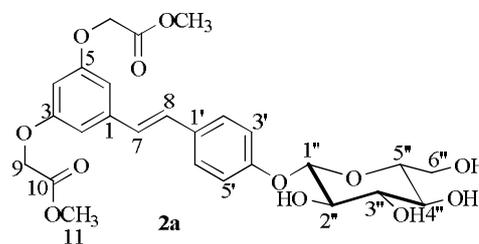


Aryloxyacetamides derived from resveratrol and pinostilbenoside

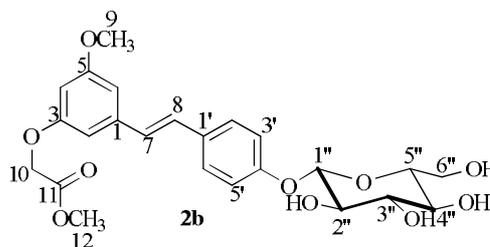
Alexandra V. Pozdeeva, Nina I. Komarova, Vladimir G. Vasiliev, Artem D. Rogachev,
Nariman F. Salakhutdinov and Genrikh A. Tolstikov

Experimental

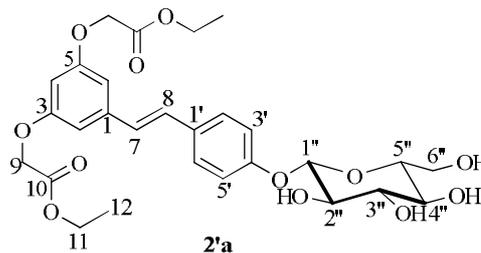
trans-3,5-Bis(2-methoxy-2-oxoethoxy)stilben-4'-yl-4'-O- β -D-glucopyranoside **2a**: yield 89%. Mp 72.1°C. IR: 1749 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 3.28-3.36 (m, 4H, H^{2'',3'',4'',5''}); 3.44-3.49 (m, 1H, H^{6''a}); 3.67-3.73 (m, 1H, H^{6''b}); 3.70 (s, 6H, H¹¹); 4.61 (dd, 1H, C^{6''}-OH, J = 5.7; J = 5.9); 4.81 (s, 4H, H⁹); 4.90 (d, 1H, H^{1''}, J = 7.3); 5.05 (d, 1H, C^{4''}-OH, J = 5,4); 5.13 (d, 1H, C^{3''}-OH, J = 4.3); 5.35 (d, 1H, C^{2''}-OH, J = 5.1); 6.41 (t, 1H, H⁴, J = 1.9); 6.78 (d, 2H, H^{2,6}, J = 1.9); 7.03 (d, 1H, H⁷, J = 16.4); 7.04 (d, 2H, H^{3',5'}, J = 8.9); 7.23 (d, 1H, H⁸, J = 16.4); 7.52 (d, 2H, H^{2',6'}, J = 8.9).



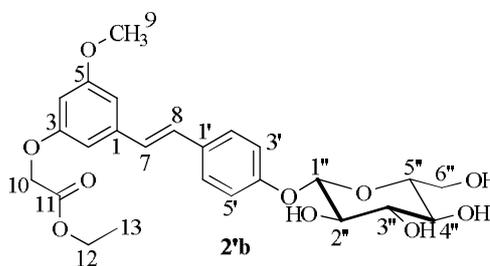
trans-3-(2-Methoxy-2-oxoethoxy)-5-methoxystilben-4'-yl-4'-O- β -D-glucopyranoside **2b**: yield 90% Mp 85.1°C. IR: 1749 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 3.45-3.56 (m, 4H, H^{2'',3'',4'',5''}); ~ 3.44-3.49 (m, 1H, H^{6''a}); ~ 3.67-3.73 (m, 1H, H^{6''b}); 3.76 (s, 3H, H⁹); 3.76 (s, 3H, H¹²); 4.67 (s, 2H, H¹⁰); 4.96 (d, 1H, H^{1''}, J = 7.3); 6.37 (t, 1H, H⁴, J = 2.1); 6.65, 6.70 (both d, 2H, H^{2,6}, J = 2.1); 6.92 (d, 1H, H⁷, J = 16.4); 7.06 (d, 1H, H⁸, J = 16.4); 7.08 (d, 2H, H^{3',5'}, J = 8.9); 7.45 (d, 2H, H^{2',6'}, J = 8.9).



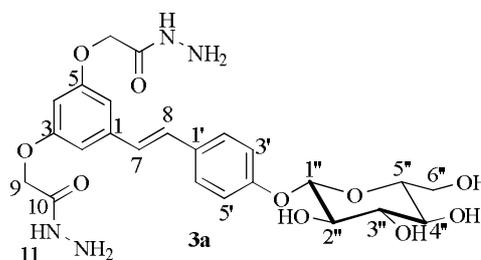
trans-3,5-Bis(2-ethoxy-2-oxoethoxy)stilben-4'-yl-4'-O- β -D-glucopyranoside **2'a**: IR: 1753 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 1.21 (t, 6H, H¹², J = 7.1); 3.12-3.40 (m, 4H, H^{2'',3'',4'',5''}); 3.42-3.51 (m, 1H, H^{6''a}); 3.65-3.73 (m, 1H, H^{6''b}); 4.17 (q, 4H, H¹¹, J = 7.1); 4.61 (dd, 1H, OH^{6''}, J = 5.6; J = 5.9); 4.79 (s, 4H, H⁹); 4.89 (d, 1H, H^{1''}, J = 7.3); 5.06 (d, 1H, OH^{4''}, J = 4.6); 5.13 (br. s, 1H, OH^{3''}); 5.36 (d, 1H, OH^{2''}, J = 4.6); 6.40 (t, 1H, H⁴, J = 2.0); 6.77 (d, 2H, H^{2,6}, J = 2.0); 7.03 (d, 1H, H⁷, J = 16.4); 7.03 (d, 2H, H^{3',5'}, J = 8.9); 7.22 (d, 1H, H⁸, J = 16.4); 7.51 (d, 2H, H^{2',6'}, J = 8.9).



