)**

Fmoc-Rink Amide MBHA resin (231 mg, 0.4 mmol/g) was placed in a polypropylene syringe. Fmoc was removed using piperidine in DMF (20:80, v/v) (1 x 1 min, 1 x 5 min, 1 x 10 min), and then Fmoc-L-Lys(N$_3$)-OH (45.6 mg, 0.12 mmol, 0.5 eq) was incorporated using OxymaPure (0.5 eq) and DIPCDI (0.5 eq) for 1 h in DMF. Then, unreacted amine groups were capped with Ac$_2$O (5 eq) and DIEA (5 eq) in DMF for 30 min. After removal of the Fmoc group, the second residue, Fmoc-L-Lys(Alloc)-OH (125.4 mg, 0.28 mmol, 3 eq), was incorporated using the same methodology. Then, the first peptide chain (Arg-Gly-Asp-Ser) was elongated using standard Fmoc/*t*Bu chemistry and the *N*-terminus acetylated by treatment with Ac$_2$O/DIEA/DMF (1:2:7, v/v/v) (1 x 5 min, 2 x 10 min). To elongate the second peptide chain, the Alloc group was first removed by treatment with Pd(PPh$_3$)$_4$-PhSiH$_3$ (0.1:10) in DCM (3 x 15 min). The resin was then washed with a solution of sodium diethyldithiocarbamate (0.02 M in DMF; 3 x 15 min) and the second peptide sequence (Asp-Trp-Ile-Val-Ala-(Ahx)$_2$) was elongated, followed by the acetylation of the *N*-terminus as previously described. 328 mg of peptide-bound resin were obtained.

The RGD-DWIVA-N$_3$ chimeric peptide **1’** was isolated as follows. First, 60 mg of peptide-bound resin **1** were treated with TFA-TIS-H$_2$O (95:2.5:2.5) (2 mL) for 1 h. The filtrate was collected, concentrated and precipitated onto ice-cold Et$_2$O. The crude was dissolved in H$_2$O-ACN (1:1, v/v) and lyophilized to give 15.8 mg of crude peptide (74% purity). The target peptide was purified by semi-analytical RP-HPLC (linear gradient from 25:60 (0.036% TFA in ACN/0.045% TFA in H_2O) in 15 min at 25°C). 1.54 mg were obtained (3.5% yield).

Characterization: RP-HPLC (linear gradient from 20:100 (0.036% TFA in ACN/0.045% TFA in H_2O) in 8 min; t_R= 6.10 min, 98% purity). HRMS (ESI-TOF) (*m/z*): $[M+2H]^{2+}$Calcd. for $C_{84}H_{140}N_{24}O_{22}$ 918.5287; found, 918.5283.

- **Alkyne-Cys(Dpm)-NH_2 (2)**

Fmoc-Sieber-PS resin (380.4 mg, 0.59 mmol/g) was placed in a polypropylene syringe. Fmoc was removed using piperidine in DMF (20:80, v/v) (1 x 1 min, 1 x 5 min, 1 x 10 min), and then Fmoc-L-Cys(Dpm)-OH (343.1 mg, 0.67 mmol, 3 eq) was incorporated using OxymaPure (3 eq) and DIPCDI (3 eq) as coupling reagents for 1 h in DMF. After removal of the Fmoc group, 4-pentynoic acid (33.0 mg, 0.34 mmol, 1.5 eq) was introduced using the same methodology and the reaction mixture was stirred for 2 h in DMF. Cleavage from the resin was carried out by using very mild TFA conditions (TFA-DCM (3:97, v/v) (8 x 0.5 min)) and the crude collected over H_2O. DCM was evaporated using N_2 flow and ACN (2 mL) was added. After lyophilisation, 53.0 mg of compound **2** (66% yield) were obtained, which was used without further purification.

Characterization: RP-HPLC (linear gradient from 30:100 (0.036%TFA in ACN/0.045% TFA in H_2O) in 8 min; t_R= 7.10 min, > 99.9% purity).^{1}H NMR (400 MHz, DMSO-*d$_6$*, δ (ppm)): 8.15 (1H, d, *J* = 8.4 Hz) 7.47 (1H, br s), 7.44-7.20 (10H, m), 7.16 (1H, br s), 5.34 (1H, s), 4.45 (1H, m), 2.73 (1H, m), 2.60 (1H, m), 2.47 (1H, m), 2.34 (2H, m). ^{13}C NMR (101 MHz, DMSO-*d$_6$*, δ (ppm)): 172.0, 170.2, 141.5, 128.5, 128.1, 128.0, 127.1, 83.8, 71.3, 52.7, 51.7, 33.9, 14.1. HRMS (ESI-TOF) (*m/z*): $[M+H]^+$ Calcd. for $C_{21}H_{23}N_2O_2S$ 367.1480; found, 367.1483; $[M+Na]^+$ Calcd. for $C_{21}H_{22}N_2NaO_2S$ 389.1300; found, 389.1303.

- **Alkyne-DOPA(acetonide)$_2$-NH_2 (3)**

Fmoc-Sieber-PS resin (300 mg, 0.59 mmol/g) was placed in a polypropylene syringe. Fmoc was removed using piperidine in DMF (20:80, v/v) (1 x 1 min, 1 x 5 min, 1 x 10 min), and then Fmoc-L-DOPA(acetonide)-OH (162.7 mg, 0.35 mmol, 2 eq) was incorporated using OxymaPure (2 eq) and DIPCDI (2eq) as coupling reagents for 1.5 h in DMF. After removal of the Fmoc group, the second Fmoc-L-DOPA(acetonide)-OH (122 mg, 0.27 mmol, 1.5 eq) was introduced using the same coupling agents and the reaction mixture was stirred for 2 h in DMF. Afterwards, 4-pentynoic acid (26.0 mg, 0.27 mmol, 1.5 eq) was incorporated. Cleavage from the resin was performed with very mild TFA conditions (TFA-DCM (3:97, v/v) (8 x 0.5 min)) and the crude collected over

H_2O. DCM was evaporated using N_2 flow and then ACN (2 mL) was added. After lyophilisation, 33.8 mg (42 % yield) of compound **3** were obtained, which was used without further purification.

