Supplementary Information for

Efficient approach to novel 1α-triazolyl-5α-androstane derivatives as potent antiproliferative agents

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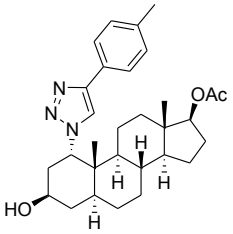
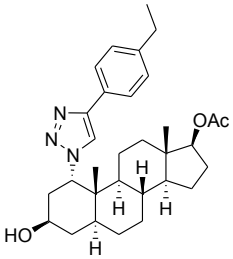
β-Acetoxy-1α-[4′-(4″-tolyl)-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3β-ol (7b)



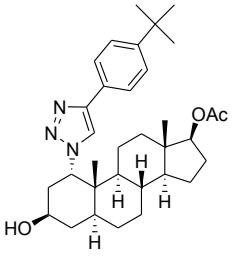
Alkyne: 4-tolylacetylene (**6b**, 0.09 mL) as described in the **General procedure 4.4.** After purification with CH_2Cl_2/EtOAc (90:10) as eluent, **7b** was obtained as a white solid (362 mg, 93%), mp 274-275 °C, R_f = 0.41 (ss E); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.20 (m, 1H), 0.75 (s, 3H, 18-H_3), 0.81-0.88 (m, 3H), 1.05 (s, 3H, 19-H_3), 1.18-1.26 (m, 2H), 1.36-1.44 (m, 4H), 1.50-1.79 (m, 6H), 1.98 (s, 3H, Ac-CH_3), 2.04 (m, 2H), 2.36 (m, 2H), 2.38 (s, 3H, 4″-CH_3), 4.00 (bs, 1H, 3-H), 4.42 (t, 1H, *J* = 8.3 Hz, 17-H), 4.55 (d, 1H, *J* = 4.9 Hz, 1-H), 5.29 (d, 1H, *J* = 10.2 Hz, 3-OH), 7.23 (d, 2H, *J* = 7.7 Hz, 3″-H and 5″-H), 7.69 (d, 2H, *J* = 7.7 Hz, 2″-H and 6″-H), 7.85 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.4 (C-18), 13.3 (C-19), 21.1 (Ac-CH_3), 21.2 (4”-CH_3), 21.3 (CH_2), 23.3 (CH_2), 27.4 (CH_2), 28.6 (CH_2), 30.3 (CH_2), 32.8 (CH), 33.2 (CH_2), 35.8 (CH), 36.2 (CH_2), 36.3 (CH_2), 40.4 (C-10), 42.6 (C-13), 47.5 (CH), 50.5 (CH), 63.7 and 64.0 (C-1 and C-3), 82.4 (C-17), 122.0 (C-5′), 125.6 (2C, C-2″ and C-6″), 127.3 (C-1″), 129.6 (2C, C-3″ and C-5″), 138.2 (C-4″), 146.7 (C-4′), 170.9 (Ac-CO); ESI-MS: 492 $[M+H]^+$; Anal. Calcd for $C_{30}H_{41}N_3O_3$ C, 73.29; H, 8.41; N, 8.55. Found: C, 73.43; H, 8.28; N, 8.62.

17β-Acetoxy-1α-[4′-(4″-ethylphenyl)-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3β-ol (7c)