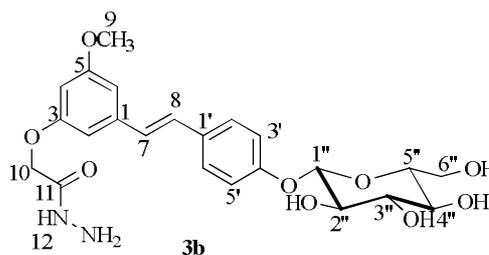
trans-3-(2-Ethoxy-2-oxoethoxy)-5-methoxystilben-4'-yl-4'-O- β -D-glucopyranoside **2'b**: IR: 1754 cm⁻¹. HPLC/MS: found m/z 513.185 [M+Na⁺], calculated for C₂₅H₃₀NaO₁₀: m/z 513.17; found m/z 525.159 [M+Cl⁻], calculated for C₂₅H₃₀ClO₁₀: m/z 525.153, [M+Cl⁻]. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 1.21 (t, 3H, H¹³, J = 7.1); 3.12-3.30 (m, 4H, H^{2'',3'',4'',5''}); 3.43-3.51 (m, 1H, H^{6''a}); 3.66-3.73 (m, 1H, H^{6''b}); 3.76 (s, 6H, H⁹); 4.17 (q, 2H, H¹², J = 7.1); 4.60 (dd, 1H, OH^{6''}, J = 5.7); 4.78 (s, 2H, H¹⁰); 4.89 (d, 1H, H^{1''}, J = 7.3); 5.06 (d, 1H, OH^{4''}, J = 5.1); 5.12 (d, 1H, OH^{3''}, J = 4.3); 5.34 (d, 1H, OH^{2''}, J = 4.8); 6.39 (t, 1H, H⁴, J = 1.9); 6.74, 6.77 (both d, 1H, H^{2,6}, J = 1.9); 7.02 (d, 1H, H⁷, J = 16.4); 7.03 (d, 2H, H^{3',5'}, J = 8.6); 7.22 (d, 1H, H⁸, J = 16.4); 7.52 (d, 2H, H^{2',6'}, J = 8.6).



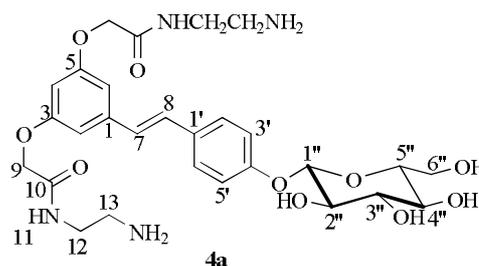
trans-3,5-Bis(2-hydrazinyl-2-oxoethoxy)stilben-4'-yl-4'-O- β -D-glucopyranoside **3a**: A mixture of 80 mg (0.15 mmol) of **2a** and 180 mg (3.6 mmol) of N₂H₄·H₂O in 3 ml of absolute EtOH was boiled for 28 hours. The residue was filtered and washed with EtOH. 42 mg (0.8 mmol) of **3a** was obtained (53%). ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 3.28-3.49 (m, 5H, H^{2'',3'',4'',5'',6''a}); 3.67-3.73 (m, 1H, H^{6''b}); 4.49 (s, 4H, H⁹); 4.61 (dd, 1H, C^{6''}-OH, J = 5.7; J = 5.9); 4.88 (d, 1H, H^{1''}, J = 7.5); 5.08 (d, 1H, C^{4''}-OH, J = 5.4); 5.13 (d, 1H, C^{3''}-OH, J = 4.3); 5.36 (d, 1H, C^{2''}-OH, J = 4.8); 6.48 (t, 1H, H⁴, J = 1.9); 6.79 (d, 2H, H^{2,6}, J = 1.9); 7.03 (d, 1H, H⁷, J = 16.4); 7.04 (d, 2H, H^{3',5'}, J = 8.9); 7.19 (d, 1H, H⁸, J = 16.4); 7.51 (d, 2H, H^{2',6'}, J = 8.9); 9.36 (s, 2H, H¹¹).



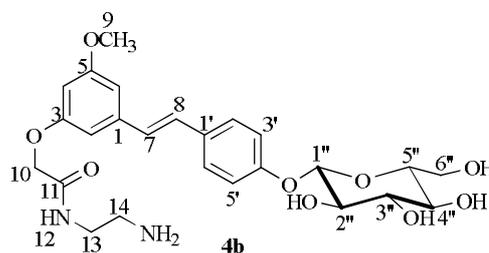
trans-3-(2-Hydrazinyl-2-oxoethoxy)-5-methoxystilben-4'-yl-4'-O- β -D-glucopyranoside **3b**: yield 60% ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 3.25-3.75 (m, 6H, H^{2'',3'',4'',5'',6''a}); 3.67-3.75 (m, 1H, H^{6''b}); 3.76 (s, 3H, H⁹); 4.50 (s, 2H, H¹⁰); 4.89 (d, 1H, H^{1''}, J = 7.3); 6.44 (t, 1H, H⁴, J = 2.1); 6.76, 6.77 (both d, 2H, H^{2,6}, J = 2.1); 7.02 (d, 1H, H⁷, J = 16.4); 7.03 (d, 2H, H^{3',5'}, J = 8.9); 7.19 (d, 1H, H⁸, J = 16.4); 7.52 (d, 2H, H^{2',6'}, J = 8.9); 9.35 (br. s, 1H, H¹²).



