Supporting information

LC and MS – LC-MS was performed with an Ultimate 3000 Rapid Separation LC System (DAD-3000RS diode array detector) using an Acclaim RSLC 120 C18 column (2.2 μm, 120 Å, 3×50 mm, flow 1.2 mL/min) from Dionex (Sunnyvale, CA, USA), coupled with a LCQ Fleet Ion Trap mass spectrometer (Thermo Scientific, San Jose, CA, USA). Data recording and processing was performed with Xcalibur (version 2.2, Thermo Scientific). High resolution MS spectra, recorded on a LTQ OrbitrapXL Hybrid Ion Trap-Orbitrap mass spectrometer (Thermo Scientific), were provided by the analytical service of the Department of Chemistry and Biochemistry at the University of Bern (group PD. Dr. Stefan Schürch).
Preparative RP-HPLC was performed with a Waters Prep LC Controller System using a Dr. Maisch GmbH Reprospher column (C18-DE, 100×30 mm, particle size 5 μm, pore size 100 Å, flow rate 40 mL/min). Compounds were detected by UV absorption at 214 nm using a Waters 486 Tuneable Absorbance Detector. The following eluents were used for all RP-HPLC measurements: "A" (Milli-Q deionized H_2O with 0.1% TFA); "D" (Milli-Q deionized H_2O/HPLC-grade acetonitrile N (10:90) with 0.1% TFA).
NMR – NMR data were acquired at 37°C using a Bruker Avance II 500 MHz spectrometer equipped with a 1.7 mm inverse triple resonance TXI (^1H, ^{13}C, ^{31}P) z-gradient microprobehead. The ^1H δ scale was referenced to the residual water signal at 4.637 ppm (37°C).
Elemental analysis – Thermal elemental analysis was performed by the Schürch group, Department of Chemistry and Biochemistry, University of Bern.

Synthesis of 1 and 2
All synthesis were carried out under N_2 following standard Schlenk techniques. The dinuclear dithiolato complex $[(\eta^6\text{-}p\text{-cymene})_2Ru_2Cl_2(\mu_2\text{-S-CH}_2\text{-C}_6H_4\text{-}^t\text{Bu})_2]$ (0.177 mmol, 160 mg) for complex **1** or $[(\eta^6\text{-}p\text{-cymene})_2Ru_2Cl_2(\mu_2\text{-S-CH}_2\text{-CH}_2\text{-C}_6H_5)_2$ (0.177 mmol, 144.4 mg) for complex **2**, was dissolved under stirring in EtOH (40 ml), then a solution of 1,4-benzenedithiol (10 equiv., 250.6 mg) in 5 ml EtOH was added dropwise to the stirring mixture. The resulting solution was refluxed 16 h. After cooling to room temperature, the solvent was removed under reduced pressure and the residue was purified by flash chromatography (silica gel, CH_2Cl_2:EtOH 9:1). Complex **1** and complex **2** were isolated as orange to red air stable crystalline solids.

Peptide synthesis and thioether ligation reactions
ClAc-R8 and **ClAc-K8** were synthesized manually on batches of TentaGel S RAM resin according to the procedures described above. **ClAc-RGD** was synthesized from linear sequence GDfKR, which was assembled on 2-chlorotrityl resin, cyclized in solution and chloroacetylated on the lysine side-chain in solution.
^{ClAc}RRRRRRRR$_{NH_2}$ (ClAc-R8). From TentaGel S RAM resin (1 g, 0.23 mmol/g) **ClAc-R8** was obtained as a glassy crystalline solid after preparative RP-HPLC (158.7 mg, 70.4 μmol, 31%). Analytical RP-HPLC: t_R = 1.64 min (A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{50}H_{100}ClN_{33}O_9$ calc./obs. 671.91/672.14 $[M+2H]^{2+}$, 448.28/448.76 $[M+3H]^{3+}$.
^{ClAc}KKKKKKKK$_{NH_2}$ (ClAc-K8). From TentaGel S RAM resin (1 g, 0.23 mmol/g) **ClAc-K8** was obtained as a glassy crystalline solid after preparative RP-HPLC (110.8 mg, 54.6 μmol, 24%). Analytical RP-HPLC: t_R = 2.17 min (A/D 100:0 for 1 min, then A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{50}H_{100}ClN_{17}O_9$ calc./obs. 1118.77/1118.80 $[M+H]^+$, 559.89/560.22 $[M+2H]^{2+}$.
G^{1}DfK$_{(ClAc)}$R^1 (ClAc-RGD). To a solution of cyclic peptide G^{1}DfKR^1 (24.2 mg, 29.1 μmol) and chloroacetic anhydride (5.5 mg, 1.1 eq) in DMF (2.8 mL) DIPEA was added (20 μL) and the

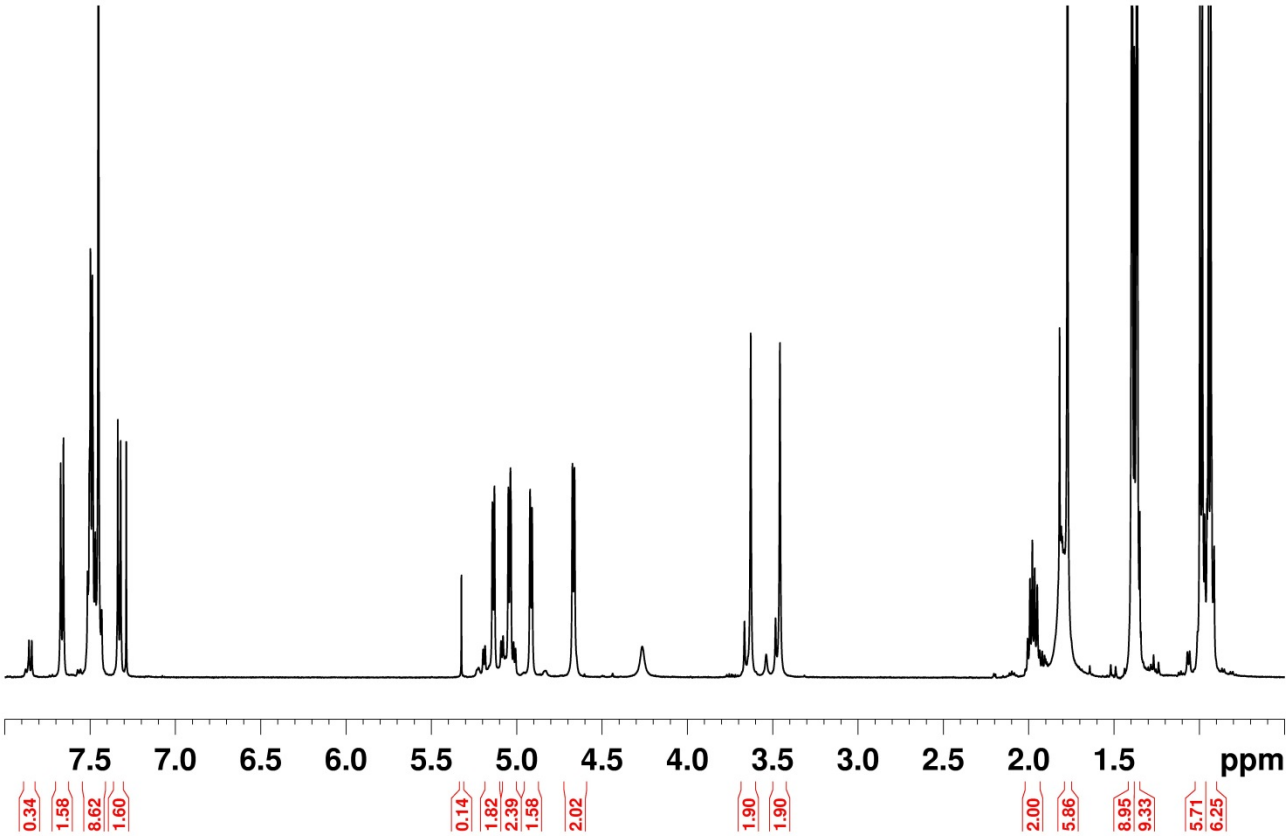
reaction was left stirring at r.t. for 10 h. The reaction was monitored by LC-MS and was stopped by evaporation of the solvent after complete disappearance of the starting material. **ClAc-RGD** was obtained as a foamy white solid after preparative RP-HPLC (15.0 mg, 18.9 µmol, 65%). Analytical RP-HPLC: t_R = 2.72 min (A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{29}H_{42}ClN_9O_8$ calc./obs. 680.29/680.49 $[M+H]^+$.

The six peptide conjugates were synthesized *via* a thioether ligation reaction between complex **1** or **2** with **ClAc-R8**, **ClAc-K8** or **ClAc-RGD**. In all six cases, thioether ligation reactions were performed in H_2O/ACN (1:1) mixtures (6 mM in **1** or **2**) in presence of a slight excess of N-chloroacetylated peptide (1.1 eq), potassium iodide (20 eq) and DIPEA (10 eq). The reactions were monitored by LC-MS and were stopped by flash-freezing and lyophilisation after disappearance of the starting material. Crudes were dissolved in H_2O/ACN (4:1) and purified by preparative RP-HPLC. Yields were calculated by considering the chloride salts of **1** and **2** as the starting material and the trifluoroacetate salts of the products.

Data for **1**:

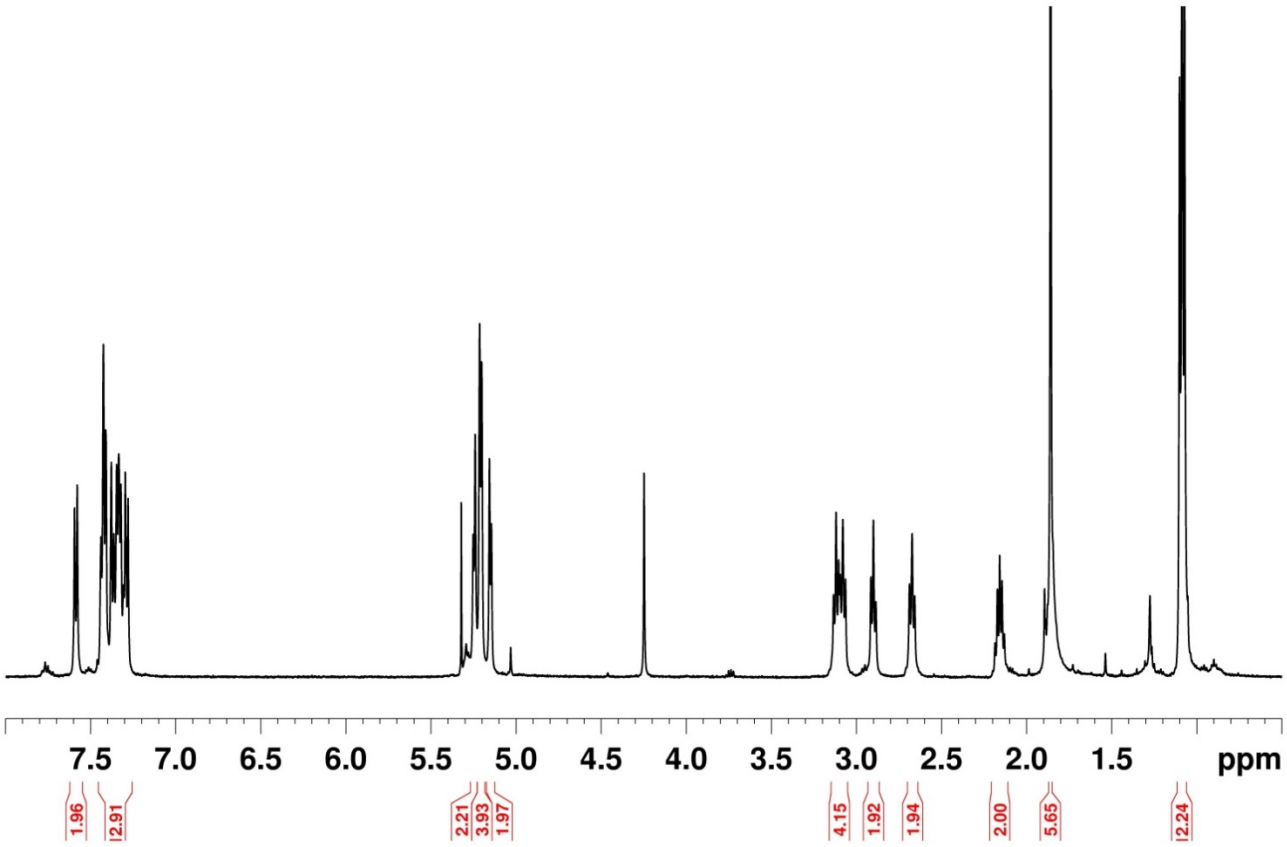
^{1}H-NMR, 500 MHz, $CDCl_3$: 0.94 (d, ^3J = 6.8 Hz, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 0.99 (d, ^3J = 6.8 Hz, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.36 (s, 9 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 1.39 (s, 9 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 1.77 (s, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.97 (m, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 3.45 (m, 2 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 3.63 (m, 2 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 4.67 (d, ^3J = 5.7 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 4.91 (d, ^3J = 5.7 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 5.04 (d, ^3J = 5.7 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 5.13 (d, ^3J = 5.7 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 7.32 (d, ^3J = 8.2 Hz, 2 H, S-C_6H_4-S); 7.47 (m, 8 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.66 ppm (d, ^3J = 8.2 Hz, 2 H, S-C_6H_4-S). ^{13}C-NMR, 500 MHz, $CDCl_3$: 17.1; 22.6; 22.9; 31.2; 39.2; 39.8; 82.2; 83.5; 83.6; 83.8; 107.0; 125.4; 125.5; 129.1; 132.9; 133.8; 136.3; 151.3; 152.6 ppm.

$C_{48}H_{63}Ru_2S_4Cl \cdot ¼\ CH_2Cl_2$, yield 90%,: calcd. C 56.40, H 6.20, S 12.50; found C 56.28, H 5.96, S 11.93.



^{1}H NMR spectrum of the starting complex **1** dissolved in $CDCl_3$.

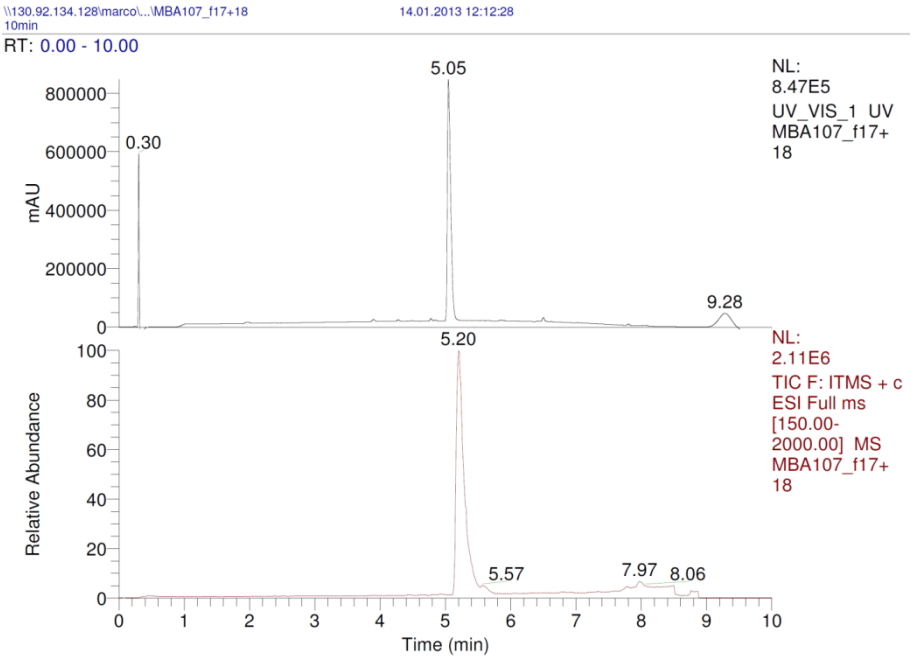
Data for **2**:
^{1}H-NMR, 500 MHz, $CDCl_3$: 1.08 (m, 12 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.85 (s, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 2.15 (m, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 2.67 (m, 2 H, S-$CH_2CH_2C_6H_5$); 2.90 (m, 2 H, S-$CH_2CH_2C_6H_5$); 3.09 (m, 4 H, S-$CH_2CH_2C_6H_5$); 5.15 (d, ^{3}J = 5.7 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 5.21 (d, ^{3}J = 5.7 Hz, 4 H, $(CH_3)_2CH$-C_6H_4-CH_3); 5.25 (d, ^{3}J = 5.7 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 7.28 (d, ^{3}J = 8.2 Hz, 2 H, S-C_6H_4-S); 7.38 (m, 10 H, S-$CH_2CH_2C_6H_5$); 7.58 ppm (d, ^{3}J = 8.2 Hz, 2 H, S-C_6H_4-S). ^{13}C-NMR, 500 MHz, $CDCl_3$: 17.8; 22.5; 22.8; 30.8; 38.6; 38.8; 40.0; 41.1; 82.9; 83.6; 83.9; 107.6; 126.7; 128.3; 128.5; 128.7; 128.9; 132.8; 134.7; 139.6 ppm.
$C_{42}H_{51}Ru_2S_4Cl \cdot ½\ CH_2Cl_2$, yield 82%,: calcd. C 52.90, H 5.40, S 13.30; found C 52.78, H 5.21, S 12.95.

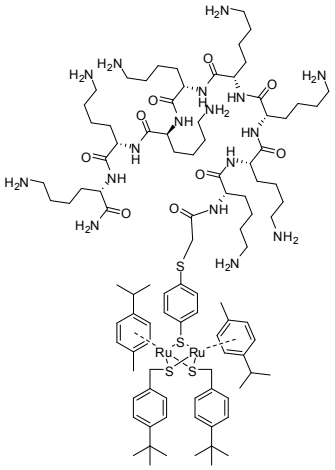


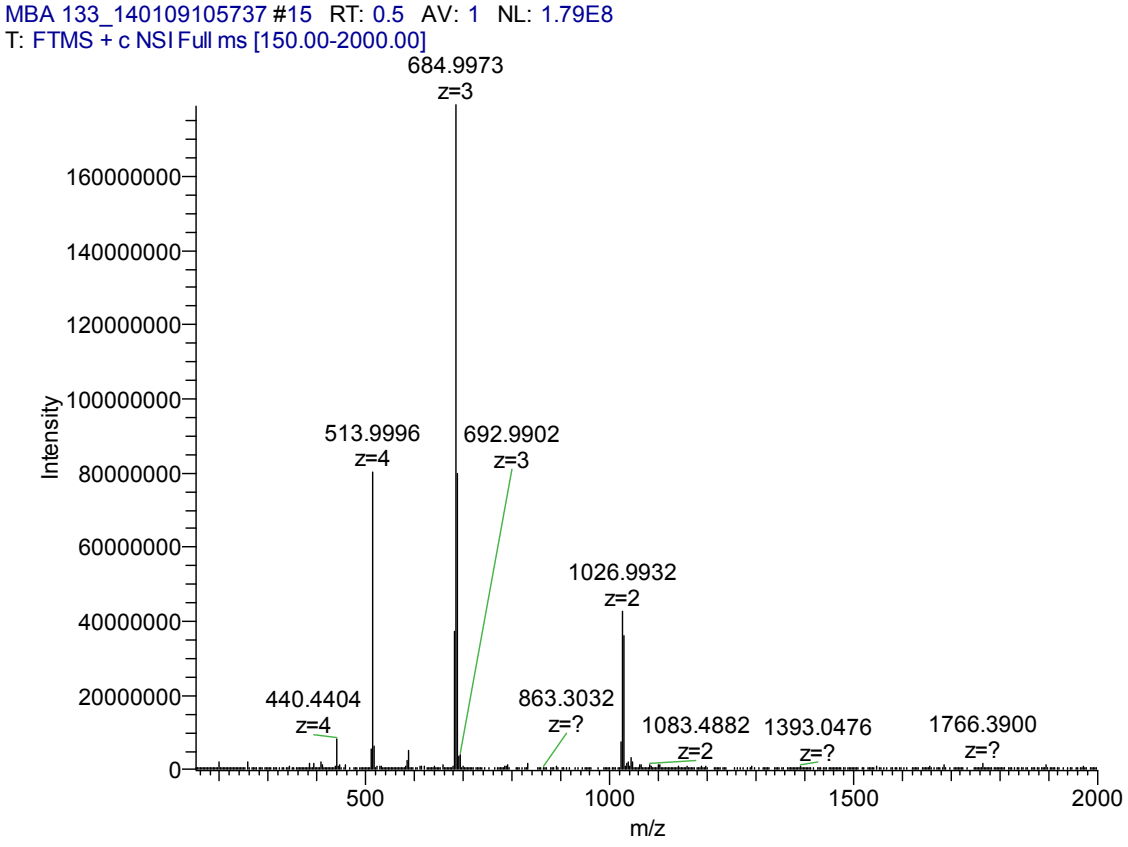
^{1}H NMR spectrum of the starting complex **2** dissolved in $CDCl_3$.