Alkyne: 4-ethylphenylacetylene (**6c**, 0.12 mL) as described in the **General procedure 4.4.** After purification with CH_2Cl_2/EtOAc (80:20) as eluent, **7c** was obtained as a white solid (372 mg, 92%), mp 253-255 °C, R_f = 0.27 (ss D); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.19 (m, 1H), 0.75 (s, 3H, 18-H_3), 0.80-0.89 (m, 3H), 1.05 (s, 3H, 19-H_3), 1.20 (m, 2H), 1.26 (t, 3H, *J* = 7.6 Hz, 4″-$CH_2\underline{CH_3}$), 1.36-1.43 (m, 4H), 1.51-1.80 (m, 6H), 1.98 (s, 3H, Ac-CH_3), 2.04 (m, 2H), 2.37 (m, 2H), 2.67 (q, 2H, *J* = 7.6 Hz, 4″-$\underline{CH_2}CH_3$), 4.00 (bs, 1H, 3-H), 4.42 (t, 1H, *J* = 8.4 Hz, 17-H), 4.55 (d, 1H, *J* = 5.4 Hz, 1-H), 5.30 (d, 1H, *J* = 10.3 Hz, 3-OH), 7.26 (d, 2H, *J* = 7.7 Hz, 3″-H and 5″-H), 7.71 (d, 2H, *J* = 7.7 Hz, 2″-H and 6″-H), 7.89 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.4 (C-18), 13.3 (C-19), 15.5 (4″-$CH_2\underline{CH_3}$), 21.0 (Ac-CH_3), 21.3 (CH_2), 23.3 (CH_2), 27.4 (CH_2), 28.6 (2C, 2 × CH_2), 30.3 (CH_2), 32.8 (CH), 33.1 (CH_2), 35.8 (CH), 36.3 (2C, 2 × CH_2), 40.4 (C-10), 42.6 (C-13), 47.5 (CH), 50.5 (CH), 63.7 and 64.0 (C-1 and C-3), 82.4 (C-17), 122.0 (C-5′), 125.7 (2C, C-2″ and C-6″), 127.6 (C-1″), 128.4 (2C, C-3″ and C-5″), 144.6 (C-4″), 146.7 (C-4′), 170.9 (Ac-CO); ESI-MS: 506 $[M+H]^+$; Anal. Calcd for $C_{31}H_{43}N_3O_3$ C, 73.63; H, 8.57; N, 8.31. Found: C, 73.51; H, 8.75; N, 8.46.

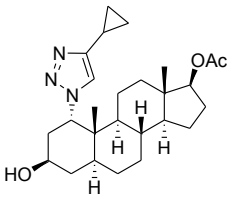
17β-Acetoxy-1α-[4′-(4″-*tert*-butylphenyl)-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3β-ol (7d)



Alkyne: 4-*tert*-butylphenylacetylene (**6d**, 0.16 mL) as described in the **General procedure 4.4.** After purification with CH_2Cl_2/EtOAc (80:20) as eluent, **7d** was obtained as a white solid (397 mg, 93%), mp 271-273 °C, R_f = 0.29 (ss E); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.19 (m, 1H), 0.75 (s, 3H, 18-H_3), 0.79-0.89 (m, 3H), 1.05 (s, 3H, 19-H_3), 1.20 (m, 2H), 1.34 (s, 9H, 4″-*t*Bu-$\underline{CH_3}$), 1.36-1.43 (m, 4H), 1.51-1.79 (m, 6H), 1.98 (s, 3H, Ac-CH_3), 2.04 (m, 2H), 2.37 (m, 2H), 4.00 (bs, 1H, 3-H), 4.43 (t, 1H, *J* = 8.4 Hz, 17-H), 4.56 (d, 1H, *J* = 5.4 Hz, 1-H), 5.32 (d, 1H, *J* = 10.3 Hz, 3-OH), 7.45 (d, 2H, *J* = 7.9 Hz, 3″-H and 5″-H), 7.73 (d, 2H, *J* = 7.9