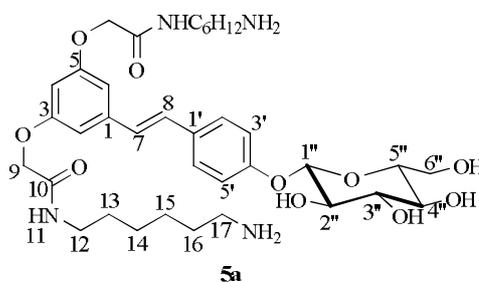
trans-3,5-Bis[2-(2-aminoethylamino)-2-oxoethoxy]stilben-4'-yl-4'-O- β -D-glucopyranoside **4a**: yield 85%. IR: 1659 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 2.60 (t, 4H, H¹³, J = 6.2); 3.10-3.16 (m, 4H, H¹²); 3.20-3.52 (m, 5H, H^{2'',3'',4'',5'',6''a}); 3.65-3.75 (m, 1H, H^{6''b}); 4.50 (s, 4H, H⁹); 4.90 (d, 1H, H^{1''}, J = 7.5); 6.50 (t, 1H, H⁴, J = 1.9); 6.81 (d, 2H, H^{2,6}, J = 1.9); 7.03 (d, 1H, H⁷, J = 16.4); 7.04 (d, 2H, H^{3',5'}, J = 8.9); 7.21 (d, 1H, H⁸, J = 16.4); 7.52 (d, 2H, H^{2',6'}, J = 8.9); 8.13 (t, 2H, H¹¹, J = 5.4).



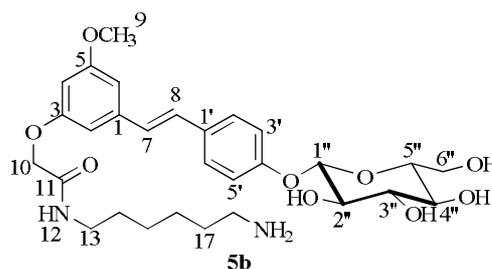
trans-3-[2-(2-Aminoethylamino)-2-oxoethoxy]-5-methoxystilben-4'-yl-4'-O- β -D-glucopyranoside **4b**: yield 60%. IR: 1657 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 2.59 (t, 2H, H¹⁴, J = 6.4); 3.11-3.16 (m, 2H, H¹³); 3.20-3.60 (m, 5H, H^{2'',3'',4'',5'',6''a}); 3.65-3.73 (m, 1H, H^{6''b}); 3.76 (s, 3H, H⁹); 4.49 (s, 2H, H¹⁰); 4.89 (d, 1H, H^{1''}, J = 7.3); 6.44 (t, 1H, H⁴, J = 2.1); 6.76, 6.78 (both d, 2H, H^{2,6}, J = 2.1); 7.03 (d, 1H, H⁷, J = 16.4); 7.02 (d, 2H, H^{3',5'}, J = 8.9); 7.21 (d, 1H, H⁸, J = 16.4); 7.52 (d, 2H, H^{2',6'}, J = 8.9); 8.08 (t, 1H, H¹², J = 5.9).



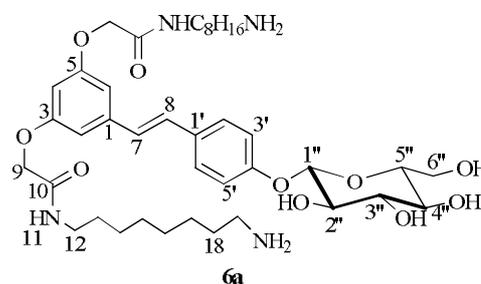
trans-3,5-Bis[2-(6-aminohexylamino)-2-oxoethoxy]stilben-4'-yl-4'-O- β -D-glucopyranoside **5a**: yield 93%. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 1.15-1.45 (m, 16H, H^{13,14,15,16}); 2.42-2.52 (m, 4H, H¹⁷); 2.95-3.15 (m, 4H, H¹²); 3.20-3.50 (m, 5H, H^{2'',3'',4'',5'',6''a}); 3.65-3.72 (m, 1H, H^{6''b}); 4.47 (s, 4H, H⁹); 4.88 (d, 1H, H^{1''}, J = 7.5); 6.47 (t, 1H, H⁴, J = 1.9); 6.79 (d, 2H, H^{2,6}, J = 1.9); 7.01 (d, 1H, H⁷, J = 16.4); 7.02 (d, 2H, H^{3',5'}, J = 8.9); 7.19 (d, 1H, H⁸, J = 16.4); 7.50 (d, 2H, H^{2',6'}, J = 8.9); 8.15 (t, 2H, H¹¹, J = 5.5).



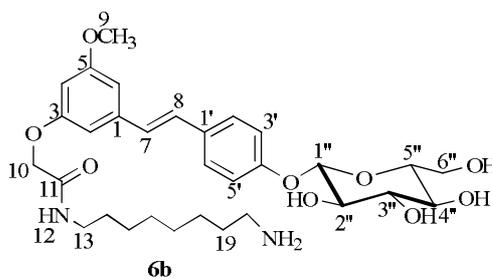
trans-3-[2-(6-Aminohexylamino)-2-oxoethoxy]-5-methoxystilben-4'-yl-4'-O- β -D-glucopyranoside **5b**: yield 90%. IR: 1659 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 1.10-1.50 (m, 8H, H^{14,15,16,17}); 2.53 (t, 2H, H¹⁸); 3.07-3.15 (m, 2H, H¹³); 3.30-3.50 (m, 5H, H^{2'',3'',4'',5'',6''a}); 3.65-3.73 (m, 1H, H^{6''b}); 3.76 (s, 3H, H⁹); 4.47 (s, 2H, H¹⁰); 4.88 (d, 1H, H^{1''}, J = 7.3); 6.43 (t, 1H, H⁴, J = 2.1); 6.75, 6.77 (both d, 2H, H^{2,6}, J = 2.1); 7.03 (d, 1H, H⁷, J = 16.4); 7.02 (d, 2H, H^{3',5'}, J = 8.9); 7.20 (d, 1H, H⁸, J = 16.4); 7.51 (d, 2H, H^{2',6'}, J = 8.9); 8.11 (t, 1H, H¹², J = 5.6).