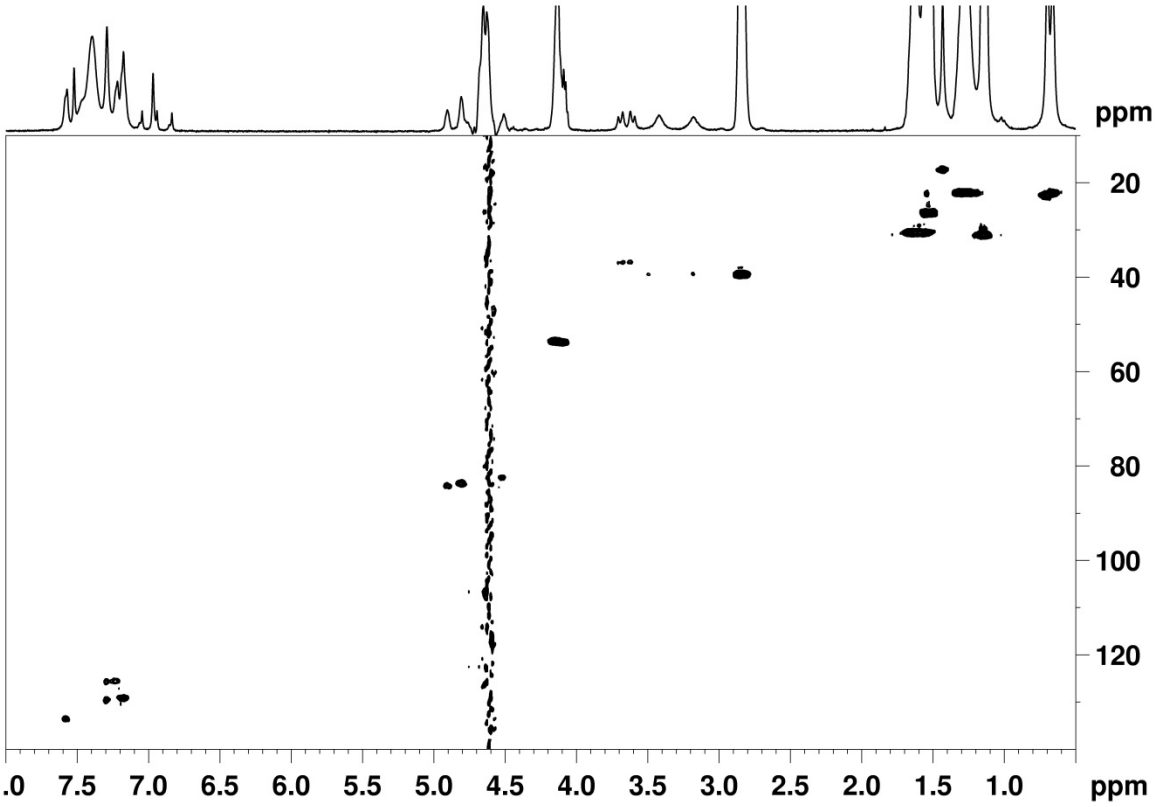
Data for **1-K8**
^{1}H-NMR, 500 MHz, H_2O/D_2O 9:1: 0.81 (d, ^{3}J = 17.9 Hz, 12 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.24 (s, 9 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 1.27 (s, 9 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 1.39 (m, 16 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 1.55 (s, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.65 (m, 16 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 1.75 (m, 16 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 1.80 (m, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 2.96 (m, 16 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 3.29 (m, 1 H, S-$CH_2$-CONHCH(CO) $CH_2CH_2CH_2CH_2NH_2$); 3.54 (m, 1 H, S-CH_2-CONHCH(CO)$CH_2CH_2CH_2CH_2NH_2$); 3.72 (d, ^{3}J = 15.6 Hz, 1 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 3.81 (d, ^{3}J = 15.6 Hz, 1 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 4.24 (m, 8 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 4.92 (m, 8 H, $(CH_3)_2CH$-C_6H_4-CH_3); 7.08 (m, 2 H, S-C_6H_4-S); 7.29 (m, 4 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.41 (m, 4 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.64 (m, 2 H, S-C_6H_4-S); 8.37 ppm (m, 8 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$). (^{13}C-NMR, 500 MHz, H_2O/D_2O 9:1): 17.1; 22.0; 22.3; 26.2; 30.0; 31.2; 36.3; 39.0; 39.2; 53.3; 81.9; 83.1; 84.3; 125.2; 126.2; 128.6; 133.0 ppm.
$C_{78}H_{136}N_{17}O_9Ru_2S_4Cl \cdot 8C_2HF_3O_2 \cdot 25H_2O$: calcd. C 39.70, H 6.50, N 6.90, S 3.70; found C 39.45, H 6.07, N 7.72, S 4.55.

1-K8. From **1** (18.0 mg, 17.9 µmol), **1-K8** was obtained as a foamy yellow solid after preparative RP-HPLC (18.2 mg, 5.9 µmol, 33%). Analytical RP-HPLC: t_R = 5.05 min (A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{98}H_{162}N_{17}O_9Ru_2S_4$ calc./obs. 1026.99/1026.99 $[M+H]^{2+}$.





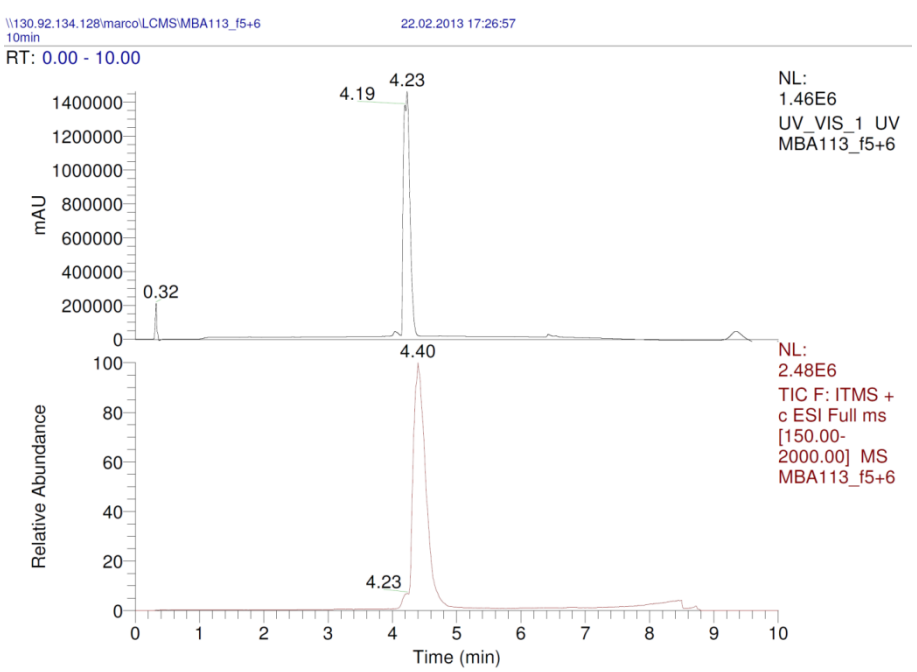


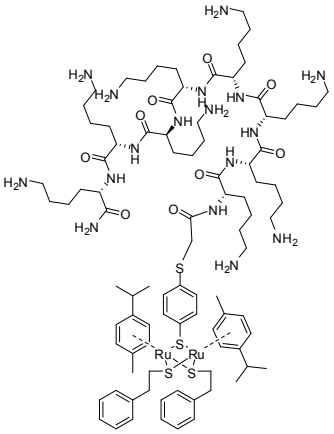


^{1}H-^{13}C HSQC NMR spectrum of the conjugate **1-K8** dissolved in 90% H_2O/10% D_2O.

Data for **2-K8**:
^{1}H-NMR, 500 MHz, H_2O/D_2O 9/1: 0.91 (m, 12 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.38 (m, 16 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 1.64 (m, 16 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 1.73 (m, 16 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 1.78 (s, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.98 (m, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 2.57 (m, 2 H, S-CH_2CH_2-C_6H_5); 2.86 (m, 2 H, S-CH_2CH_2-C_6H_5); 2.95 (m, 16 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 2.98 (m, 2 H, S-$CH_2CH_2$-$C_6H_5$); 3.05 (m, 2 H, S-$CH_2CH_2$-$C_6H_5$); 3.76 (m, 2 H, S-$CH_2$-$CONHCH(CO)CH_2CH_2CH_2CH_2NH_2$); 4.24 (m, 8 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$); 5.16 (m, 4 H, $(CH_3)_2CH$-C_6H_4-CH_3); 5.29 (m, 4 H, $(CH_3)_2CH$-C_6H_4-CH_3); 7.28 (m, 2 H, S-C_6H_4-S); 7.35 (m, 10 H, S-CH_2CH_2-C_6H_5), 7.64 (m, 2 H, S-C_6H_4-S); 8.35 ppm (m, 8 H, $H_2NCH_2CH_2CH_2CH_2CH(NH)CO$). ^{13}C-NMR, 500 MHz, H_2O/D_2O 9/1: 17.0; 21.6; 21.8; 26.4; 30.0; 30.5; 37.3; 37.8; 39.2; 39.5; 40.5; 53.8; 83.6; 83.8; 84.3; 107.2; 127.0; 129.0; 129.2; 132.8; 133.6; 134.7; 139.6 ppm.
$C_{92}H_{150}N_{17}O_9Ru_2S_4Cl \cdot 8C_2HF_3O_2 \cdot 10H_2O$: calcd. C 41.89, H 5.79, N 7.69, S 4.14; found C 41.46, H 5.12, N 7.21, S 3.66.

2-K8. From **2** (17.0 mg, 18.4 μmol), **2-K8** was obtained as a foamy yellow solid after preparative RP-HPLC (34.5 mg, 11.5 μmol, 64%). Analytical RP-HPLC: t_R = 4.23 min (A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{92}H_{150}N_{17}O_9Ru_2S_4$ calc./obs. 984.94/984.95 $[M+H]^{2+}$.