Characterization: RP-HPLC (linear gradient from 20:100 (0.036%TFA in ACN/0.045% TFA in H_2O) in 8 min; t_R= 5.64min, 83% purity). ^{1}H NMR (400 MHz, DMSO-*d$_6$*, δ (ppm)): 8.05 (1H, d, *J* = 8.4 Hz) 7.89 (1H, d, *J* = 8.0 Hz), 7.28 (1H, s), 7.08 (1H, s), 6.69-6.56 (6H, m), 4.36 (2H, m), 2.86 (2H, m), 2.70 (2H, m), 2.58 (1H, m), 2.24 (4H, m), 1.59 (12H, s). ^{13}C NMR (101 MHz, DMSO-*d$_6$*, δ(ppm)): 172.6, 170.8, 170.2, 146.5, 145.2, 130.9, 121.7, 117.5, 109.4, 107.6, 83.6, 71.2, 54.2, 53.9, 37.3, 37.1, 34.1, 25.5, 14.1. HRMS (ESI-TOF) (*m/z*): $[M+H]^+$Calcd. for $C_{29}H_{34}N_3O_7$536.2397; found, 536.2402.

- **(Ac-RGDS-Ahx$_2$)(Ac-DWIVA-Ahx$_2$)-K-K(triazole-NH$_2$)-NH$_2$ (4**)

(Ac-R(Pbf)GD(OtBu)S(tBu)-Ahx$_2$)(Ac-D(OtBu)W(Boc)IVA-Ahx$_2$)-K-K(N_3)-bound resin **1** (53.5 mg) was placed in a glass vial under N_2 atmosphere and DMF (2.5 mL) was added. A solution of $CuSO_4\cdot5H_2O$ (15.5 mg, 0.06 mmol, 3 eq) in H_2O (127.6 µL) and propargylamine (4.11 µL, 0.02 mmol, 3 eq) were sequentially added to the vial. Then, sodium ascorbate (12.7 mg, 0.06 mmol, 3 eq) was directly added, and the reaction mixture was stirred overnight at RT. After this time, the resin was transferred into a polypropylene syringe and washed with DMF (5 x 0.5 min) and DCM (5 x 0.5 min). Cleavage and deprotection were performed by treating the resin with TFA-TIS-H_2O (95:2.5:2.5) (4 mL) for 1 h. The filtrate was collected, concentrated and precipitated onto ice-cold Et_2O. The crude was dissolved in H_2O-ACN (1:1, v/v) and lyophilized to give 14.2 mg of crude peptide (22% purity). Compound **4** was isolated by semi-analytical RP-HPLC (linear gradient from 20:60 (0.036%TFA in ACN/0.045% TFA in H_2O) in 15 min at 60 ^{o}C). 1.88 mg were obtained (5% yield).

Characterization: RP-HPLC (linear gradient from 20:100 (0.036% TFA in ACN/0.045% TFA in H_2O) in 8 min; t_R= 5.45min, 93% purity). HRMS (ESI-TOF) (*m/z*): $[M+2H]^{2+}$ Calcd. for $C_{87}H_{145}N_{25}O_{22}$ 946.0498; found, 946.0501.

- **(Ac-RGDS-Ahx$_2$)(Ac-DWIVA-Ahx$_2$)-K-K(triazole-Cys)-NH$_2$ (5)**

(Ac-R(Pbf)GD(OtBu)S(tBu)-Ahx$_2$)(Ac-D(OtBu)W(Boc)IVA-Ahx$_2$)-K-K(N_3)-bound resin **1** (60.2 mg) was placed in a glass vial under N_2 atmosphere and DMF (2.9 mL) was added. A solution of $CuSO_4\cdot5H_2O$ (18.0 mg, 0.07 mmol, 3 eq) in H_2O (143.0 µL) and compound **2** (26.5 mg, 0.07 mmol, 3 eq) were sequentially added to the vial. Then, sodium ascorbate (14.3 mg, 0.07 mmol, 3 eq) was directly added, and the reaction mixture was stirred overnight at RT. After this time, the resin was transferred into a polypropylene syringe and washed with DMF (5 x 0.5 min) and DCM

(5 x 0.5 min). Cleavage and deprotection were performed by treating the resin with TFA-TIS-H_2O (95:2.5:2.5) (4 mL) for 1 h in the presence of small amount of dithiothreitol (DTT). The filtrate was collected, concentrated and precipitated onto ice-cold Et_2O. The crude was dissolved in H_2O-ACN (1:1, v/v) and lyophilized to give 28.0 mg of crude peptide (47% purity). Compound **5** was purified by semi-analytical RP-HPLC (linear gradient from 20:60 (0.036% TFA in ACN/0.045% TFA in H_2O) in 15 min at 25 °C). 3.82 mg were obtained (8% yield).

Characterization: RP-HPLC (linear gradient from 20:100 (0.036% TFA in ACN/0.045% TFA in H_2O) in 8 min; t_R= 5.75 min, 97% purity). HRMS (ESI-TOF) (*m/z*): $[M+2H]^{2+}$ Calcd. for $C_{92}H_{152}N_{26}O_{24}S$ 1018.5597; found, 1018.5596.

- **(Ac-RGDS-Ahx$_2$)(Ac-DWIVA-Ahx$_2$)-K-K(triazole-DOPA$_2$)-NH$_2$ (6)**

(Ac-R(Pbf)GD(OtBu)S(tBu)-Ahx$_2$)(Ac-D(OtBu)W(Boc)IVA-Ahx$_2$)-K-K(N_3)-bound resin **1** (57.3 mg) was placed in a glass vial under N_2 atmosphere and DMF (2.9 mL) was added. A solution of $CuSO_4 \cdot 5H_2O$ (17.2 mg, 0.07 mmol, 3 eq) in H_2O (143.0 μL) and compound **3** (36.8 mg, 0.07 mmol, 3 eq) were sequentially added to the vial. Then, sodium ascorbate (13.6 mg, 0.07 mmol, 3 eq) was directly incorporated, and the reaction mixture was stirred overnight at RT. After this time, the resin was transferred into a polypropylene syringe and washed with DMF (5 x 0.5 min) and DCM (5 x 0.5 min). Cleavage and deprotection were performed by treating the resin with TFA-TIS-H_2O (95:2.5:2.5) (4 mL) for 1 h. The filtrate was collected, concentrated and precipitated onto ice-cold Et_2O. The crude was dissolved in H_2O-ACN (1:1, v/v) and lyophilized to give 20.3 mg of crude peptide (68% purity). Compound **6** was isolated by semi-analytical RP-HPLC (linear gradient from 20:60 (0.036% TFA in ACN/0.045% TFA in H_2O) in 15 min at 25 °C). 3.80 mg were obtained (7% yield).

Characterization: RP-HPLC (linear gradient from 20:100 (0.036% TFA in ACN/0.045% TFA in H_2O) in 8 min; t_R= 5.44 min, > 99.9% purity). HRMS (ESI-TOF) (*m/z*): $[M+2H]^{2+}$ Calcd. for $C_{107}H_{165}N_{27}O_{29}$ 1146.1134; found, 1146.1116.