trans-3,5-Bis[2-(8-aminoctylamino)-2-oxoethoxy]stilben-4'-yl-4'-O- β -D-glucopyranoside **6a**: yield 93%. IR: 1655 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 1.15-1.55 (m, 24H, H^{13,14,15,16,17,18}); 2.43-2.55 (m, 4H, H¹⁹); 3.05-3.16 (m, 4H, H¹²); 3.20-3.55 (m, 5H, H^{2'',3'',4'',5'',6''a}); 3.66-3.74 (m, 1H, H^{6''b}); 4.45 (s, 4H, H⁹); 4.86 (d, 1H, H^{1''}, J = 6.8); 6.48 (t, 1H, H⁴, J = 2.0); 6.76 (d, 2H, H^{2,6}, J = 2.0); 6.95 (d, 1H, H⁷, J = 16.4); 7.01 (d, 2H, H^{3',5'}, J = 9.0); 7.13 (d, 1H, H⁸, J = 16.4); 7.46 (d, 2H, H^{2',6'}, J = 9.0); 7.98 (t, 2H, H¹¹, J = 5.6).

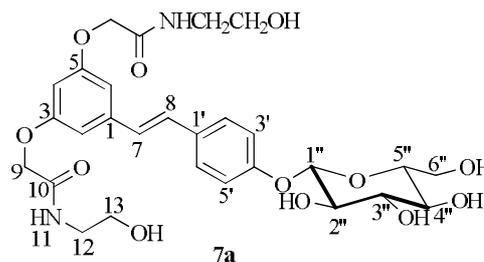


trans-3-[2-(8-Aminoctylamino)-2-oxoethoxy]-5-methoxystilben-4'-yl-4'-O- β -D-glucopyranoside **6b**: yield 98%. IR: 1659 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 1.20-1.50 (m, 12H, H^{14,15,16,17,18,19}); 2.47-2.53 (m, 2H, H²⁰); 3.08-3.15 (m, 2H, H¹³); 3.24-3.50 (m, 5H, H^{2'',3'',4'',5'',6''a}); 3.65-3.73 (m, 1H, H^{6''b}); 3.76 (s, 3H, H⁹); 4.48 (s, 2H, H¹⁰); 4.89 (d, 1H, H^{1''}, J = 7.2); 6.43 (t, 1H, H⁴, J = 1.9); 6.76, 6.77 (both d, 2H, H^{2,6}, J = 1.9); 7.02 (d, 1H, H⁷, J = 16.4); 7.03 (d, 2H, H^{3',5'}, J = 8.9); 7.19 (d, 1H, H⁸, J = 16.4); 7.51 (d, 2H, H^{2',6'}, J = 8.9); 8.08 (t, 1H, H¹², J = 5.6).



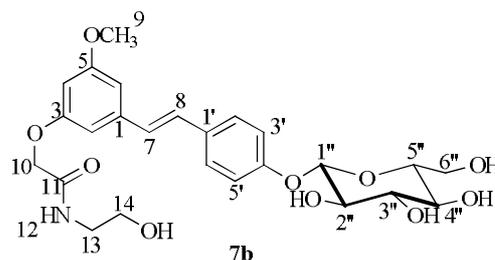
trans-3,5-Bis[2-(2-hydroxyethylamino)-2-oxoethoxy]stilben-4'-yl-4'-O- β -D-glucopyranoside **7a**:

yield 96%. ^1H NMR (DMSO- d_6 , δ , ppm, J/Hz): 3.15-3.60 (m, 13H, $\text{H}^{12,13,2'',3'',4'',5'',6''\text{a}}$); 3.65-3.73 (m, 1H, $\text{H}^{6''\text{b}}$); 4.50 (s, 4H, H^9); 4.89 (d, 1H, $\text{H}^{1''}$, $J = 7.3$); 6.50 (br. s, 1H, H^4); 6.81 (br. s, 2H, $\text{H}^{2,6}$); 7.03 (d, 1H, H^7 , $J = 16.4$); 7.04 (d, 2H, $\text{H}^{3',5'}$, $J = 8.3$); 7.21 (d, 1H, H^8 , $J = 16.4$); 7.52 (d, 2H, $\text{H}^{2',6'}$, $J = 8.3$); 8.05 (t, 2H, H^{11} , $J = 5.1$).



trans-3-[2-(2-Hydroxyethylamino)-2-oxoethoxy]-5-methoxystilben-4'-yl-4'-O- β -D-glucopyranoside