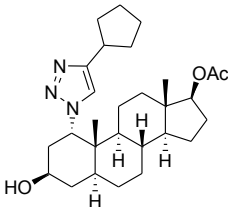
Hz, 2″-H and 6″-H), 7.87 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.4 (C-18), 13.3 (C-19), 21.1 (Ac-CH_3), 21.3 (CH_2), 23.3 (CH_2), 27.4 (CH_2), 28.6 (CH_2), 30.4 (CH_2), 31.3 (3C, 4″-*t*Bu-$\underline{CH_3}$), 32.8 (CH), 33.2 (CH_2), 34.7 (4″-*t*Bu-C), 35.8 (CH), 36.3 (2C, 2 × CH_2), 40.4 (C-10), 42.6 (C-13), 47.5 (CH), 50.5 (CH), 63.7 and 63.9 (C-1 and C-3), 82.4 (C-17), 122.1 (C-5′), 125.5 (2C) and 125.8 (2C): (C-2″, C-3″, C-5″ and C-6″), 127.3 (C-1″), 146.6 (C-4′), 151.4 (C-4″), 170.9 (Ac-CO); ESI-MS: 534 $[M+H]^+$; Anal. Calcd for $C_{33}H_{47}N_3O_3$ C, 74.26; H, 8.88; N, 7.87. Found: C, 74.45; H, 8.81; N, 7.99.

17β-Acetoxy-1α-[4′-cyclopropyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3β-ol (7e)



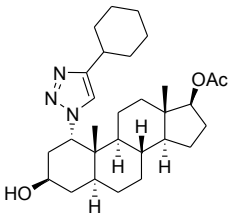
Alkyne: cyclopropylacetylene (**6e**, 0.07 mL) as described in the **General procedure 4.4.** After purification with CH_2Cl_2/EtOAc (80:20) as eluent, **7e** was obtained as a white solid (338 mg, 96%), mp 237-239 °C, R_f = 0.29 (ss E); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.01 (m, 1H), 0.75 (s, 3H, 18-H_3), 0.77-0.90 (m, 5H), 0.96 (m, 2H), 1.01 (s, 3H, 19-H_3), 1.14-1.27 (m, 2H), 1.31-1.47 (m, 5H), 1.54 (m, 2H), 1.62-1.75 (m, 3H), 1.90-1.97 (m, 2H), 2.00 (s, 3H, Ac-CH_3), 2.06 (m, 1H), 2.33 (m, 2H), 3.94 (bs, 1H, 3-H), 4.38 (d, 1H, *J* = 5.3 Hz, 1-H), 4.50 (t, 1H, *J* = 8.5 Hz, 17-H), 5.54 (d, 1H, *J* = 10.9 Hz, 3-OH), 7.28 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 6.5 (C-1″), 7.7 and 8.2 (C-2″ and C-3″), 12.4 (C-18), 13.3 (C-19), 21.1 (Ac-CH_3), 21.3 (CH_2), 23.2 (CH_2), 27.3 (CH_2), 28.6 (CH_2), 30.3 (CH_2), 32.7 (CH), 33.0 (CH_2), 35.8 (CH), 36.4 (2C, 2 × CH_2), 40.4 (C-10), 42.7 (C-13), 47.4 (CH), 50.6 (CH), 63.4 and 63.9 (C-1 and C-3), 82.4 (C-17), 122.7 (C-5′), 149.0 (C-4′), 171.0 (Ac-CO); ESI-MS: 442 $[M+H]^+$; Anal. Calcd for $C_{26}H_{39}N_3O_3$ C, 70.71; H, 8.90; N, 9.52. Found: C, 70.81; H, 8.71; N, 9.66.

17β-Acetoxy-1α-[4′-cyclopentyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3β-ol (7f)