3. Sample preparation

Titanium disks. Commercially pure (c.p.) grade 2 titanium disks (diameter: 10 mm, thickness: 2 mm) were polished with SiC grading papers and smoothed with silica-water suspension in a 1:1 proportion on cotton clothes until obtaining mirror-like surfaces. Samples were then ultrasonically cleaned 3 times in cyclohexane for 5 min each. The same process was repeated with isopropanol, distilled water, ethanol and acetone. Ti samples were finally dried with nitrogen gas.

Au surfaces. Round glass cover slips (diameter: 10 mm), were washed with water, ethanol and acetone (3 times for 5 min each) and dried with nitrogen gas. Afterwards, a sputtering of 10 nm gold layer was performed with an ANGSTROM Magnetron Sputtering ONYX-2 (Angstrom Sciences, USA).

PLA films. PLA pellets (PURASORB® PL 6 – Corbion, Amsterdam, Netherlands) were dissolved with chloroform at a 3.6 % (w/v) ratio in a speed mixer (SpeedMixer™ DAC 150.1 FVZ, FlackTek Inc, USA) at 3500 rpm in 8 runs of 5 min. The resulting PLA solution was spread on a Petri dish and incubated in a chloroform saturated atmosphere at RT for 3 days and placed then on an oven at 80 ^{o}C for 12 h to ensure a complete chloroform evaporation. Finally, PLA films were cut in disks of 10 mm diameter. Prior to functionalization, PLA surfaces were O_2-plasma activated for 5 min, using a Standard Femto Plasma System (Diener, Germany). To achieve an amide bond with the amino-functionalized compound **4**, the O_2-activation was followed by a treatment with 0.2 M NHS and 0.1 M EDC in PBS at pH=6.5 during 2 h.

4. Surface functionalization and physicochemical characterization

Surface functionalization. Titanium, gold and PLA activated surfaces were coated by depositing on each material a 100 µL drop containing the peptidic molecules at a 100 µM concentration in distilled water and incubated overnight at RT to allow the anchorage of the peptides to the different surfaces. Each material was functionalized with the peptides containing the amino- (**4**), thiol- (**5**) and catechol (**6**) anchoring units. Azido peptide **1'** was also used as a control. Subsequently, the remaining peptide solutions were removed, and samples were washed three times in distilled water and dried with N_2 gas.

XPS analysis. Detection of C, O, N, Ti and Au elements was conducted on an XPS equipment (SPECS Surface Nano Analysis GmbH, Germany) using a Mg anode X50 source, operating at 150W, and a Phoibos 150 MCD-9 detector. Pass energy was fixed at 25 eV at 0.1 eV steps and at a pressure below 7.5 x 10^{-9} mbar. Casa XPS software (Version 2.3.19PR1.0, Casa Software Ltd, UK) was used to analyze the data. All peaks were referenced to C1s at 284.4 eV for calibration.

5. Cell culture and cell adhesion assay

Human bone marrow mesenchymal stem cells (MSCs) (ATCC, USA) were cultured in Advanced Dulbecco's Modified Eagle Medium (DMEM) (Gibco, USA) with D-glucose, non-essential amino acids, sodium pyruvate, and supplemented with 10% (v/v) FBS, 1% (v/v) L-glutamine and 1% (v/v) penicillin/streptomycin. Cells were maintained at 37 °C in a humidified atmosphere with 5% of CO_2. Culture medium was replaced every 2 days. When cells reached 70-80% confluence, they were detached with trypsin-EDTA and plated in new flasks.

Cell adhesion assay. Samples were first blocked with 1% bovine serum albumin (BSA) in PBS for 30 min and washed then twice with PBS to avoid non-specific interactions between the cells and the different surfaces. Afterwards, cells at passage 4 were seeded on the substrates at a density of 5000 cells/well and incubated for 6 h in serum-free medium at 37 °C in a humidified atmosphere with 5 % of CO_2. After this time, cells were washed with PBS to remove non-adherent cells, fixed with 4% paraformaldehyde in PBS (v/v) for 30 min, permeabilized with 0.05% Triton X-100 in PBS (v/v) for 20 min and blocked with 1% BSA in PBS (w/v) for 30 min to perform next immunofluorescent staining. Actin filaments were stained with phalloidin-TRITC (1:300) (Invitrogen, USA) in 0.05 % Triton X-100 in PBS for 1h and nuclei with 4',6-diamidino-2-phenyldole (DAPI) (1:1000) (Life Technologies, USA) in 20 mM Glycine-PBS for 5 min. Both staining steps were performed in darkness and PBS-Glycine washings were performed between all treatments (3 x 5 min). Samples were finally mounted on microscope slides and observed in an AF7000 fluorescent inverted microscope (Leica, Germany). Quantification of number of cells and cell projected area was done with the Fiji/Image-J package.[1]

6. Quantification of peptide grafting

To quantify the amount of peptide attached to titanium, an analogue of compound **6** (DOPA-containing peptide) was synthesized incorporating a 5(6)-carboxyfluorescein at the N-terminus of the DWIVA branch (compound **6-Fluo**). The synthesis and characterization of this peptide has been described elsewhere.[2]

Next, titanium surfaces were functionalized with **6-Fluo** as detailed in Section 4. Subsequently, the functionalized surfaces were treated with 1M NaOH at 70ºC for 12 min to detach the fluorescent biomolecule from the surface. The fluorescence intensity was measured using a microplate reader ($\lambda_{excitation}$ = 485 nm, $\lambda_{emission}$ = 528 nm) and converted into concentration by using a calibration curve. The grafting density of **6-Fluo** on titanium was of **77.4 ± 2.1 pmol/cm^2**. Complete methodological details for this procedure can be found in the recent literature.[2]

7. Statistical analysis

SPSS Statistics 24.0 software (IBM, USA) was used for statistical analysis. All data presented in this work are given as mean values ± standard deviation. XPS measurements were carried out in duplicates and performed twice independently to ensure reproducibility. For cell adhesion experiments, each condition was replicated in triplets and five pictures per sample were used to quantify number of attached cells and their projected area. One-way ANOVA test was use when normal distribution was observed between groups, performing a Tukey's or Tamhanne post-hoc pairwise test depending on the homogeneity of the variance. When data was not normally distributed, Kruskal-Wallis test was used. The calculated p values were considered significant if $p \leq 0.05$.