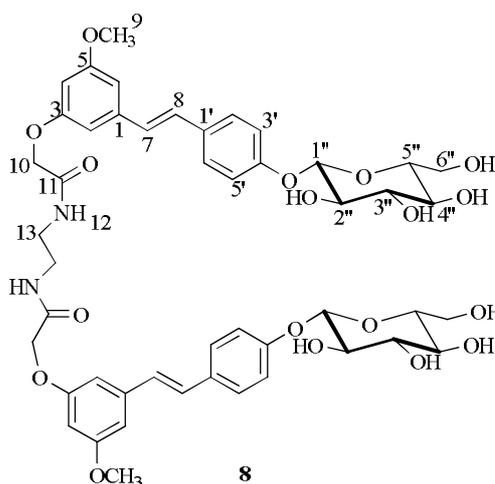
7b: yield 91%. ^1H NMR (DMSO- d_6 , δ , ppm, J/Hz): 3.13-3.52 (m, 9H, $\text{H}^{13,14,2'',3'',4'',5'',6''\text{a}}$); 3.66-3.74 (m, 1H, $\text{H}^{6''\text{b}}$); 3.76 (s, 3H, H^9); 4.50 (s, 2H, H^{10}); 4.90 (d, 1H, $\text{H}^{1''}$, $J = 7.3$); 6.45 (t, 1H, H^4 , $J = 1.9$); 6.76, 6.79 (both d, 2H, $\text{H}^{2,6}$, $J = 1.9$); 7.03 (d, 1H, H^7 , $J = 16.4$); 7.04 (d, 2H, $\text{H}^{3',5'}$, $J = 8.8$); 7.21 (d, 1H, H^8 , $J = 16.3$); 7.52 (d, 2H, $\text{H}^{2',6'}$, $J = 8.8$); 8.06 (t, 1H, H^{12} , $J = 5.4$).



trans- N,N' -(Ethane-1,2-diyl)bis{2-[3-(4'-O- β -D-glucopyranosidostyryl)-5-methoxyphenoxy]-

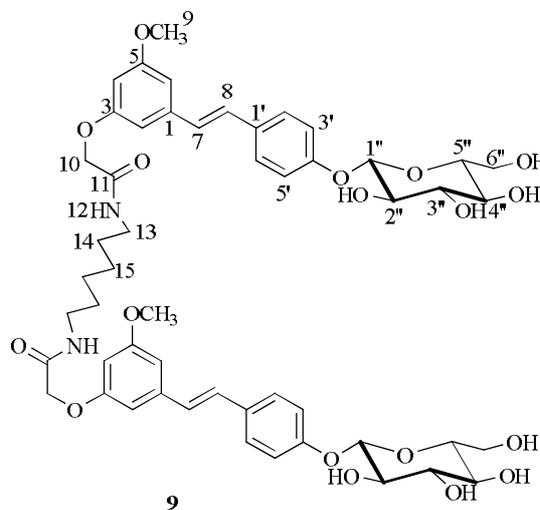
aceamide} **8**. A solution of 200 mg (0.42 mmol) of **2b** and 25.2 mg (0.21 mmol) of ethylenediamine in 3 ml of abs. EtOH was heated under reflux for 70 hours. After removal of the solvent the resulting mixture was chromatographed on SiO_2 . 40.9 mg (0.043 mmol) of **8** were obtained (yield 21%). M.p. 98°C dec. IR: 1654 cm^{-1} . ^1H NMR (DMSO- d_6 , δ , ppm, J/Hz):

3.10-3.50 (m, 9H, $\text{H}^{13,2'',3'',4'',5'',6''\text{a}}$); 3.66-3.70 (m, 2H, $\text{H}^{6''\text{b}}$); 3.74 (s, 6H, H^9); 4.48 (s, 4H, H^{10}); 4.58 (dd, 1H, $\text{C}^{6''}$ -OH, $J = 5.7$, $J = 5.9$); 4.88 (d, 1H, $\text{H}^{1''}$, $J = 7.3$); 5.02 (d, 1H, $\text{C}^{4''}$ -OH, $J = 5.1$); 5.10 (d, 1H, $\text{C}^{3''}$ -OH, $J = 4.3$); 5.30 (d, 1H, $\text{C}^{2''}$ -OH, $J = 4.8$); 6.44 (t, 2H, H^4 , $J = 1.9$); 6.75, 6.78 (both d, 4H, $\text{H}^{2,6}$, $J = 1.9$); 7.01 (d, 4H, $\text{H}^{3',5'}$, $J = 8.9$); 7.02 (d, 2H, H^7 , $J = 16.4$); 7.21 (d, 2H, H^8 , $J = 16.4$); 7.50 (d, 4H, $\text{H}^{2',6'}$, $J = 8.9$); 8.27 (t, 2H, H^{12} , $J = 5.3$).



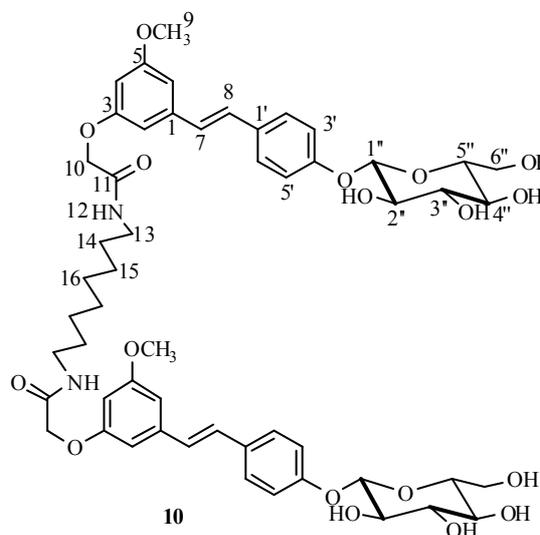
trans-N,N'-(Hexane-1,6-diyl)bis{2-[3-(4'-O- β -D-glucopyranosidostyryl)-5-methoxyphenoxy]-acetamide} **9**: A solution of 70 mg (0.147 mmol) of **2b** and 8.5 mg (0.07 mmol) of 1,6-hexamethylenediamine in 1 ml of abs. EtOH was heated under reflux for 20 hours. After removal of the solvent the resulting mixture was chromatographed on reverse-phase sorbent. 21.2 mg (0.021 mmol) of compound **9** were obtained (yield 29%). IR:

1678 cm^{-1} . HPLC/MS: found m/z 1003.41, calculated for $\text{C}_{52}\text{H}_{63}\text{N}_2\text{O}_{18}$: m/z 1003.41, $[\text{M}-\text{H}^+]$. ^1H NMR (DMSO- d_6 , δ , ppm, J/Hz): 1.17-1.25 (m, 4H, H^{15}); 1.33-1.43 (m, 4H, H^{14}); 3.03-3.60 (m, 9H, $\text{H}^{13,2'',3'',4'',5'',6''a}$); 3.66-3.72 (m, 2H, $\text{H}^{6''b}$); 3.75 (s, 6H, H^9); 4.47 (s, 4H, H^{10}); 4.88 (d, 2H, $\text{H}^{1''}$, $J = 7.3$); 6.43 (t, 2H, H^4 , $J = 1.7$); 6.75, 6.77 (both d, 4H, $\text{H}^{2,6}$, $J = 1.7$); 7.01 (d, 2H, H^7 , $J = 16.4$); 7.02 (d, 4H, $\text{H}^{3',5'}$, $J = 8.9$); 7.19 (d, 2H, H^8 , $J = 16.4$); 7.50 (d, 4H, $\text{H}^{2',6'}$, $J = 8.9$); 8.07 (t, 2H, H^{12} , $J = 5.7$).



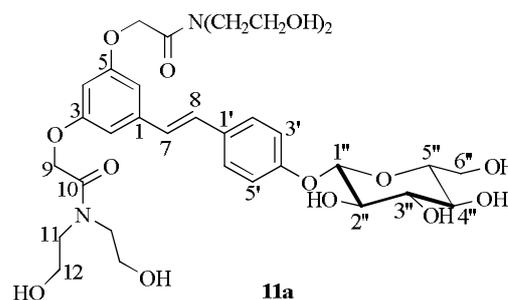
trans-N,N'-(Octane-1,8-diyl)-bis{2-[3-(4'-O- β -D-glucopyranosidostyryl)-5-methoxyphenoxy]-acetamide} **10**: The compound was obtained according

the procedure described for **8**, yield 45%. IR: 1678 cm^{-1} . ^1H NMR (DMSO- d_6 , δ , ppm, J/Hz): 1.19-1.45 (m, 8H, $\text{H}^{14,15,16}$); 3.01-3.13 (m, 4H, H^{13}); 3.15-3.50 (m, 10H, $\text{H}^{2'',3'',4'',5'',6''a}$); 3.67-3.73 (m, 2H, $\text{H}^{6''b}$); 3.75 (s, 6H, H^9); 4.47 (s, 4H, H^{10}); 4.88 (d, 2H, $\text{H}^{1''}$, $J = 7.3$); 6.43 (br. s, 2H, H^4); 6.76, 6.77 (both br. s, 4H, $\text{H}^{2,6}$); 7.01 (d, 2H, H^7 , $J = 16.4$); 7.02 (d, 4H, $\text{H}^{3',5'}$, $J = 8.9$); 7.19 (d, 2H, H^8 , $J = 16.4$); 7.50 (d, 4H, $\text{H}^{2',6'}$, $J = 8.9$); 8.06 (t, 2H, H^{12} , $J = 5.1$).



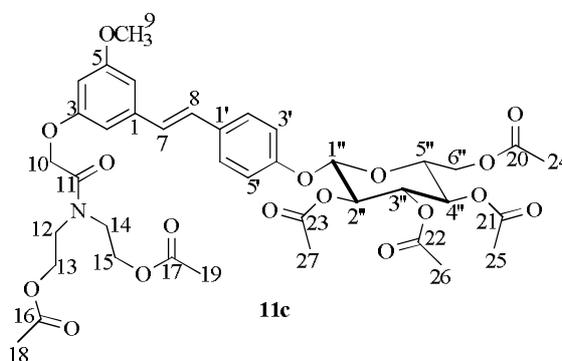
trans-3,5-Bis{2-[bis(2-hydroxyethyl)amino]-2-oxoethoxy}stilben-4'-yl-4'-O-β-D-glucopyranoside

11a: yield 80%. IR: 1659 cm⁻¹. ¹H NMR (DMSO-d₆, δ, ppm, J/Hz): 3.15-3.62 (m, 8H, H^{11,12,2'',3'',4'',5'',6''a}); 3.69-3.71 (m, 1H, H^{6''b}); 4.50 (s, 4H, H⁹); 4.88 (d, 1H, H^{1''}, J = 7.5); 6.36 (br. s, 1H, H⁴); 6.69 (br. s, 2H, H^{2,6}); 6.96 (d, 1H, H⁷, J = 16.4); 7.01 (d, 2H, H^{3',5'}, J = 8.3); 7.14 (d, 1H, H⁸, J = 16.4); 7.50 (d, 2H, H^{2',6'}, J = 8.3).

