

***N*- [((2,3-di-*O*-Acetyl-4,6-dideoxy-4-*N*-((2,2,2-trichloroethoxy)carbonyl)- α -L-talopyranosyl)oxy) ((*R*)-2,2-dimethyl-1,3-dioxolan-4-yl)methyl] 3-*O*-(*tert*-butyldimethylsilyl)-2-*N*-(methoxycarbonyl)-L-threonine amide (11).**

A solution of **10** (1.11 g, 2.64 mmol), and 4 Å powdered molecular sieves (22 g) in dry CH₂Cl₂ (39 mL) was stirred at 0 °C for 5 h. Silver triflate (1.99 g, 7.76 mmol) was added in the dark and under an argon atmosphere. The mixture was immediately cooled to -78 °C and a solution of the bromosugar **15** (1.63 g, 3.35 mmol) in dry CH₂Cl₂ (20 mL) was dropwise added with stirring under argon atmosphere. The reaction mixture was warmed to 0-5 °C and stirred at that temperature overnight in the dark.

The reaction mixture was diluted with CH₂Cl₂ and filtered through Celite. The organic solution (300 mL) was washed successively with two 100-mL portions of aqueous sodium thiosulfate, two 100-mL portions of aqueous sodium bicarbonate and two 100-mL portions of brine, dried, filtered and concentrated to afford a light foam (2.0 g); silica gel TLC (1:1 hexane-ethyl acetate) indicated a mixture of **11** (*R_f* 0.75) as the major compound, and the 1-OH sugar (*R_f* 0.70). The mixture was separated by flash column chromatography (20 g silica gel, 2:1 hexane-EtOAc). Compound **11** (870 mg, 1.05 mmol, 40% yield) was isolated as a colorless foam, and most of the sample was used in the next step without any further purification. A small sample was purified further by flash column chromatography (2:1 hexane-EtOAc) to afford pure **11** as a colorless foam: $[\alpha]_D^{20}$ -34.3 (*c* 1.0, CHCl₃); silica gel TLC (1:1 hexane-ethyl acetate) *R_f* 0.75; ¹H NMR δ 0.13 (3H, s, SiCH₃), 0.17 (3H, s, SiCH₃), 0.92 (9H, s, Si(CH₃)₃), 1.05 (3H, d, *J* = 6.3 Hz, CH₃ threonine), 1.25 (3H, d, *J* = 6.3 Hz, CH₃ talosugar), 1.35 (3H, s, CH₃ dioxolane), 1.44 (3H, s, CH₃ dioxolane), 1.96 (3H, s, CH₃CO), 2.16 (3H, s, CH₃CO), 3.70 (3H, s, CH₃ MOC), 3.80-4.42 (7H, m, H-4 and H-5 talosugar, H-2 and H-3 threonine and H-4, H-5 and H-5'

dioxolane ring), 4.54 (1H, d, $J = 12.0$ Hz, Cl_3CCH_2), 4.95 (1H, d, $J = 12.0$ Hz, Cl_3CCH_2), 4.957 (1H, bs, **H-1** talosugar), 5.07 (1H, d, $J = 3.0$ Hz, **H-2** talosugar), 5.20 (1H, t, $J = 3.0$ Hz, **H-3** talosugar), 5.48 (1H, dd, $J = 5.7$ and 9.6 Hz, **HC-O-talosugar**), 5.66 (1H, d, 10.8, TROC-NH), 5.70 (1H, d, MOC-NH) and 7.35 (1H, d, $J = 9.3$ Hz, NH); mass spectrum, m/z 826, 824 ($\text{M} + \text{H}$)⁺, 406, 404 and 403; chemical ionization mass spectrum, m/z 824.2386 ($\text{C}_{31}\text{H}_{53}\text{Cl}_3\text{N}_3\text{O}_{14}\text{Si}$ ($\text{M} + \text{H}$)⁺ requires m/z 824.2365).

N-[1-((2,3-di-*O*-Acetyl-4,6-dideoxy-4-*N*-((2,2,2-trichloroethoxy)carbonyl)- α -L-talopyranosyl)oxy)-2(*S*)-((2-methoxyethoxy)methoxy)-2-(4-(4-(methoxycarbonyl)-2-thiazolyl)-2-thiazolyl)ethyl] 3-*O*-((2-methoxyethoxy)methyl)-2-*N*-(methoxycarbonyl)-L-threonine amide (**5**).

A solution of crude **23** (60 mg) in 1 mL of dry CH_2Cl_2 was treated with 46 μL (44 mg, 0.56 mmol) of dry pyridine and 9.3 μL (13.4 mg, 0.067 mmol) of trifluoroacetic anhydride. After 1 h an additional 4 μL of trifluoroacetic anhydride was added, and the reaction mixture was stirred for an additional 30 min. It was then diluted with CH_2Cl_2 , washed with NaHCO_3 and water, dried, filtered and concentrated to afford a syrup (54 mg) that was purified by flash column chromatography (5 g silica gel, 3:2 hexane-acetone). Compound **5** (47 mg, 0.044 mmol, 76% yield from **21**) was isolated as a syrup. A sample was purified by dissolving it in Et_2O and slowly adding hexane until turbidity developed. After a few minutes, pure **5** separated as a white solid of low melting point: $[\alpha]_{\text{D}}^{20} -83.5$ (c 1.0, CHCl_3); silica gel TLC (1:1 hexane-acetone) R_f 0.50; ^1H NMR δ 0.91 (3H, d, $J = 6.0$ Hz, CH_3 threonine), 1.17 (3H, d, $J = 6.3$ Hz, CH_3 talosugar), 1.91 (3H, s, CH_3CO), 2.11 (3H, s, CH_3CO), 3.35 (3H, s, O-CH_3 MEM), 3.37 (3H, s, O-CH_3 MEM), 3.40-3.65 (8H, m, $\text{O-CH}_2\text{-CH}_2\text{-O}$ MEM), 3.69 (3H, s, CH_3 MOC), 3.98 (3H, s,

COOCH₃), 4.20-5.20 (14H, **H-1**, **H-2**, **H-3**, **H-4** and **H-5** talosugar, **H-2** and **H-3** threonine, **H-2** ethyl, O-CH₂-CCl₃, O-CH₂-O MEM), 5.49 (1H, d, $J = 10.8$ Hz, TROC-NH), 6.03 (1H, d, $J = 8.4$ Hz, MOC-NH), 6.10 (1H, dd, $J = 1.8$ and 10.2 Hz, HC-O-talosugar), 8.12 (1H, d, $J = 10.2$ Hz, NH) and 8.2 (2H, 2 singlets superimposed, thiazole-H). ¹H NMR in acetone-*d*₆ showed the two thiazole hydrogens resolved at δ 8.28 and 8.40; mass spectrum, m/z 1044 and 1042 ($M + H$)⁺; FAB mass spectrum m/z 1040.1875 (C₃₇H₅₃Cl₃N₅O₁₉S₂ ($M + 1$)⁺ requires m/z 1040.1844).