Supplementary figures and tables

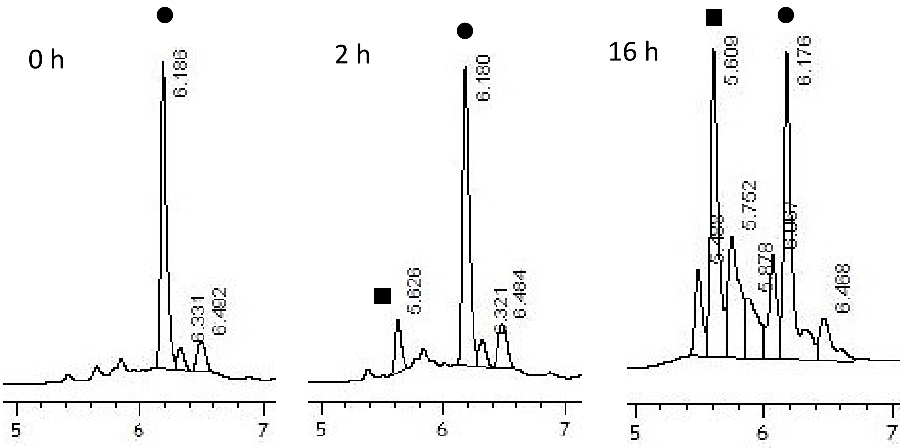


Figure S1. RP-HPLC chromatograms of the first test of the CuAAc for the synthesis of **4** at 0 h, 2 h and 16 h. Conditions: XBridge C18 (4.6 mm × 100 mm, 3.5 µm) reversed-phase column; linear gradient 20% to 100% of ACN over 8 min at 60 °C. ● = starting material **1'**, ■ = product **4**

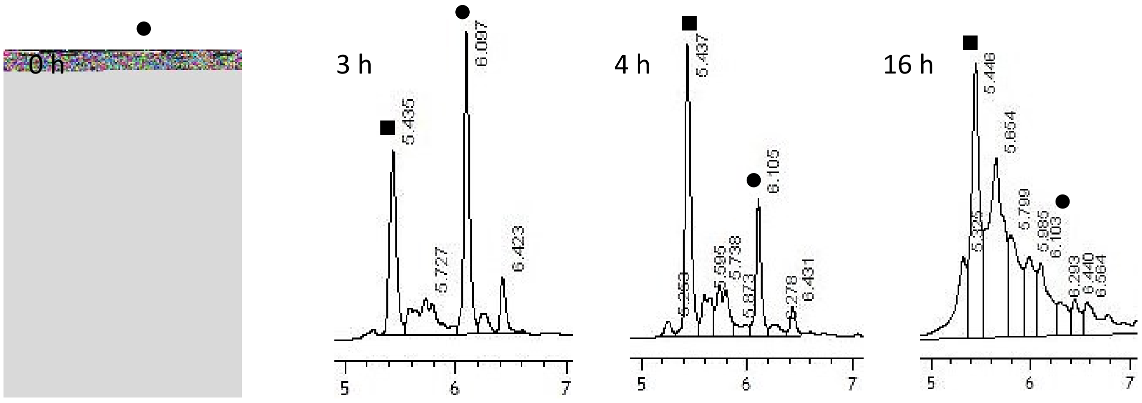


Figure S2. RP-HPLC chromatograms of the second test of the CuAAc for the synthesis of **4** at 0 h, 3 h, 4 h and 16 h. Conditions: XBridge C18 (4.6 mm × 100 mm, 3.5 µm) reversed-phase column; linear gradient 20% to 100% of ACN over 8 min at 60 °C. ● = starting material **1’**, ■ = product **4**.

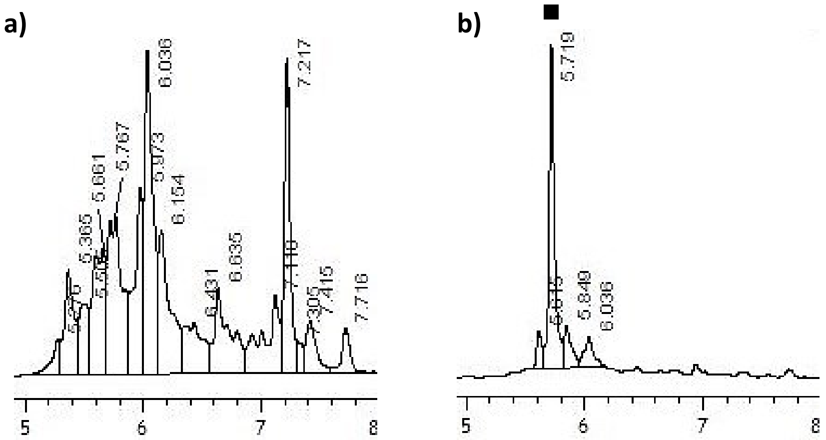


Figure S3. RP-HPLC chromatograms of the cleavage of peptide **5** a) without DTT and b) with DTT. Conditions: XBridge C18 (4.6 mm ×100 mm, 3.5 µm) reversed-phase column; linear gradient 20% to 100% of ACN over 8 min at 60 °C. ■ = product **5**.