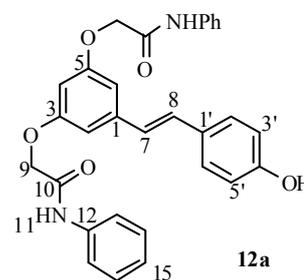


trans-3-{2-[Bis(2-acetoxyethylamino)]-2-oxoethoxy}-5-methoxystilben-4'-yl-4'-O-β-D-(2'',3'',4'',6''-O-tetraacetyl)glucopyranoside **11c**. A mixture of 100 mg (0.21 mmol) of compound **2b** and 44 mg (0.42 mmol) of diethanolamine in 4 ml of abs. EtOH was heated under reflux for 6 hours. After removal of the solvent the reaction mixture was dissolved in 5 ml of abs. pyridine and 1 ml of Ac₂O was added. After 3 hours of stirring the mixture was poured into the solution of 4.8 ml of HCl (12.5M) in 50 ml of water and the turbid liquid was stirred for 10 min and extracted with CH₂Cl₂ (3×15 ml). Organic phase was dried on MgSO₄, the filtered and the solvent was evaporated. The product obtained was chromatographed on SiO₂ giving 94 mg (0.11 mmol) of compound **12c** (yield 55%). IR: 1669; 1744 cm⁻¹. HRMS (DFS): found m/z 801.2832, calculated for C₃₉H₄₇O₁₇N₁ m/z 801.2839. ¹H NMR (DMSO-d₆, δ, ppm, J/Hz): 1.95,

1.99 (both s, 6H, H^{18,19}); 2.00, 2.02, 2.04 (all s, 12H, H^{24,25,26,27}); 3.76 (s, 3H, H⁹); 3.82-3.86 (m, 1H, H^{6''a}); 4.05-4.30 (m, 9H, H^{12,13,14,15,6''b}); 4.73 (s, 2H, H¹⁰); 4.74 (d, 1H, H^{1''}); 5.04-5.30 (m, 4H, H^{2'',3'',4'',5''}); 6.38 (t, 1H, H⁴, J = 1.9); 6.63, 6.64 (both d, 2H, H^{2,6}, J = 2.1); 6.86 (d, 1H, H⁷, J = 16.4); 6.93 (d, 2H, H^{3',5'}, J = 8.6); 6.98 (d, 1H, H⁸, J = 16.4); 7.39 (d, 2H, H^{2',6'}, J = 8.6).



trans-3,5-Bis(2-phenylamino-2-oxoethoxy)-4'-hydroxystilbene **12a**: 100 mg of compound **2a** were dissolved in 700 μ l of aniline and the obtained mixture was heated at 150°C for 20 min. Then the mixture was poured into the solution of 0.5 ml of HCl (12.5 M) in 10 ml of water. The solution was extracted with EtOAc and organic phase was dried with MgSO₄, filtered and the solvent was evaporated. The product was chromatographed on SiO₂. 50.6 mg (0.102 mmol) of compound **12a** were obtained (yield 55%). IR: 1654 cm⁻¹. HPLC/MS: found m/z 517.173, calculated for C₃₀H₂₆N₂O₅Na: m/z 517.173 [M+Na⁺]. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 4.73 (s, 4H, H⁹); 6.47 (t, 1H, H⁴, J = 1.9); 6.78 (d, 2H, H^{2,6}, J = 1.9); 6.95 (d, 1H, H⁷, J = 16.4); 7.02 (d, 2H, H^{3',5'}, J = 8.9); 7.09 (m, 2H, H¹⁵); 7.15 (d, 1H, H⁸, J = 16.4); 7.31 (m, 4H, H¹⁴); 7.40 (d, 2H, H^{2',6'}, J = 8.9); 7.66 (m, 4H, H¹³); 8.31 (s, 2H, H¹¹).



trans-3-(2-Phenylamino-2-oxoethoxy)-5-methoxy-4'-hydroxystilbene **12b**: yield 58%. IR: 1658 cm⁻¹. ¹H NMR (DMSO-d₆, δ , ppm, J/Hz): 3.82 (s, 3H, H⁹); 4.70 (s, 2H, H¹⁰); 6.47 (t, 1H, H⁴, J = 1.9); 6.77, 6.78 (both d, 2H, H^{2,6}, J = 1.9); 6.97 (d, 1H, H⁷, J = 16.4); 7.02 (d, 2H, H^{3',5'}, J = 8.9); 7.12 (1H, H¹⁶); 7.15 (d, 1H, H⁸, J = 16.4); 7.33 (m, 2H, H¹⁵); 7.49 (d, 2H, H^{2',6'}, J = 8.9); 7.68 (m, 2H, H¹⁴); 8.31 (s, 2H, H¹²).

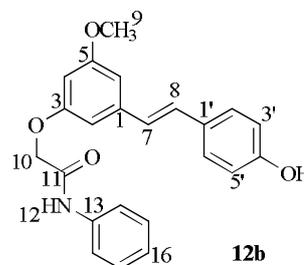


Table 1. Chemical shifts of carbon atoms in ^{13}C NMR spectra of compounds **2a,b** – **12a,b**

Atom	2a	2b	2'a	2'b	3a	3b
1	139.69	141.02	139.56	139.44	139.40	139.43
2	105.59	106.18	105.55	104.95	105.53	105.01
3	158.99	162.24	158.95	160.60	159.09	160.60
4	100.32	101.89	100.55	100.09	100.27	100.45
5	158.99	160.38	158.95	158.95	159.09	159.19
6	105.59	105.81	105.55	104.78	105.53	104.82
7	126.40	127.87	126.35	126.49	126.44	126.60
8	129.04	129.71	128.92	128.67	128.85	128.70
9	64.74	55.84	64.77	55.25	66.41	55.29
10	169.29	65.90	168.71	64.74	166.63	66.41
11	51.95	171.24	60.70	168.67		166.71
12		52.68	14.11	60.62		
13				14.08		
1'	130.72	130.72	130.64	130.65	130.61	130.70
2', 6'	127.86	127.86	127.77	127.69	127.78	127.78
3', 5'	116.54	116.54	116.48	116.44	116.50	116.51
4'	157.30	157.30	157.26	157.17	157.25	157.24
1''	100.31	100.31	100.26	100.25	100.26	100.28
2''	73.34	73.34	73.28	73.24	73.28	73.30
3''	76.69	76.69	76.66	76.62	76.65	76.66
4''	69.78	69.78	69.72	69.70	69.73	69.75
5''	77.13	77.13	77.12	77.07	77.11	77.12
6''	60.77	60.77	60.70	60.69	60.72	60.74

Table 1. Continued.