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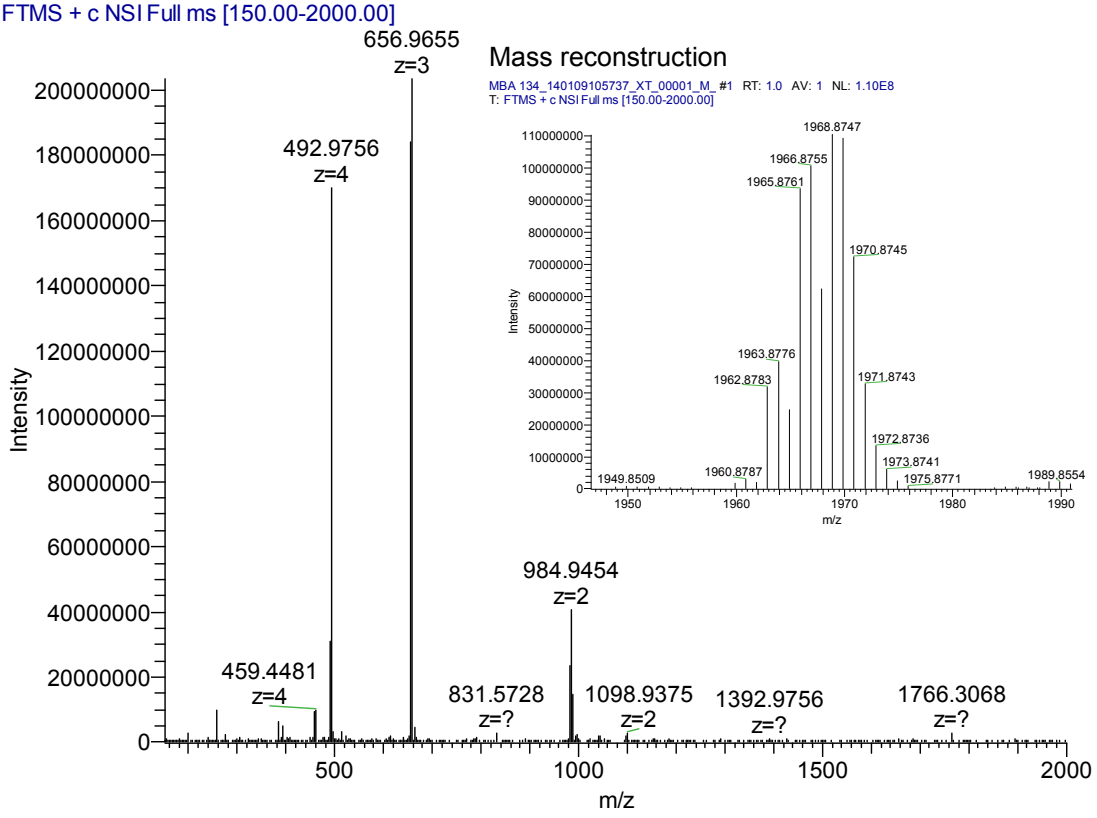
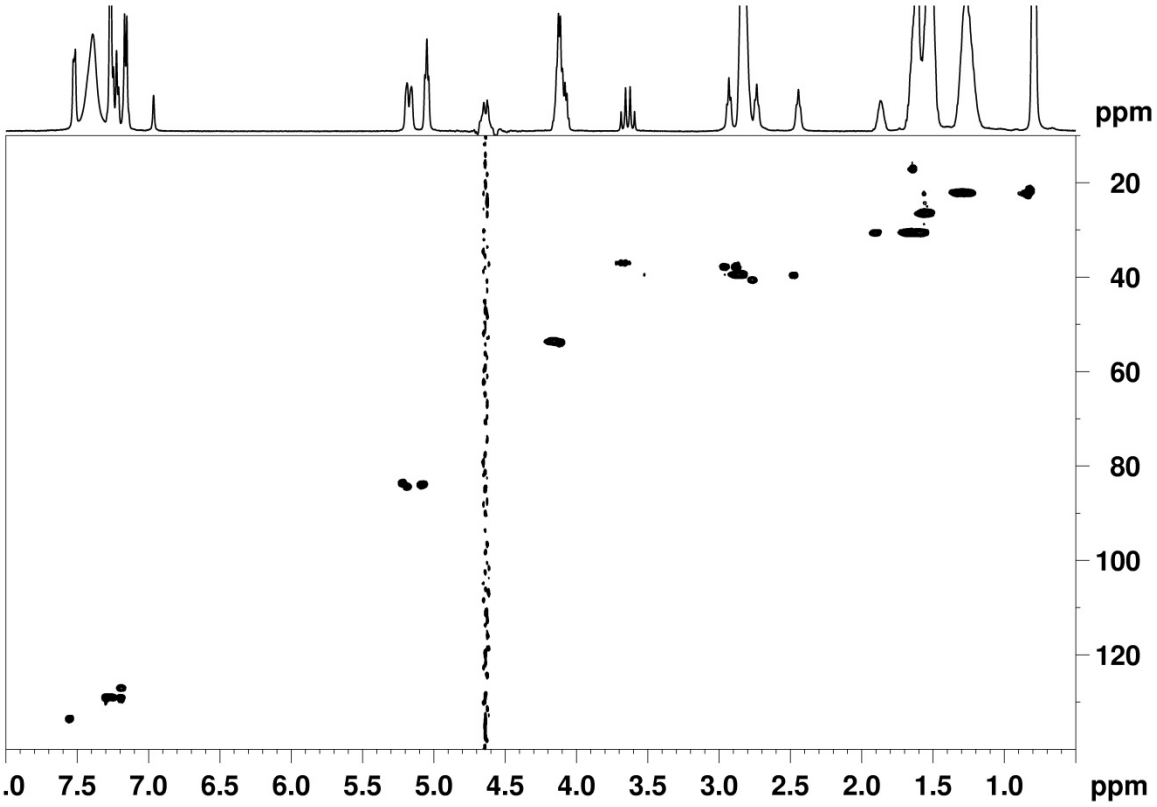
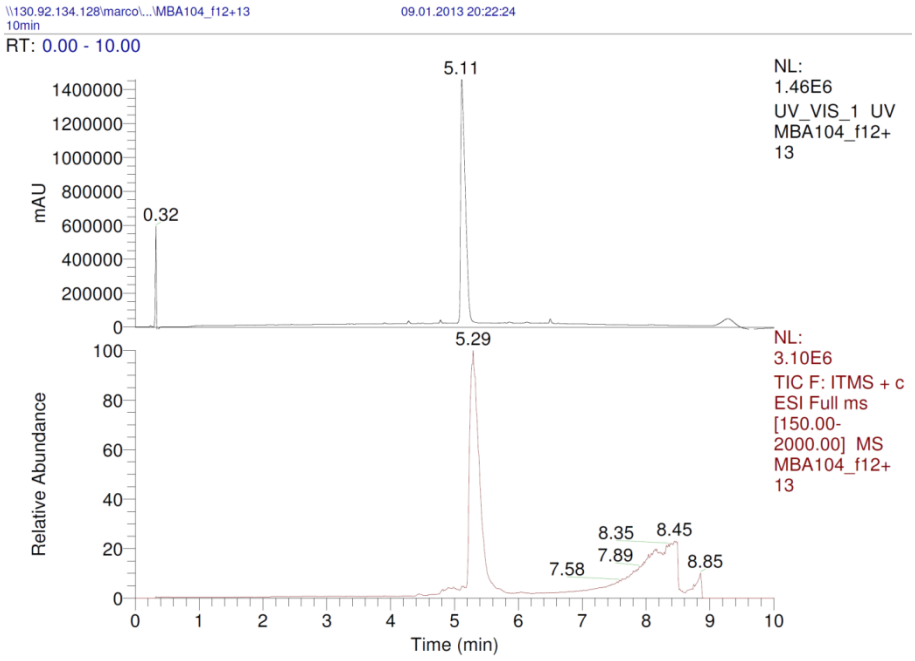


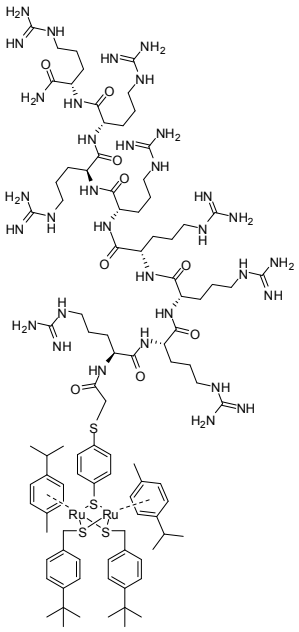


^{1}H-^{13}C HSQC NMR spectrum of the conjugate **2-K8** dissolved in 90% H_2O/10% D_2O.

Data for **1-R8**:
^{1}H-NMR, 500 MHz, H_2O/D_2O 9/1: 0.78 (m, 12 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.22 (s, 9 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 1.26 (s, 9 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 1.58 (m, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.65 (m, 32 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$); 1.80 (m, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 3.14 (m, 16 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$); 3.49 (m, 2 H, S-$CH_2$-$CONHCH(CO)CH_2CH_2CH_2NHCNHNH_2$); 3.76 (m, 2 H, S-$CH_2$-$C_6H_4$-$C(CH_3)_3$); 4.27 (m, 8 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$); 5.02 (m, 8 H, overlapped by water, $(CH_3)_2CH$-C_6H_4-CH_3); 7.10 (m, 2 H, S-C_6H_4-S); 7.29 (m, 4 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.39 (m, 4 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.69 (m, 2 H, S-C_6H_4-S); 8.41 ppm (m, 8 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$). ^{13}C-NMR, 500 MHz, H_2O/D_2O 9/1: 17.1; 22.0; 24.5; 28.3; 30.3; 30.8; 36.6; 40.0; 40.7; 53.0; 82.4; 83.1; 84.5; 107.2; 125.2; 128.4; 129.1; 133.2; 134.0; 136.6; 151.7; 152.9 ppm.
$C_{98}H_{162}N_{33}O_9Ru_2S_4Cl \cdot 8C_2HF_3O_2 \cdot 10H_2O$: calcd. C 40.22, H 5.62, N 13.50, S 3.77; found C 39.82, H 5.23, N 13.15, S 3.21.

1-R8. From **1** (18.0 mg, 17.9 μmol), **1-R8** was obtained as a foamy yellow solid after preparative RP-HPLC (20.2 mg, 6.1 μmol, 34%). Analytical RP-HPLC: t_R = 5.11 min (A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{98}H_{162}N_{33}O_9Ru_2S_4$ calc./obs. 759.68/759.68 $[M+2H]^{3+}$.