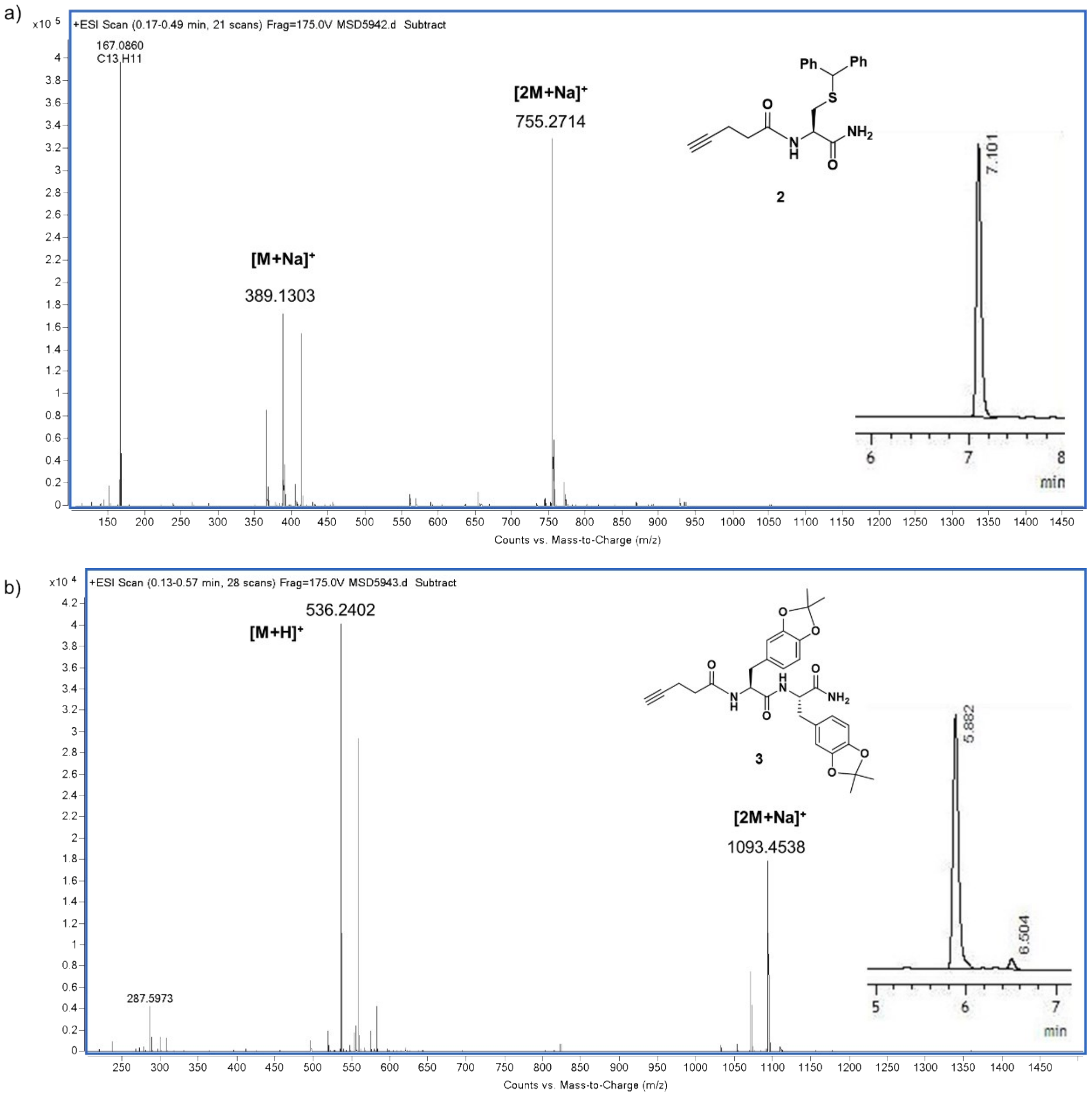
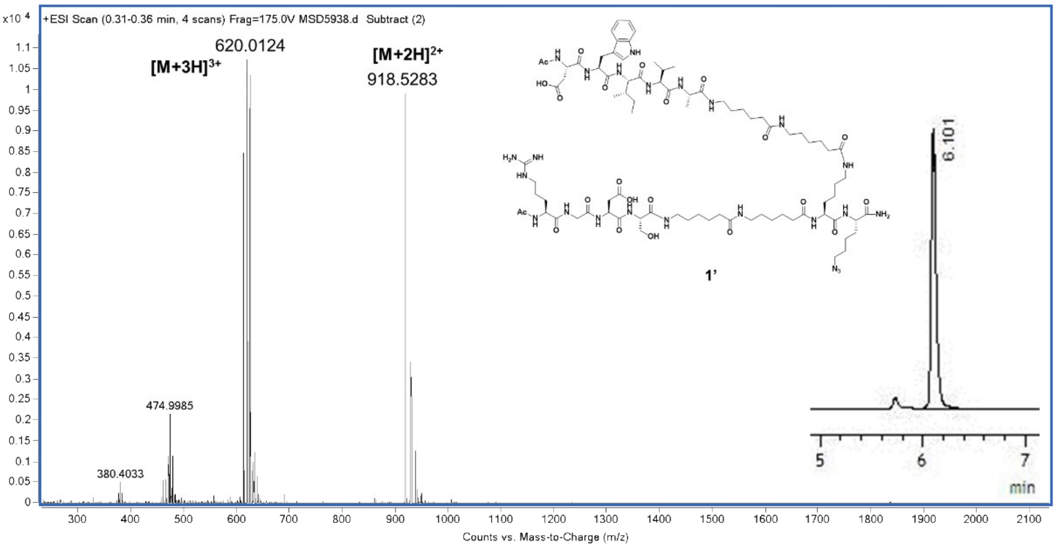
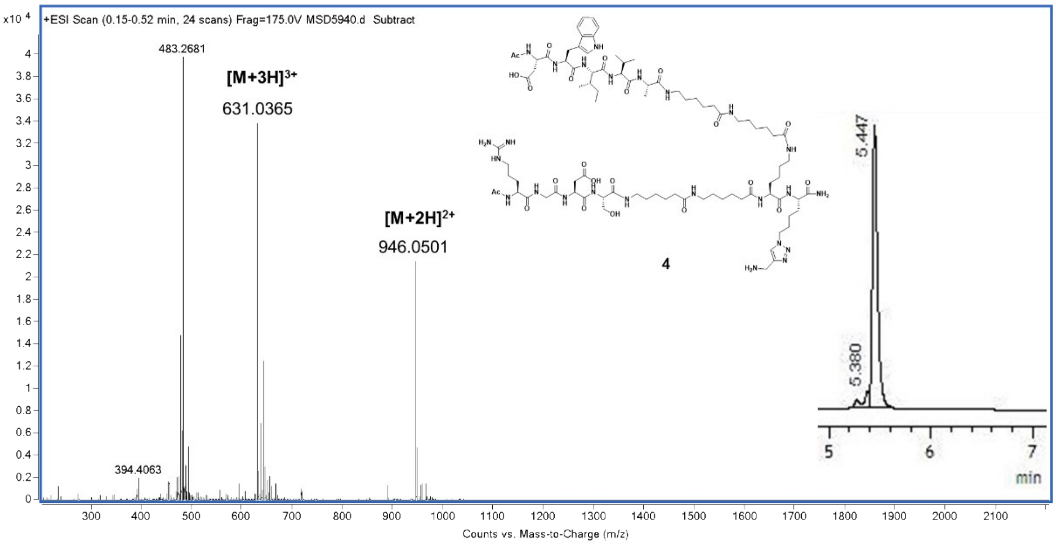


Figure S4. Chemical structures, HRMS spectra and HPLC chromatograms of anchoring units a) **2** and b) **3**.