Alkyne: cyclopentylacetylene (**6f**, 0.10 mL) as described in the **General procedure 4.4.** After purification with CH_2Cl_2/EtOAc (80:20) as eluent, **7f** was obtained as a white solid (349 mg, 93%), mp 265-267 °C, R_f = 0.30 (ss D); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.04 (m, 1H), 0.75 (s, 3H, 18-H_3), 0.79-0.86 (m, 3H), 1.02 (s, 3H, 19-H_3), 1.15-1.46 (m, 8H), 1.51-1.77 (m, 11H), 2.00 (s, 3H, Ac-CH_3), 2.09 (m, 3H), 2.34 (m, 2H), 3.17 (m, 1H), 3.95 (m, 1H, 3-H), 4.40 (d, 1H, *J* = 5.6 Hz, 1-H), 4.46 (t, 1H, *J* = 8.5 Hz, 17-H), 5.70 (d, 1H, *J* = 11.2 Hz, 3-OH), 7.29 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.4 (C-18), 13.3 (C-19), 21.1 (Ac-CH_3), 21.4 (CH_2), 23.3 (CH_2), 25.1 (CH_2), 27.4 (CH_2), 28.6 (CH_2), 30.3 (CH_2), 32.7 (CH), 33.0 (CH_2), 33.2 (CH_2), 33.3 (CH_2), 35.8 (CH), 36.4 (3C, 3 × CH_2), 36.5 (CH), 40.4 (C-10), 42.6 (C-13), 47.5 (CH), 50.7 (CH), 63.4 and 63.9 (C-1 and C-3), 82.5 (C-17), 122.8 (C-5′), 151.5 (C-4′), 171.1 (Ac-CO); ESI-MS: 470 $[M+H]^+$; Anal. Calcd for $C_{28}H_{43}N_3O_3$ C, 71.61; H, 9.23; N, 8.95. Found: C, 71.72; H, 9.36; N, 8.87.

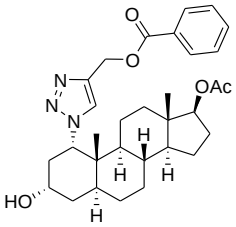
17β-Acetoxy-1α-[4′-cyclohexyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3β-ol (7g)



Alkyne: cyclohexylacetylene (**6g**, 0.11 mL) as described in the **General procedure 4.4.** After purification with CH_2Cl_2/EtOAc (80:20) as eluent, **7g** was obtained as a white solid (375 mg, 97%), mp 243-245 °C, R_f = 0.28 (ss D); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.04 (m, 1H), 0.76 (s, 3H, 18-H_3), 0.79-0.86 (m, 3H), 1.02 (s, 3H, 19-H_3), 1.15-1.45 (m, 13H), 1.51-1.79 (m, 8H), 2.00 (s, 3H, Ac-

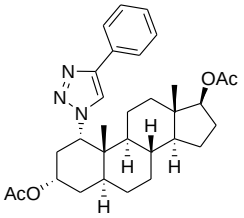
CH_3), 2.04 (m, 3H), 2.35 (m, 2H), 2.75 (m, 1H), 3.95 (m, 1H, 3-H), 4.40 (d, 1H, *J* = 5.5 Hz, 1-H), 4.46 (t, 1H, *J* = 8.5 Hz, 17-H), 5.71 (d, 1H, *J* = 11.2 Hz, 3-OH), 7.27 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.4 (C-18), 13.3 (C-19), 21.1 (Ac-CH_3), 21.4 (CH_2), 25.9 (CH_2), 26.0 (CH_2), 27.4 (CH_2), 28.6 (CH_2), 30.3 (CH_2), 32.7 (CH), 33.0 (2C, 2 × CH_2), 33.1 (CH_2), 33.3 (CH_2), 35.0 (CH), 35.8 (CH), 36.4 (3C, 3 × CH_2), 40.5 (C-10), 42.6 (C-13), 47.5 (CH), 50.7 (CH), 63.5 and 63.9 (C-1 and C-3), 82.5 (C-17), 122.5 (C-5′), 152.4 (C-4′), 171.1 (Ac-CO); ESI-MS: 484 $[M+H]^+$; Anal. Calcd for $C_{29}H_{45}N_3O_3$ C, 72.01; H, 9.38; N, 8.69. Found: C, 71.89; H, 9.47; N, 8.84.