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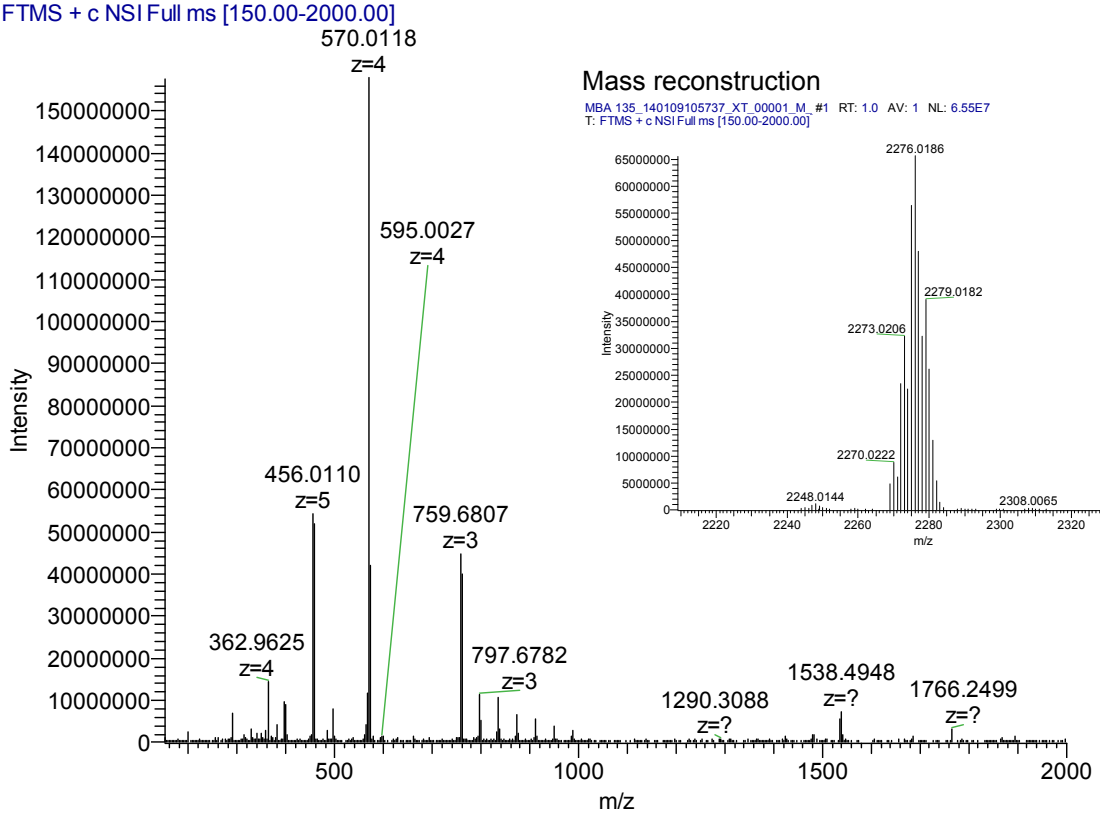
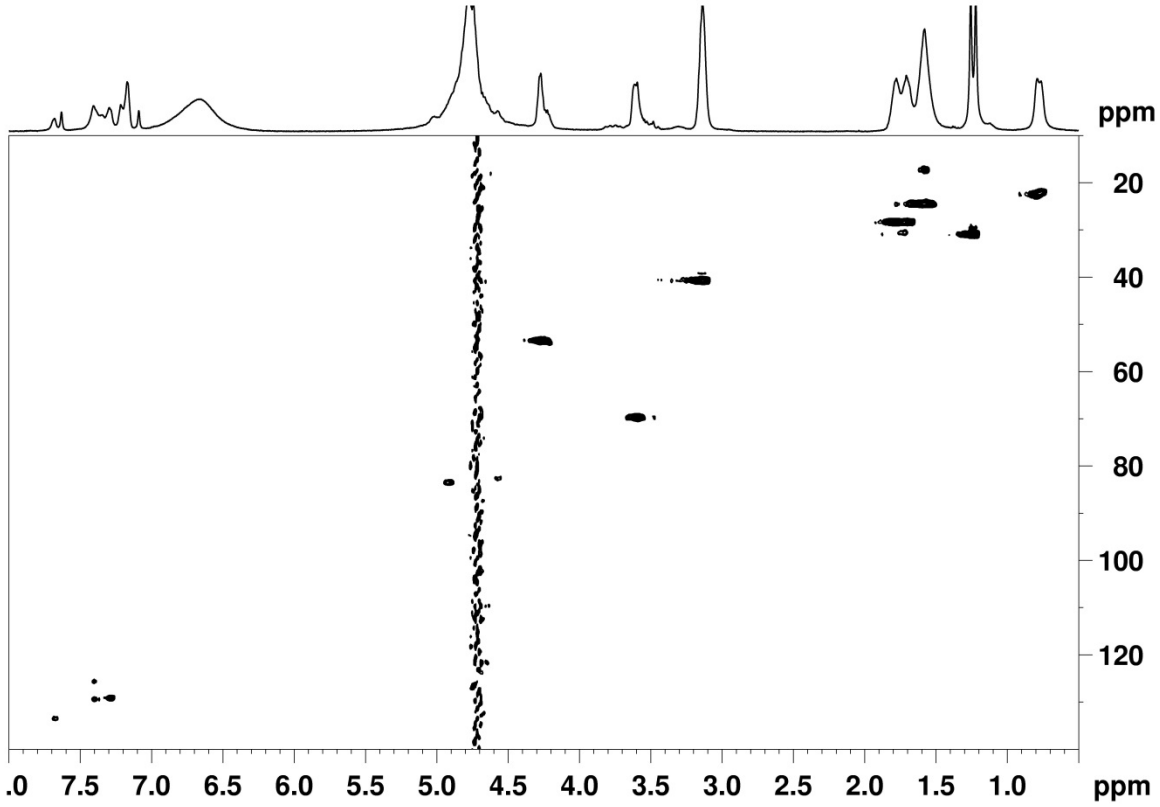


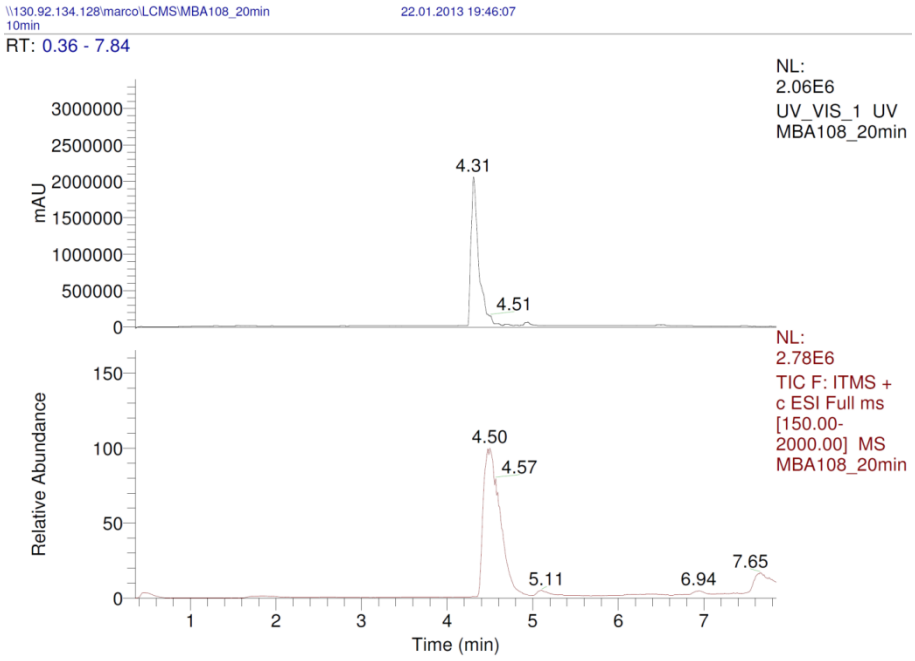
Mass reconstruction

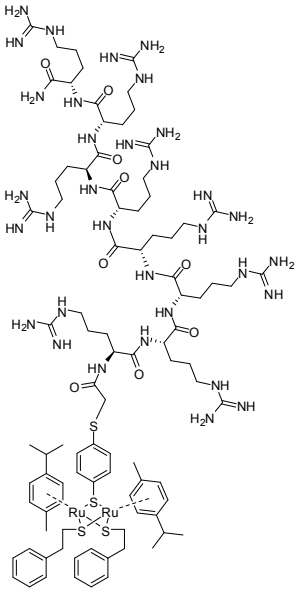


^{1}H-^{13}C HSQC NMR spectrum of the conjugate **1-R8** dissolved in 90% H_2O/10% D_2O.

Data for **2-R8**:
^{1}H-NMR, 500 MHz, H_2O/D_2O 9/1: 0.90 (m, 12 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.59 (m, 16 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$); 1.71 (m, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.75 (m, 16 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$); 1.98 (m, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 2.56 (m, 2 H, S-CH_2CH_2-C_6H_5); 2.85 (m, 2 H, S-CH_2CH_2-C_6H_5); 2.96 (m, 2 H, S-CH_2CH_2-C_6H_5); 3.05 (m, 2 H, S-CH_2CH_2-C_6H_5); 3.15 (m, 16 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$); 3.76 (m, 2 H, S-$CH_2$-$CONHCH(CO)CH_2CH_2CH_2NHCNHNH_2$); 4.28 (m, 8 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$); 5.14 (m, 8 H, partially overlapped by water, $(CH_3)_2CH$-C_6H_4-CH_3); 7.16 (m, 2 H, S-C_6H_4-S); 7.33 (m, 10 H, S-CH_2CH_2-C_6H_5); 7.63 (m, 2 H, S-C_6H_4-S); 8.40 ppm (m, 8 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$). ^{13}C-NMR, 500 MHz, H_2O/D_2O 9/1: 17.1; 22.1; 24.3; 28.5; 30.6; 36.8; 37.8; 38.0; 40.8; 40.9; 53.3; 54.0; 69.6; 83.7; 83.9; 84.4; 107.2; 126.9; 128.9; 129.1; 129.3; 132.8; 133.5; 134.7; 139.6 ppm.
$C_{92}H_{150}N_{33}O_9Ru_2S_4Cl \cdot 8C_2HF_3O_2 \cdot 10H_2O$: calcd. C 39.06, H 5.40, N 13.90, S 3.86; found C 39.50, H 4.98, N 13.50, S 3.47.

2-R8. From **2** (16.5 mg, 17.9 μmol), **2-R8** was obtained as a foamy yellow solid after preparative RP-HPLC (40.1 mg, 12.5 μmol, 69%). Analytical RP-HPLC: t_R = 4.31 min (A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{92}H_{150}N_{33}O_9Ru_2S_4$ calc./obs. 731.65/731.65 $[M+2H]^{3+}$.