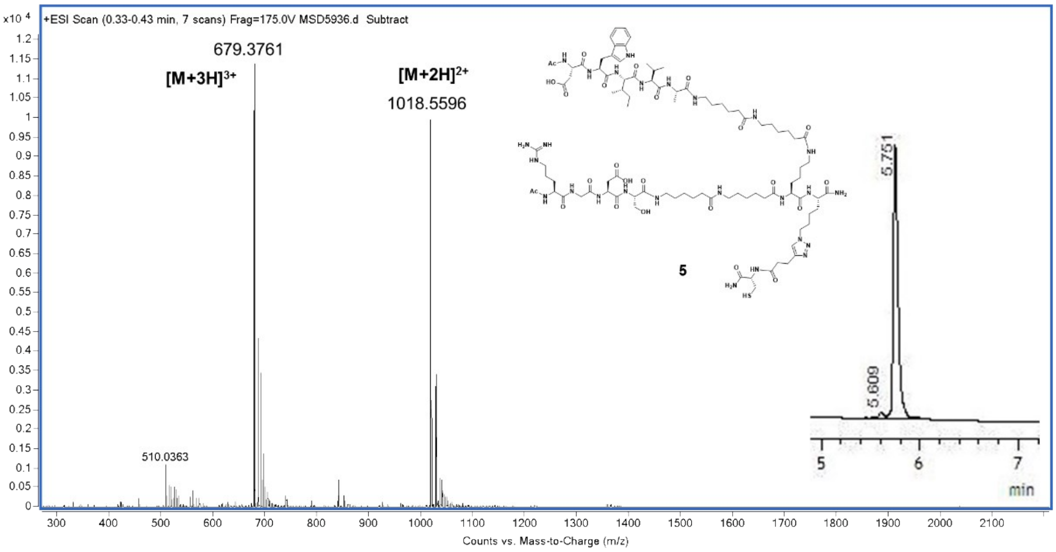
a)


x10 4
+ESI Scan (0.31-0.36 min, 4 scans) Frag=175.0V MSD5938.d Subtract (2)
620.0124
[M+3H]3+
[M+2H]2+
918.5283
474.9985
380.4033
1'
6.101
5
6
7
min
Counts vs. Mass-to-Charge (m/z)

b)


x10 4
+ESI Scan (0.15-0.52 min, 24 scans) Frag=175.0V MSD5940.d Subtract
483.2681
[M+3H]3+
631.0365
[M+2H]2+
946.0501
394.4063
4
5.447
5.380
5
6
7
min
Counts vs. Mass-to-Charge (m/z)

c)


x10 4
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679.3761
[M+3H]3+
[M+2H]2+
1018.5596
510.0363
5
5.751
5.609
5
6
7
min
Counts vs. Mass-to-Charge (m/z)

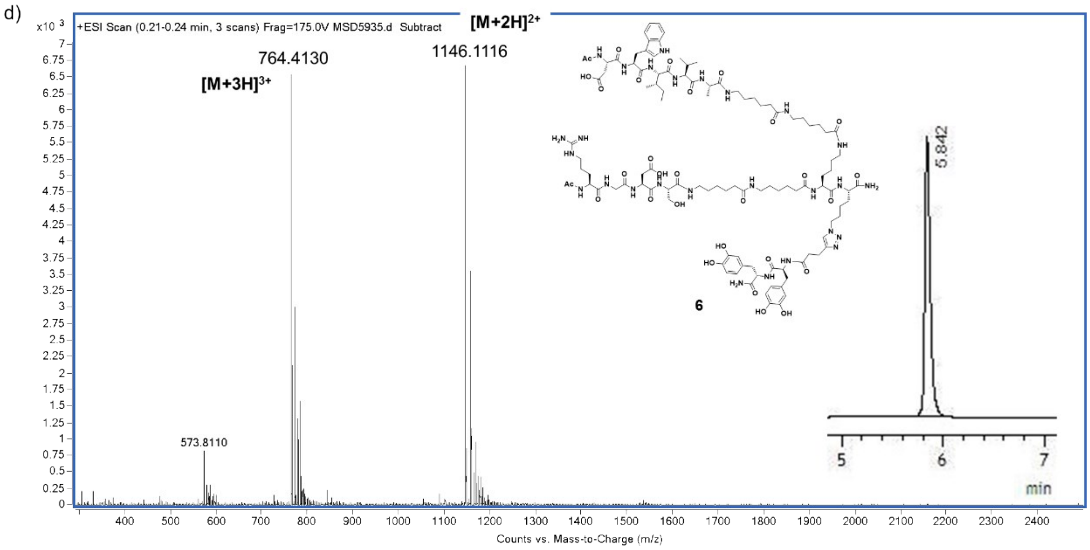

Figure S5. Chemical structures, HRMS spectra and HPLC chromatograms of RGD-DWIVA peptide platforms containing the different anchoring groups a) azido **1’**, b) amino **4**, c) thiol **5** and d) catechol **6**.