17β-Acetoxy-1α-[4′-(*O*-benzoyl)hydroxymethyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3α-ol (8h)



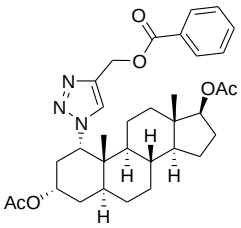
Substrate: **5**, alkyne: benzoic acid propargyl ester (**6h**, 0.13 mL) as described in the **General procedure 4.6.** After purification with CH_2Cl_2/EtOAc (80:20) as eluent, **8h** was obtained as a white solid (351 mg, 83%), mp 226-228 °C, R_f = 0.26 (ss F); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.15 (m, 1H), 0.71 (s, 3H, 18-H_3), 0.76 (m, 3H), 1.08 (s, 3H, 19-H_3), 1.14-1.36 (m, 6H), 1.45-1.55 (m, 4H), 1.85 (m, 1H), 1.99 (s, 3H, Ac-CH_3), 2.03 (m, 3H), 2.35 (m, 1H), 2.53 (m, 1H), 4.44 (m, 1H, 17-H), 4.53 (m, 1H, 3-H), 4.61 (bs, 1H, 1-H), 5.44 (s, 2H, *O*-CH_2), 7.41 (t, 2H, *J* = 7.3 Hz, 3”-H and 5”-H), 7.53 (t, 1H, *J* = 7.2 Hz, 4″-H), 7.67 (s, 1H, 5′-H), 8.01 (d, 2H, *J* = 7.2 Hz, 2″-H and 6″-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.3 (C-18), 13.8 (C-19), 21.1 (Ac-CH_3), 21.2 (CH_2), 23.3 (CH_2), 27.4 (CH_2), 28.7 (CH_2), 30.5 (CH_2), 35.6 (CH), 36.3 (2C, 2 × CH_2), 37.6 (CH_2), 37.9 (CH), 40.1 (C-10), 42.5 (C-13), 47.5 (CH), 50.3 (CH), 57.9 (*O*-CH_2), 65.6 (2C, C-1 and C-3), 82.5 (C-17), 126.1 (C-5′), 128.4 (2C, C-3″ and C-5″), 129.7 (2C, C-2″ and C-6″), 133.2 (C-4″), 141.3 (2C, C-1″ and C-4′), 166.4 (C=O), 170.8 (Ac-CO); ESI-MS: 536 $[M+H]^+$; Anal. Calcd for $C_{31}H_{41}N_3O_5$ C, 69.51; H, 7.71; N, 7.84. Found: C, 69.68; H, 7.87; N, 8.03.

3α,17β-Diacetoxy-1α-[4′-phenyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstane (10a)



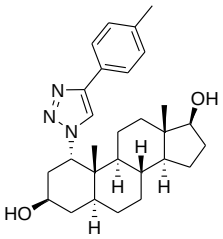
Substrate: **9**, alkyne: phenylacetylene (**6a**, 0.08 mL) as described in the **General procedure 4.6.** After purification with CH_2Cl_2/EtOAc (90:10) as eluent, **10a** was obtained as a white solid (112 mg, 30%), mp 158-160 °C, R_f = 0.32 (ss B); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.36 (m, 1H), 0.75 (s, 3H, 18-H_3), 0.79-0.91 (m, 3H), 1.14 (s, 3H, 19-H_3), 1.19-1.31 (m, 2H), 1.35-1.46 (m, 5H), 1.49-1.63 (m, 4H), 1.97 (s, 3H, Ac-CH_3), 1.99 (s, 3H, Ac-CH_3), 2.02-2.20 (m, 4H), 2.41 (m, 1H), 4.43 (t, 1H, *J* = 8.6 Hz, 17-H), 4.77 (bs, 1H, 1-H), 5.52 (m, 1H, 3-H), 7.33 (t, 1H, *J* = 7.6 Hz, 4″-H), 7.42 (t, 2H, *J* = 7.6 Hz, 3″-H and 5″-H), 7.77 (s, 1H, 5′-H), 7.83 (d, 2H, *J* = 7.6 Hz, 2″-H and 6″-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.3 (C-18), 13.9 (C-19), 21.0 (Ac-CH_3), 21.1 (CH_2), 21.2 (Ac-CH_3), 23.3 (CH_2), 27.4 (CH_2), 28.6 (CH_2), 30.4 (CH_2), 32.7 (CH_2), 33.4 (CH_2), 35.7 (CH), 36.3 (CH_2), 37.7 (CH), 40.1 (C-10), 42.6 (C-13), 47.4 (CH), 50.3 (CH), 64.9 and 69.2 (C-1 and C-3), 82.4 (C-17), 120.8 (C-5′), 125.7 (2C, C-2″ and C-6″), 128.1 (C-4″), 128.8 (2C, C-3″ and C-5″), 130.5 (C-1″), 146.5 (C-4′), 170.0 and 170.9 (2 × Ac-CO); ESI-MS: 520 $[M+H]^+$; Anal. Calcd for $C_{31}H_{41}N_3O_4$ C, 71.65; H, 7.95; N, 8.09. Found: C, 71.83; H, 7.79; N, 8.36.