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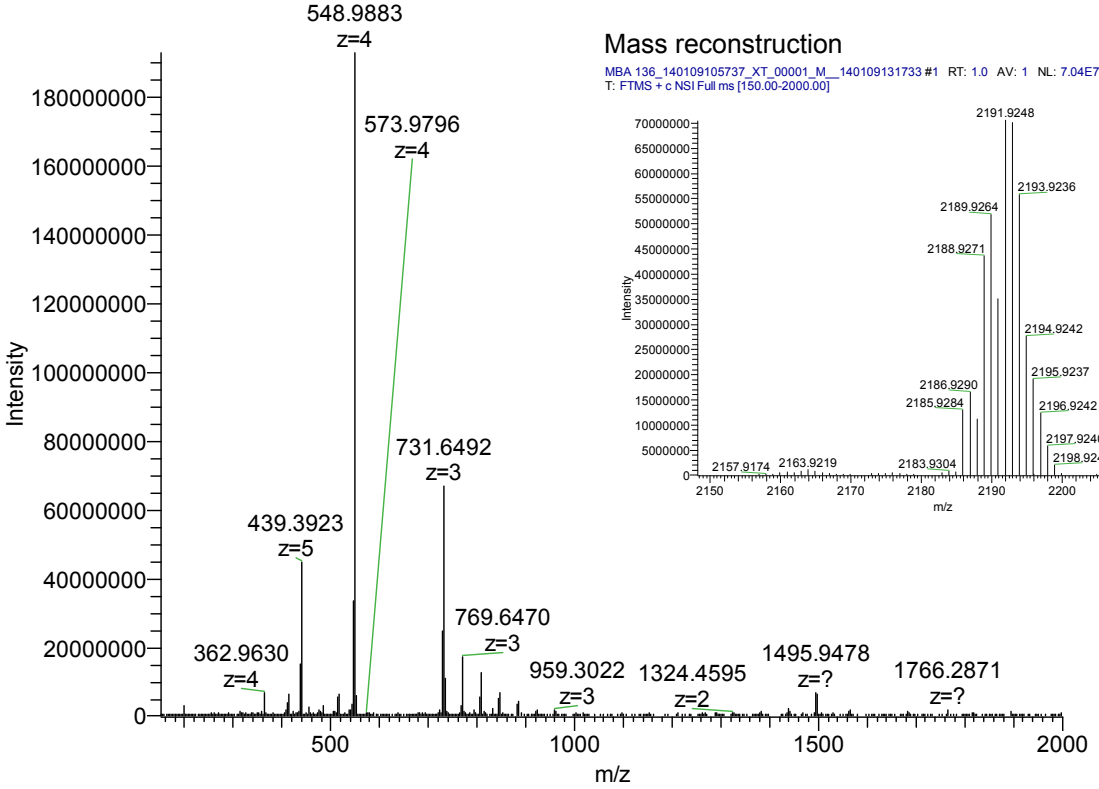
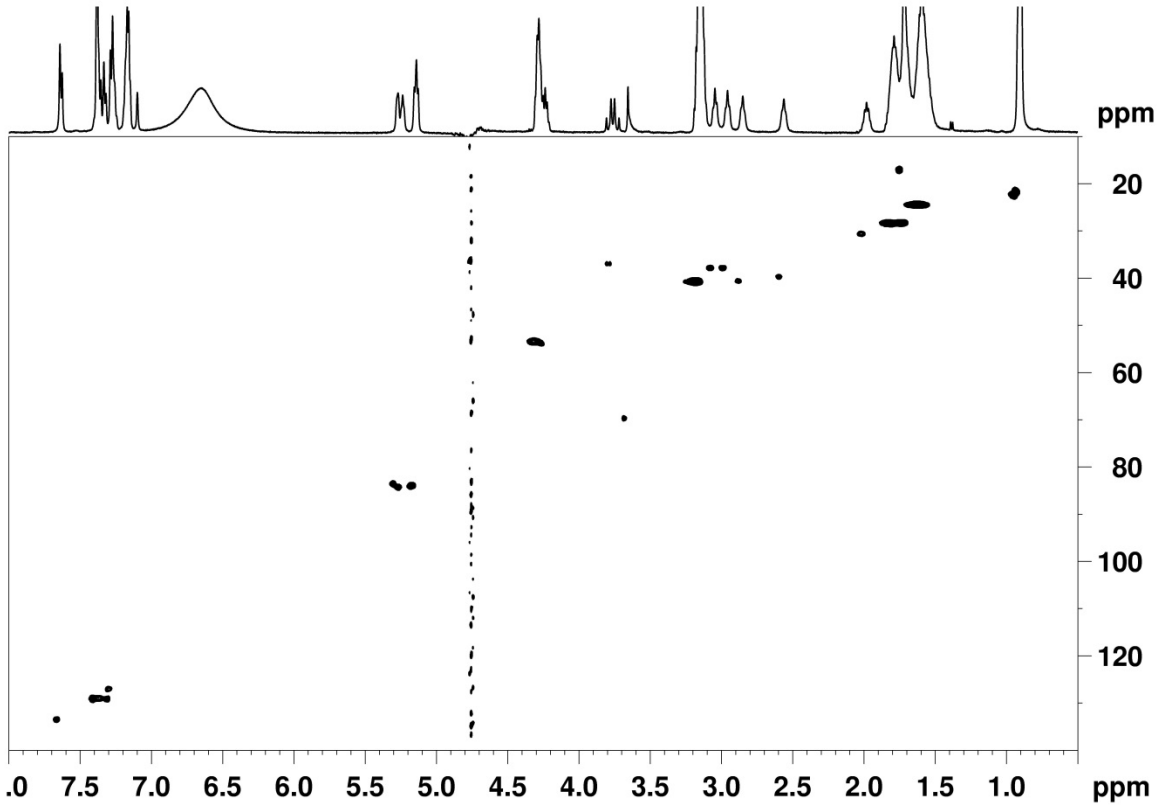


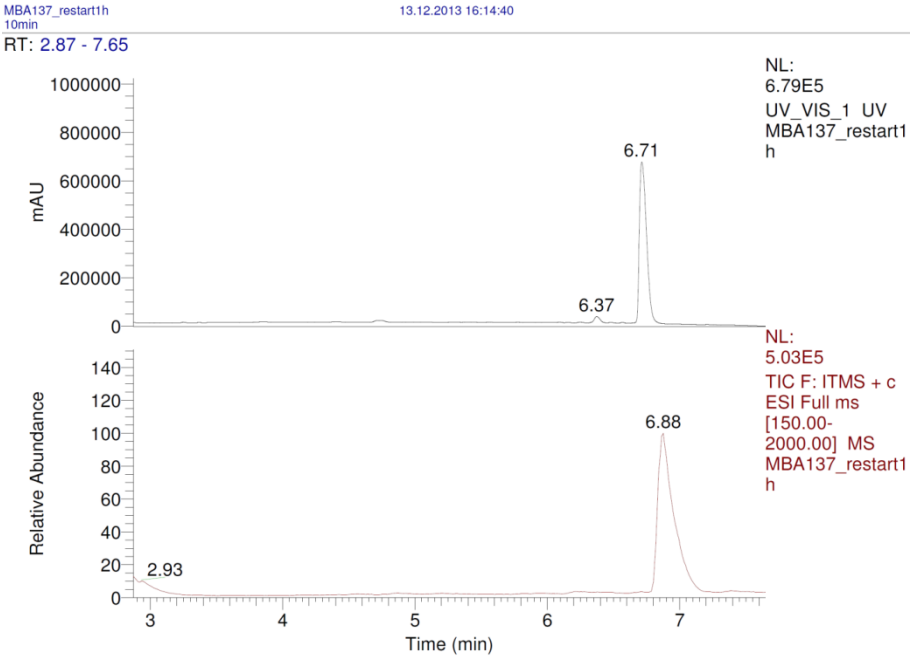
Mass reconstruction

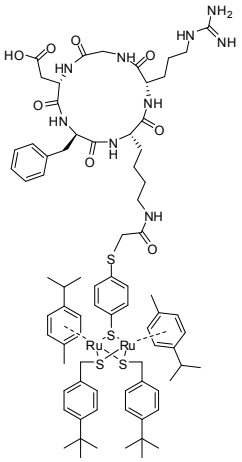


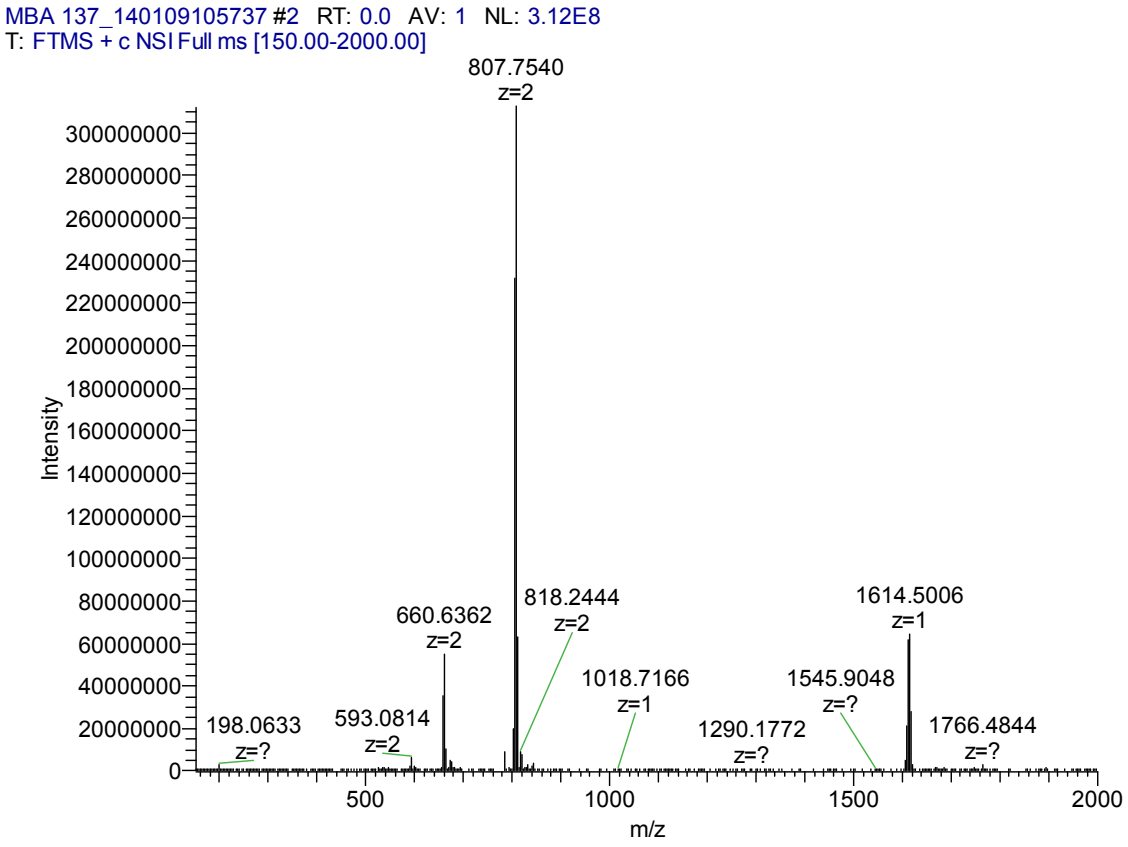
^{1}H-^{13}C HSQC NMR spectrum of the conjugate **2-R8** dissolved in 90% H_2O/10% D_2O.