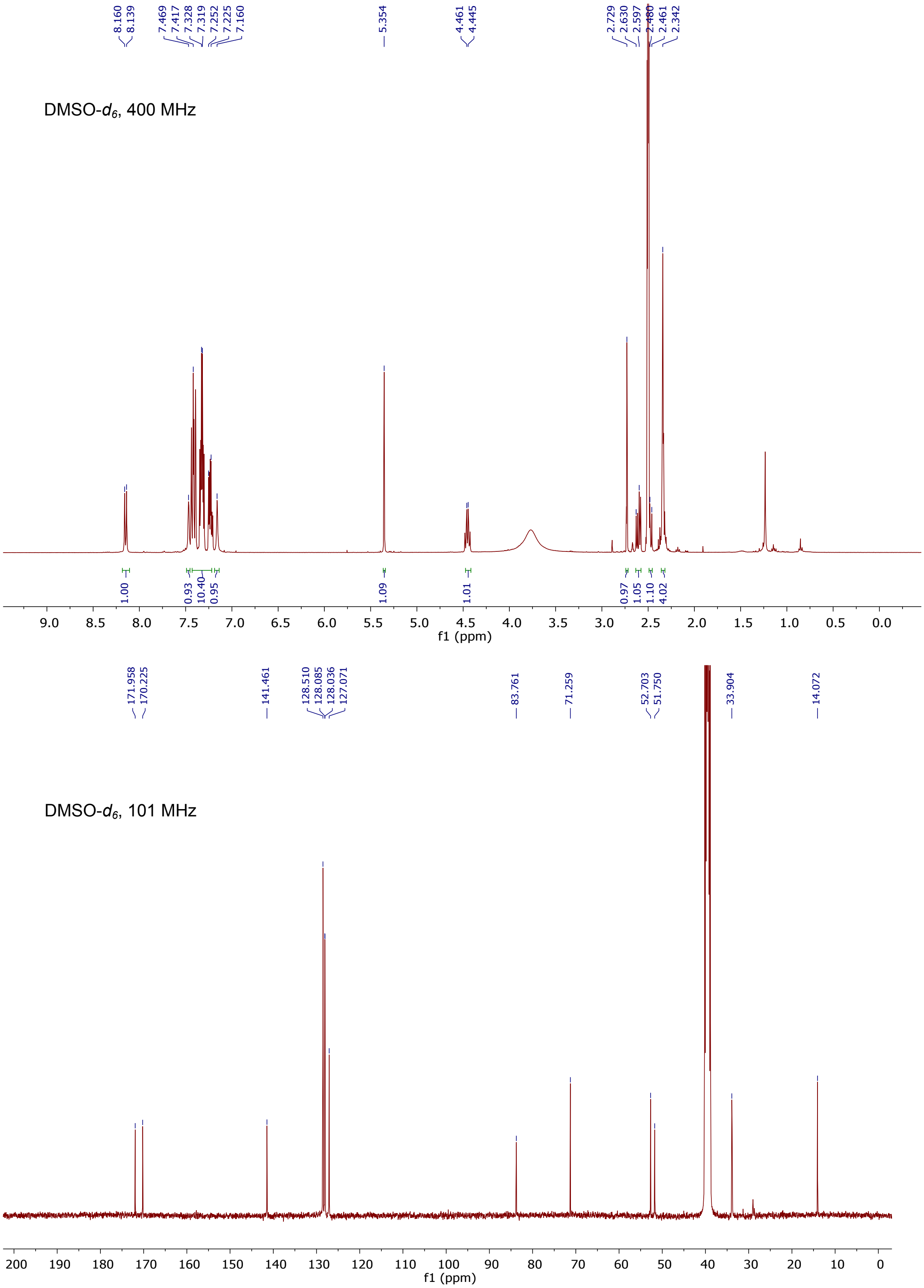

Figure S6. ^1H and ^{13}C NMR spectra of **2** in DMSO-d_6.

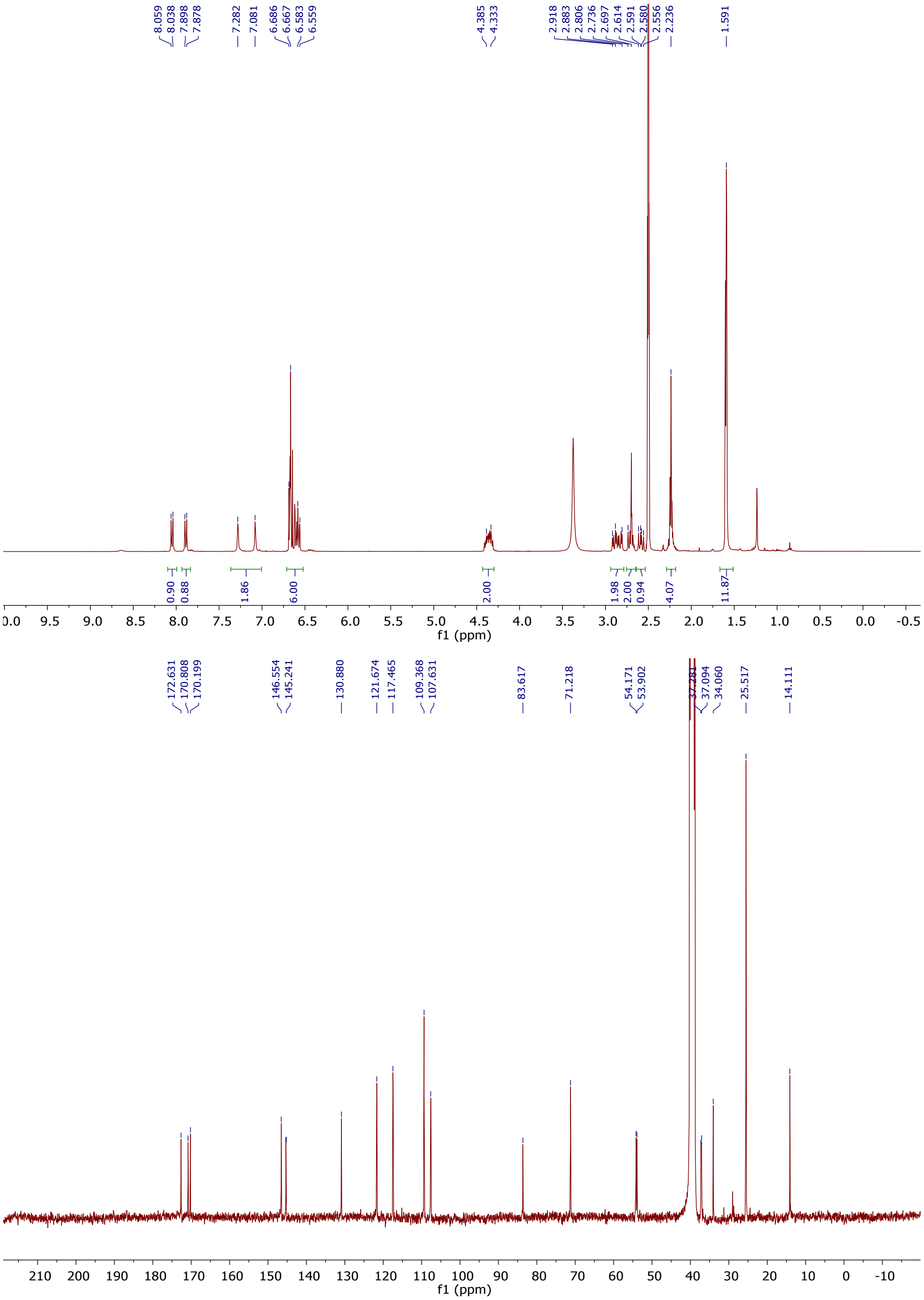

Figure S7. ^{1}H and ^{13}C NMR spectra of **3** in DMSO-d_6.

Surface	**Peptide**[a]	**%C**	**%N**	**%O**	**%Ti or Au**
Ti	**1’**	43.20	2.14	38.56	16.11
	4	49.67	3.79	33.35	13.20
	5	39.33	3.51	40.58	16.59
	6	44.39	6.66	35.92	13.04
	Ctrl	31.43	1.46	48.38	18.74
Au	**1’**	32.22	4.98	7.04	55.77
	4	38.23	7.54	6.86	47.39
	5	45.69	9.30	9.92	35.11
	6	33.66	5.78	6.74	53.83
	Ctrl	25.54	1.19	6.02	67.26
PLA	**1’**	78.40	0.75	20.86	-
	4	80.86	0.73	18.42	-
	5	80.19	0.55	19.27	-
	6	80.62	0.87	18.52	-
	Ctrl	77.34	0.27	22.4	-

Table S1. Atomic percentages (%) of C 1s, N 1s, O 1s, Ti 2p and Au 4f, measured by X-ray photoelectron spectroscopy (XPS), on the functionalized surfaces. [a]Ctrl refers to the surface without peptide functionalization.