3α,17β-Diacetoxy-1α-[4′-(*O*-benzoyl)hydroxymethyl-1′*H*-1′2′3′-triazol-1′-yl]-5α-androstane (10h)



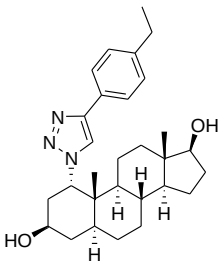
Substrate: **9**, alkyne: benzoic acid propargyl ester (**6h**, 0.12 mL) as described in the **General procedure 4.6.** After purification with CH_2Cl_2/EtOAc (90:10) as eluent, **10h** was obtained as a white solid (357 mg, 86%), mp 261-263 °C, R_f = 0.38 (ss C); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.12 (m, 1H), 0.71 (s, 3H, 18-H_3), 0.75 (m, 3H), 1.09 (s, 3H, 19-H_3), 1.13-1.56 (m, 11H), 1.97 (s, 3H, Ac-CH_3), 1.99 (s, 3H, Ac-CH_3), 2.01-2.14 (m, 4H), 2.37 (m, 1H), 4.28 (t, 1H, J = 8.5 Hz, 17-H), 4.67 (bs, 1H, 1-H), 5.42-5.52 (m, 3H, *O*-CH_2 and 3-H), 7.41 (t, 2H, J = 7.4 Hz, 3″-H and 5″-H), 7.53 (t, 1H, J = 7.4 Hz, 4″-H), 7.71 (s, 1H, 5′-H), 8.02 (d, 2H, J = 7.4 Hz, 2″-H and 6″-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.3 (C-18), 13.8 (C-19), 21.0 (CH_2), 21.1 (Ac-CH_3), 21.2 (Ac-CH_3), 23.3 (CH_2), 27.4 (CH_2), 28.5 (CH_2), 30.3 (CH_2), 32.6 (CH_2), 33.4 (CH_2), 35.6 (CH), 36.2 (CH_2), 37.5 (CH_2), 40.1 (C-10), 42.4 (C-13), 47.4 (CH), 50.3 (CH), 58.0 (*O*-CH_2), 64.9 and 69.1 (C-1 and C-3), 82.4 (C-17), 125.8 (C-5′), 128.4 (2C, C-3″ and C-5″), 129.7 (2C, C-2″ and C-6″), 133.1 (C-4”), 141.5 (2C, C-1″ and C-4′), 166.4 (C=O), 170.0 and 170.8 (2 × Ac-CO); ESI-MS: 578 $[M+H]^+$; Anal. Calcd for $C_{33}H_{43}N_3O_6$ C, 68.61; H, 7.50; N, 7.27. Found: C, 68.73; H, 7.65; N, 7.58.