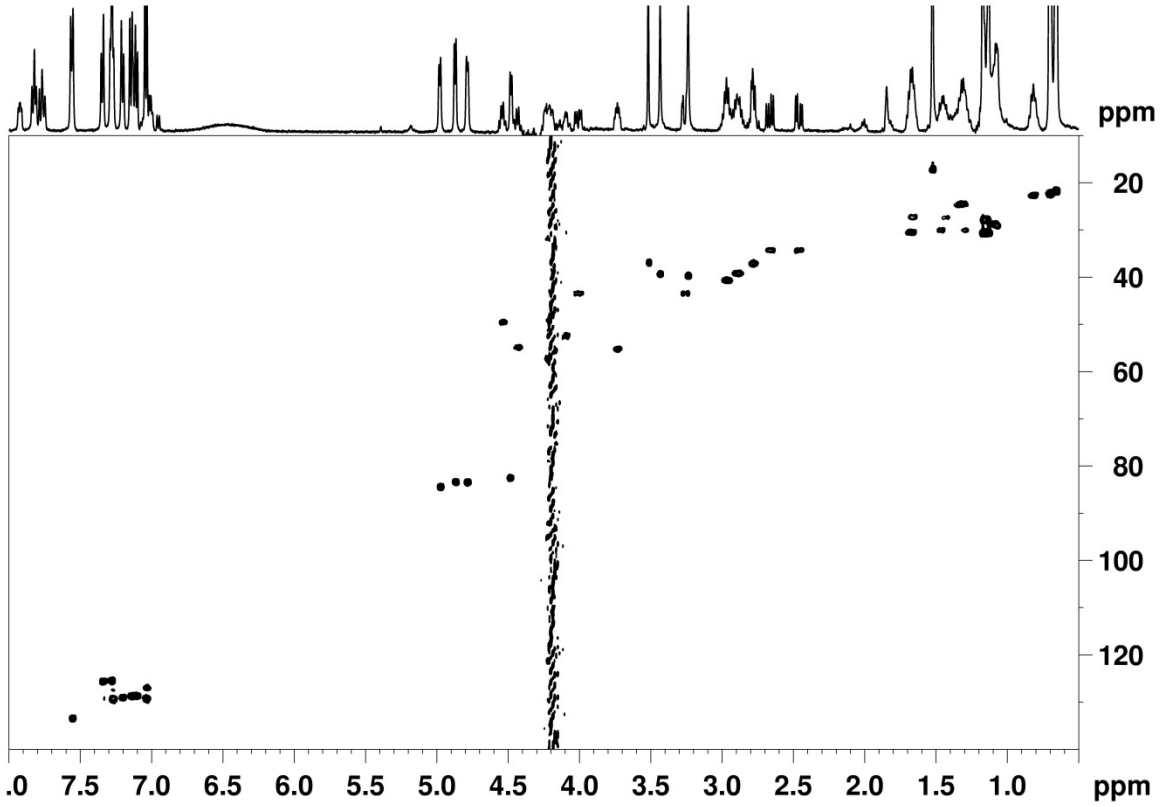
Data for **1-RGD**:
^{1}H-NMR, 500 MHz, H_2O/D_2O 9/1 + 45% CD_3CN: 0.77 (d, ^{3}J = 6.7 Hz, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 0.82 (d, ^{3}J = 6.7 Hz, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.25 (s, 9 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 1.29 (s, 9 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 1.42 (m, 4 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$- [Arg]); 1.43 (m, 2 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 1.57 (m, 2 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 1.64 (s, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.77 (m, 2 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 1.79 (m, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 2.58 (m, 1 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 2.78 (m, 1 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 2.90 (m, 2 H, $C_6H_5CH_2CH(NH)CO$- [Phe]); 2.99 (m, 2 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 3.01 (m, 2 H, -$HNCH(CH_2COOH)CONH$- [Asp]); 3.11 (m, 1 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$- [Arg]); 3.39 (m, 1 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 3.55 (m, 2 H, S-CH_2-$CONHCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 3.63 (s, 2 H, -$CONHCH_2CONH$- [Gly]); 4.12 (m, 1 H, -$HNCH(CH_2COOH)CONH$- [Asp]); 4.33 (m, 1 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 4.54 (m, 1 H, $C_6H_5CH_2CH(NH)CO$- [Phe]); 4.59 (d, ^{3}J = 5.9 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 4.65 (m, 1 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 4.91 (d, ^{3}J = 5.9 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 4.99 (d, ^{3}J = 5.9 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 5.09 (d, ^{3}J = 5.9 Hz, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 7.15 (d, ^{3}J = 7.7 Hz, 2 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.22 (d, ^{3}J = 7.7 Hz, 2 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.26 (d, ^{3}J = 8.7 Hz, 2 H, S-C_6H_4-S); 7.32 (d, ^{3}J = 7.7 Hz, 2 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.39 (m, 5 H, $C_6H_5CH_2CH(NH)CO$- [Phe]); 7.46 (d, ^{3}J = 7.7 Hz, 2 H, S-CH_2-C_6H_4-$C(CH_3)_3$); 7.67 ppm (d, ^{3}J = 8.7 Hz, 2 H, S-C_6H_4-S).
^{13}C-NMR, 500 MHz, H_2O/D_2O 9/1 + 45% CD_3CN : 17.1; 21.8; 22.3; 22.7; 24.5; 27.2; 27.5; 27.8; 28.8; 30.0; 30.5; 30.8; 34.5; 37.1; 39.3; 39.9; 40.7; 43.5; 49.4; 52.5; 54.9; 55.2; 82.6; 83.6; 84.5; 107.1; 125.6; 127.0; 128.6; 129.1; 129.2; 129.3; 133.4; 134.0; 136.6; 151.7; 152.9 ppm.
$C_{77}H_{104}N_9O_8Ru_2S_4Cl \cdot C_2HF_3O_2 \cdot 7H_2O$: C 50.20, H 6.35, N 6.60, S 6.71; found C 50.15, H 5.96, N 6.12, S 6.31.

1-RGD. From **1** (9.0 mg, 8.9 µmol), **1-RGD** was obtained as a foamy orange solid after preparative RP-HPLC (11.3 mg, 6.1 µmol, 69%). Analytical RP-HPLC: t_R = 6.71 min (A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{77}H_{104}N_9O_8Ru_2S_4$ calc./obs. 1614.50/1614.50 $[M]^+$.





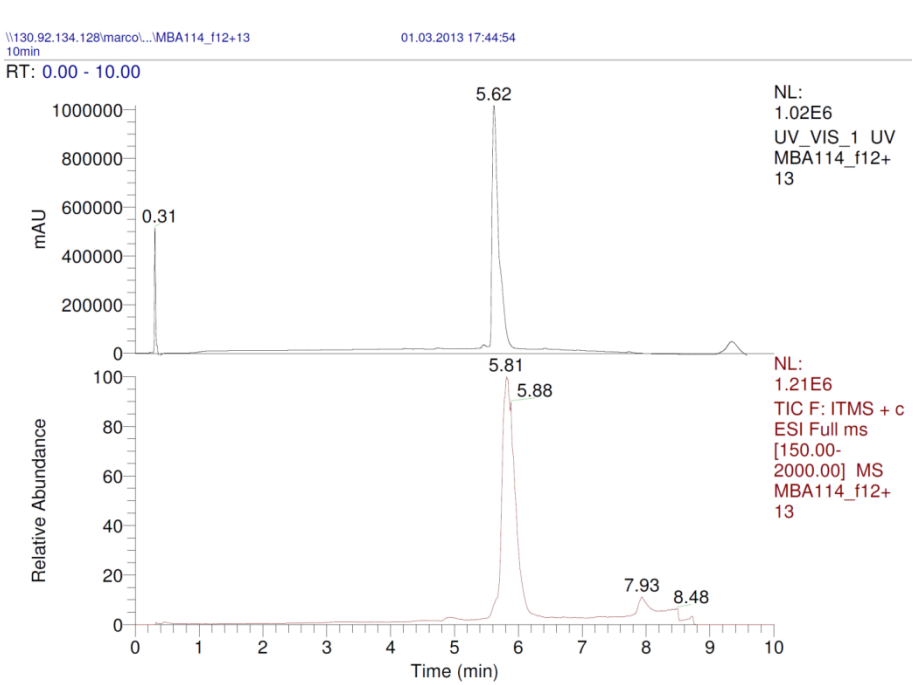


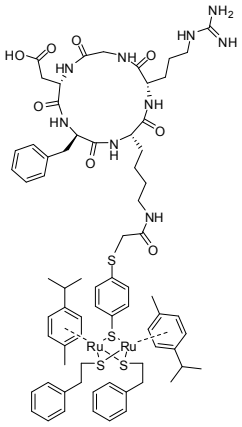


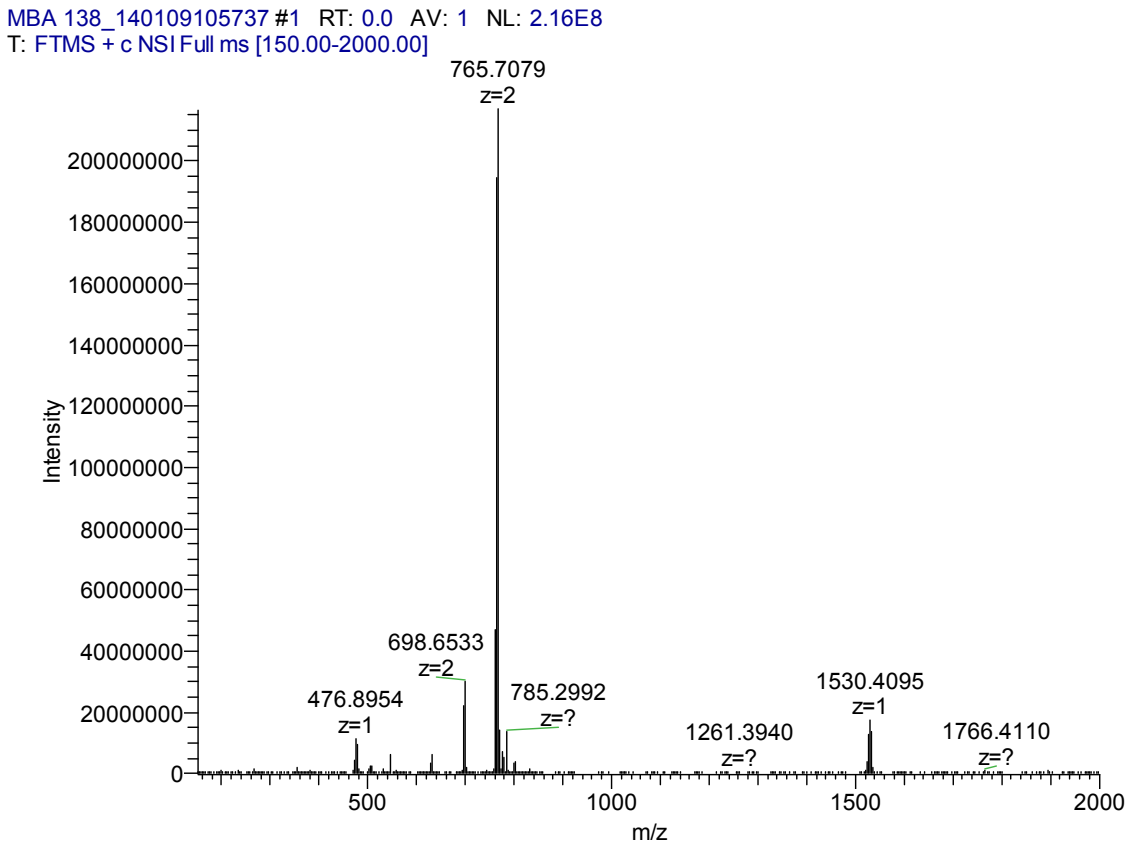
^{1}H-^{13}C HSQC NMR spectrum of the conjugate **1-RGD** dissolved in 90% H_2O/10% D_2O.