Atom	4a	4b	5a	5b	6a	6b
1	139.51	139.47	139.44	139.39	139.28	139.39
2	105.70	105.18	105.62	105.17	105.50	105.17
3	159.03	160.62	159.03	160.58	158.86	160.57
4	100.31	100.29	100.27	100.26	100.28	100.35
5	159.03	159.09	159.03	159.07	158.86	159.07
6	105.70	104.80	105.62	104.69	105.50	104.68
7	126.37	126.55	126.35	126.53	126.18	126.50
8	128.88	128.71	128.82	128.65	128.63	128.60
9	67.17	55.30	67.15	55.27	67.06	55.22
10	167.65	67.13	167.43	67.10	167.15	67.14
11		167.72		167.46		167.42
12	41.97		38.34		38.17	
13	41.27	41.93	29.24	38.29	29.08	38.29
14		41.26	26.38 ^{a)}	29.12	26.34	29.07
15			26.23 ^{a)}	26.26 ^{a)}	28.95	26.44 ^{a)}
16			32.94	26.13 ^{a)}	28.88	28.98 ^{a)}
17			41.45	32.12	26.34	28.89 ^{a)}
18				41.08	32.79	26.38 ^{a)}
19					41.26	33.12
20						41.55
1'	130.59	130.67	130.60	130.65	130.45	130.63
2', 6'	127.80	127.77	127.75	127.73	127.51	127.67
3', 5'	116.49	116.48	116.47	116.45	116.44	116.44
4'	157.29	157.24	157.24	157.20	157.20	157.20
1''	100.31	100.29	100.27	100.25	100.32	100.32
2''	73.27	73.29	73.26	73.26	73.25	73.25
3''	76.67	76.66	76.64	76.64	76.64	76.64
4''	69.74	69.74	69.73	69.72	69.74	69.74
5''	77.21	77.15	77.18	77.12	77.15	77.15
6''	60.72	60.73	60.70	60.70	60.71	60.71

^{a)} The values marked by the same letter can be swapped within the same column.

Table 1. Continued.

Atom	7a	7b	8	9	10
1	139.60	139.57	139.41	139.37	139.37
2	105.79	105.34	105.14	105.08	105.10
3	159.05	160.72	160.54	160.55	160.55
4	100.33	100.35	100.42	100.26	100.28
5	159.05	159.13	158.99	159.04	159.04
6	105.79	104.82	104.78	104.81	104.79
7	126.43	126.62	126.49	126.51	126.51
8	128.97	128.80	128.66	128.61	128.61
9	67.16	55.37	55.26	55.21	55.20
10	167.82	67.15	67.01	67.08	67.09
11		167.91	168.00	167.37	167.37
12	41.32	41.34			
13	59.77	59.80	41.30	38.19	38.26
14				29.09	29.10
15				26.06	26.32 ^{a)}
16					28.71 ^{a)}
1'	130.71	130.79	130.64	130.63	130.63
2', 6'	127.87	127.86	127.71	127.67	127.65
3', 5'	116.58	116.56	116.44	116.44	116.45
4'	157.31	157.30	157.17	157.17	157.18
1''	100.33	100.35	100.23	100.25	100.28
2''	73.35	73.37	73.25	73.24	73.24
3''	76.69	76.73	76.60	76.61	76.61
4''	69.79	69.81	69.68	69.70	69.71
5''	77.14	77.18	77.04	77.06	77.05
6''	60.79	60.81	60.65	60.68	60.69

^{a)} The values marked by the same letter can be swapped within the same column.

Table 1. Continued.

Atom	11a	11c	12a	12b
1	139.17	139.42	139.77	140.35
2	105.05	105.23	105.42	104.78
3	159.65	160.85	159.13	161.07
4	100.37	100.36	100.90	100.27
5	159.65	159.07	159.13	158.22
6	105.05	104.95	105.42	105.83
7	126.77	127.41	128.00	127.95
8	128.59	128.39	129.39	128.85
9	65.78	55.23	67.31	55.41
10	167.92	67.12	166.46	67.54
11	51.72	168.28		166.36
12	58.76	45.49 ^{a)}	138.38	
13		61.53 ^{b)}	119.78	138.52
14		46.57 ^{a)}	128.74	119.93
15		61.83 ^{b)}	128.00	129.06
16		169.16 ^{c)}		128.00
17		169.26 ^{c)}		
18		20.61 ^{d)}		
19		20.63 ^{d)}		
20		170.05 ^{e)}		
21		170.40 ^{e)}		
22		170.43 ^{e)}		
23		170.59 ^{e)}		
24		20.43 ^{f)}		
25		20.45 ^{f)}		
26		20.48 ^{f)}		
27		20.56 ^{f)}		
1'	130.85	132.25	131.02	130.78
2', 6'	127.90	127.65	128.87	128.90
3', 5'	116.56	116.99	115.64	115.80
4'	157.28	156.32	157.58	156.49
1''	100.37	98.79		
2''	73.32	70.98		
3''	76.76	71.87		
4''	69.82	68.10		
5''	77.20	72.51		
6''	60.83	61.78		

a, b, c, d, e, f) The values marked by the same letter can be swapped within the same column.