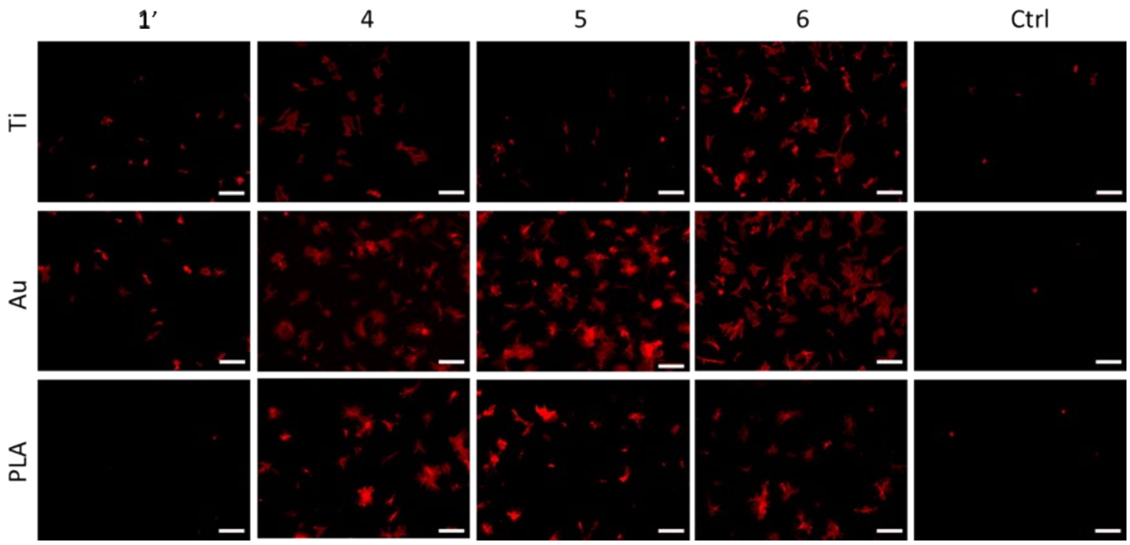

Figure S8. F-actin immunostaining (scale bar = 200 µm) of human MSCs on the different functionalized surfaces (Ti, Au and PLA) with the different peptide platforms **1’** and **4** – **6**.

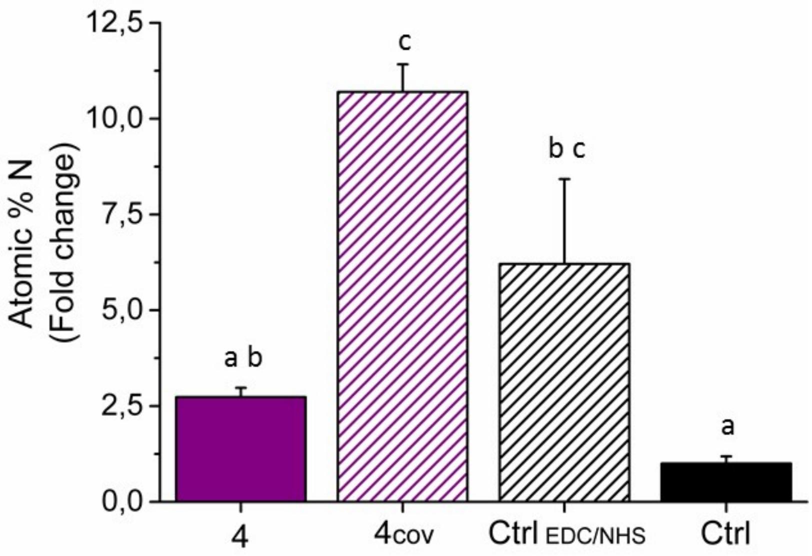

Figure S9. Atomic percentages (%) of N 1s, measured by X-ray photoelectron spectroscopy (XPS), on the functionalized surfaces. ***Ctrl***: Untreated PLA control; ***4***: PLA + **4** through electrostatic interactions; ***4cov***: PLA + **4** through covalent bond; ***Ctrl EDC/NHS***: PLA treated with EDC/NHS. Different letters denote statistically significant differences between samples.

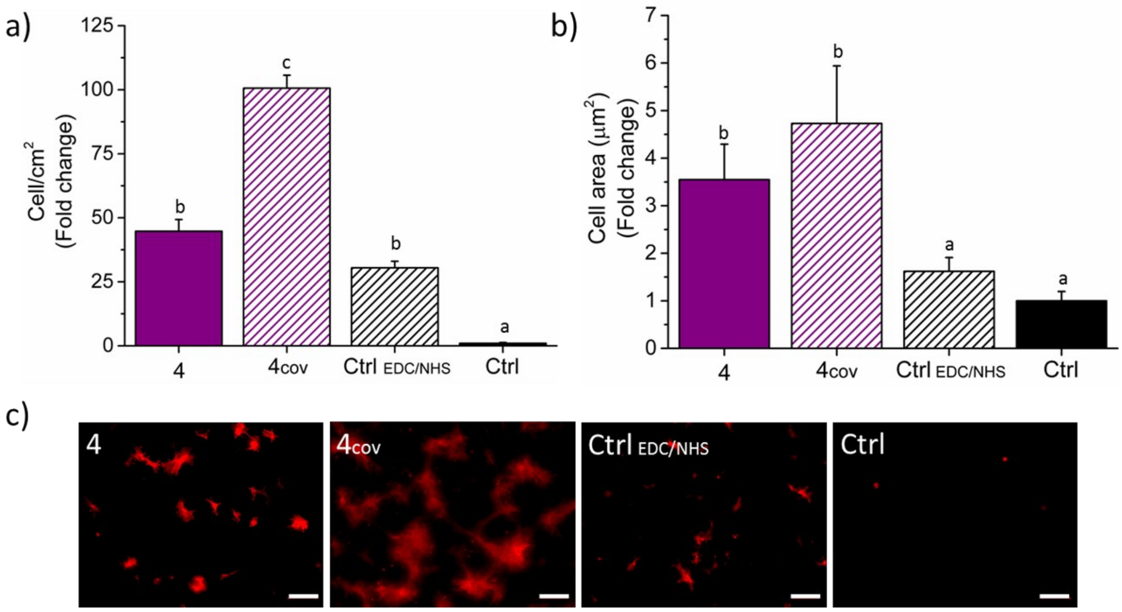

Figure S10. Human MSCs biological characterization of functionalized PLA surface. A) Quantification of cell number relative to PLA control (Ctrl) and B) projected cell area compared to PLA control (Ctrl) after incubating the cells 6 h in serum-free medium. C) F-actin immunostaining of the different conditions (scale bar = 200 µm). ***Ctrl***: Untreated PLA control; ***4***: PLA + **4** through electrostatic interactions; ***4cov***: PLA + **4** through covalent bond; ***Ctrl EDC/NHS***: PLA treated with EDC/NHS. Different letters denote statistically significant difference between samples.

Supplementary References

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