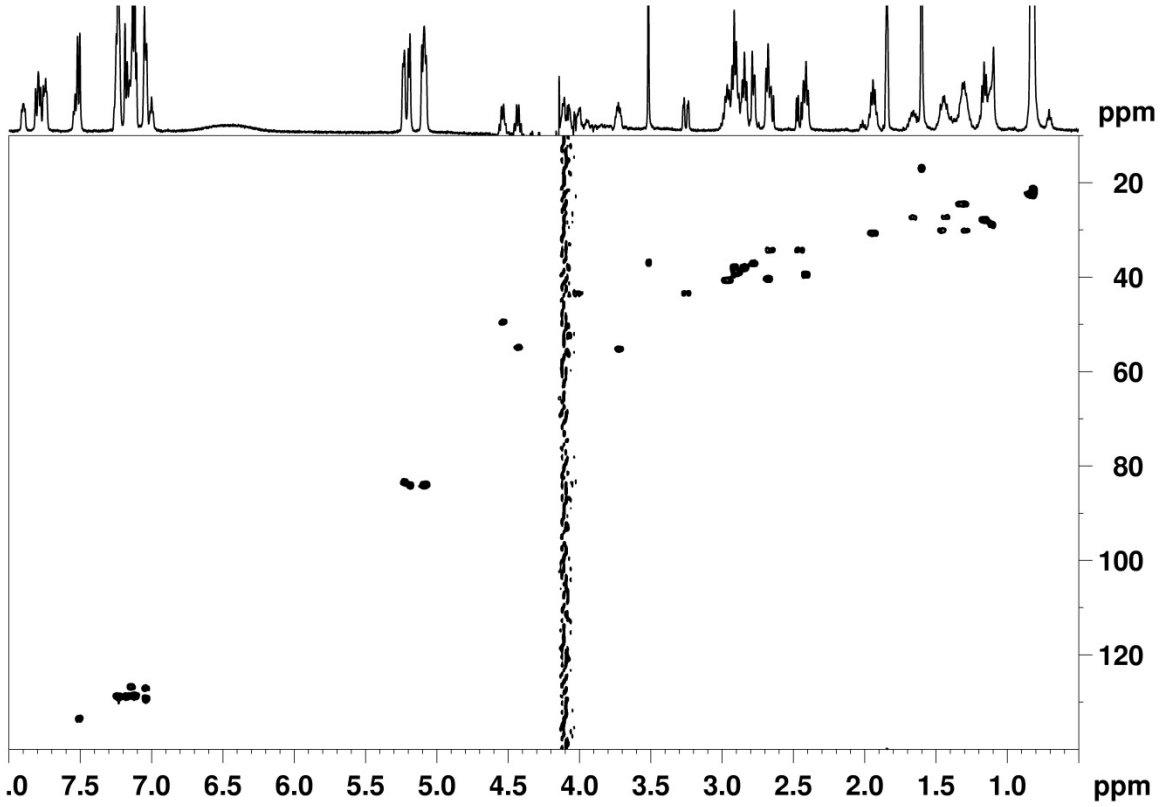
Data for **2-RGD**:
^{1}H-NMR, 500 MHz, H_2O/D_2O 9/1 + 45% CD_3CN: 0.94 (m, 12 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.26 (m, 4 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$- [Arg]); 1.43 (m, 2 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 1.56 (m, 2 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 1.73 (s, 6 H, $(CH_3)_2CH$-C_6H_4-CH_3); 1.96 (m, 2 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 2.06 (m, 2 H, $(CH_3)_2CH$-C_6H_4-CH_3); 2.52 (m, 2 H, S-CH_2CH_2-C_6H_5); 2.80 (m, 2 H, S-CH_2CH_2-C_6H_5); 2.90 (m, 2 H, $C_6H_5CH_2CH(NH)CO$- [Phe]); 2.96 (m, 2 H, S-CH_2CH_2-C_6H_5); 3.02 (m, 2 H, S-CH_2CH_2-C_6H_5); 2.99 (m, 2 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 3.01 (m, 2 H, -$HNCH(CH_2COOH)CONH$- [Asp]); 3.11 (m, 1 H, $H_2N(NH)NHCH_2CH_2CH_2CH(NH)CO$- [Arg]); 3.37 (m, 1 H, -$HNCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 3.64 (s, 2 H, -$CONHCH_2CONH$- [Gly]); 3.83 (m, 2 H, S-CH_2-$CONHCH_2CH_2CH_2CH_2CH(NH)CO$- [Lys]); 4.14 (m, 1 H, -$HNCH(CH_2COOH)CONH$- [Asp]); 4.23 (m, 1 H, $C_6H_5CH_2CH(NH)CO$- [Phe]); 5.20 (m, 4 H, $(CH_3)_2CH$-C_6H_4-CH_3); 5.33 (m, 4 H, $(CH_3)_2CH$-C_6H_4-CH_3); 7.16 (m, 2 H, S-C_6H_4-S); 7.26 (m, 10 H, S-CH_2CH_2-C_6H_5), 7.35 (m, 5 H, $C_6H_5CH_2CH(NH)CO$- [Phe]); 7.63 ppm (m, 2 H, S-C_6H_4-S).
^{13}C-NMR, 500 MHz, H_2O/D_2O 9:1 + 45% CD_3CN : 16.9; 21.2; 22.3; 24.5; 27.2; 27.9; 28.7; 30.1; 30.6; 34.2; 36.9; 37.2; 37.8; 39.0; 39.5; 40.3; 40.7; 43.4; 49.6; 52.2; 55.0; 55.5; 83.3; 84.0; 84.2; 107.2; 126.7; 127.0; 128.5; 128.9; 129.2; 132.8; 133.5; 134.7; 139.6 ppm.
$C_{71}H_{92}N_9O_8Ru_2S_4Cl \cdot C_2HF_3O_2 \cdot 7H_2O$: calcd. C 48.56, H 5.90, N 6.90, S 7.10; found C 48.63, H 6.62, N 6.58, S 6.91.

2-RGD. From **2** (8.0 mg, 8.7 µmol), **2-RGD** was obtained as a foamy orange solid after preparative RP-HPLC (15.3 mg, 8.7 µmol, 99%). Analytical RP-HPLC: t_R = 5.62 min (A/D 100:0 to 0:100 in 7.5 min, λ = 214 nm). MS (ESI+): $C_{71}H_{92}N_9O_8Ru_2S_4$ calc./obs. 1530.40/1530.41 $[M]^+$.



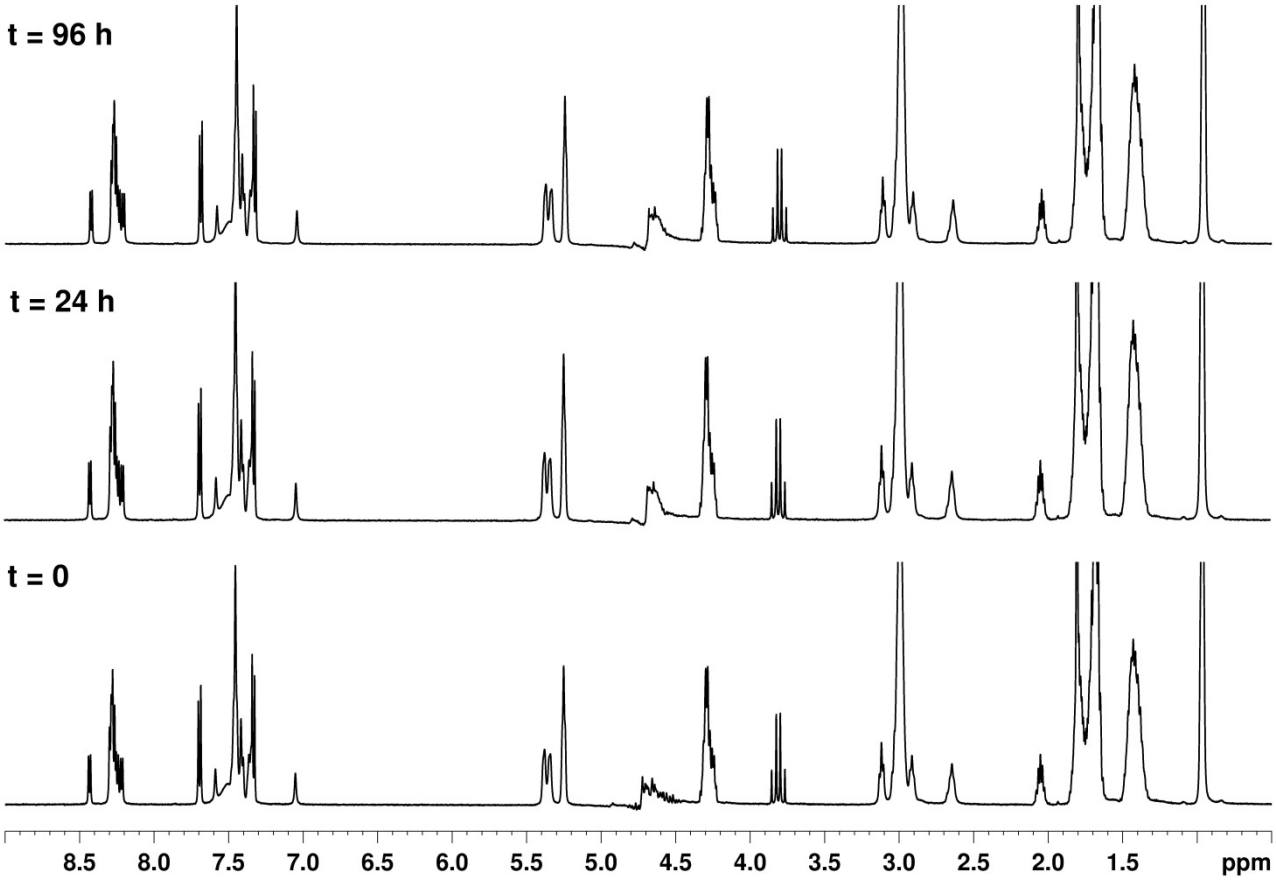






^{1}H-^{13}C HSQC NMR spectrum of the conjugate **2-RGD** dissolved in 90% H_2O/10% D_2O.

Cell Culture and Inhibition of Cell Growth – Human A2780 and A2780cisR ovarian carcinoma cells were obtained from the European Centre of Cell Cultures (ECACC, Salisbury, UK) and maintained in culture as described by the provider. The cells were routinely grown in RPMI-1640 medium which contained fetal calf serum (FCS) (10%), 2 mM Gln and 1% antibiotics (penicillin/streptomycin) at 37 °C and CO_2 (5%). Human HEK293 cells were graciously provided by the group of Professor Reymond and routinely grown in DMEM medium which contained fetal calf serum (FCS) (10%), 2 mM Gln, 1 % HEPES buffer and 1% antibiotics (penicillin/streptomycin) at 37 °C and CO_2 (5%). Cytotoxicity was determined using the cell counting kit 8 (Dojindo). Therefore, the cells were seeded in 96-well plates as monolayers with 100 µL of cell solution (approximately 10'000 cells) per well. Compounds were dissolved in DMSO, then dissolved in the culture medium and serially diluted to the appropriate concentration, to give a final DMSO concentration of 1%. 100 µL of drug solution was added to each well and the plates were incubated for 96 h. After incubation the culture medium was removed completely and subsequently, 10 µL kit solution and 100 µL fresh medium were added to the cells. The plates were incubated for a further 90 minutes. The optical density, directly proportional to the number of surviving cells, was quantified at 450 nm using a multiwell plate reader and the fraction of surviving cells was calculated from the absorbance of untreated control cells. Evaluation is based on means from four independent experiments, each comprising four microcultures per concentration level.



^{1}H-NMR spectra of the conjugate **2-K8** dissolved in 90% H_2O/10% D_2O with addition of 1% DMSO, recorded at t = 0, t = 24 h, and t = 96 h.