1α-[4′-(4″-Tolyl)-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstane-3β,17β-diol (11b)



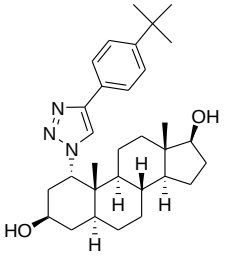
Substrate: **7b** (0.24 mmol) was used for the synthesis as described in the **General procedure 4.7.** Compound **11b** was obtained as a white solid (101 mg, 94%), mp 161-163 °C, R_f = 0.28 (ss F); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.17 (m, 1H), 0.72 (s, 3H, 18-H_3), 0.75-0.83 (m, 3H), 1.07 (s, 3H, 19-H_3), 1.14-1.60 (m, 12H), 1.95 (m, 1H), 2.06 (m, 1H), 2.38 (m, 2H), 2.39 (s, 3H, 4”-CH_3), 3.46 (m, 1H, 17-H), 4.02 (m, 1H, 3-H), 4.56 (d, 1H, J = 5.5 Hz, 1-H), 5.25 (d, 1H, J = 10.5 Hz, 3-OH), 7.25 (d, 2H, J = 7.9 Hz, 3″-H and 5″-H), 7.71 (d, 2H, J = 7.9 Hz, 2″-H and 6″-H), 7.86 (s, 1H, 5′-H); ESI-MS: 450 $[M+H]^+$; Anal. Calcd for $C_{28}H_{39}N_3O_2$ C, 74.80; H, 8.74; N, 9.35. Found: C, 74.96; H, 8.92; N, 9.22.

1α-[4′-(4″-Ethylphenyl)-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstane-3β,17β-diol (11c)



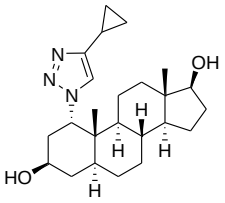
Substrate: **7c** (0.24 mmol) was used for the synthesis as described in the **General procedure 4.7.** Compound **11c** was obtained as a white solid (104 mg, 93%), mp 154-157 °C, R_f = 0.34 (ss F); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.17 (m, 1H), 0.72 (s, 3H, 18-H_3), 0.75-0.84 (m, 3H), 1.07 (s, 3H, 19-H_3), 1.14-1.22 (m, 2H), 1.27 (t, 3H, J = 7.6 Hz, 4″-$CH_2\underline{CH_3}$), 1.34-1.58 (m, 7H), 1.69-1.81 (m, 3H), 1.95 (m, 1H), 2.06 (m, 1H), 2.39 (m, 2H), 2.68 (q, 2H, J = 7.6 Hz, 4”-$\underline{CH_2}CH_3$), 3.47 (m, 1H, 17-H), 4.02 (m, 1H, 3-H), 4.57 (d, 1H, J = 5.4 Hz, 1-H), 5.24 (d, 1H, J = 10.5 Hz, 3-OH), 7.27 (d, 2H, J = 8.0 Hz, 3″-H and 5″-H), 7.73 (d, 2H, J = 8.0 Hz, 2″-H and 6″-H), 7.87 (s, 1H, 5′-H); ESI-MS: 464 $[M+H]^+$; Anal. Calcd for $C_{29}H_{41}N_3O_2$ C, 75.12; H, 8.91; N, 9.06. Found: C, 75.24; H, 9.06; N, 9.28.

1α-[4′-(4″-*tert*-Butylphenyl)-1′*H*-1′,2,′3′-triazol-1′-yl]-5α-androstane-3β,17β-diol (11d)



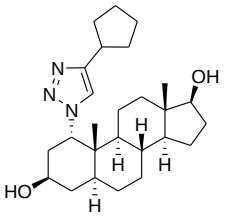
Substrate: **7d** (0.22 mmol) was used for the synthesis as described in the **General procedure 4.7.** Compound **11d** was obtained as a white solid (103 mg, 95%), mp 170-172 °C, R_f = 0.38 (ss F); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.16 (m, 1H), 0.72 (s, 3H, 18-H_3), 0.75-0.84 (m, 3H), 1.07 (s, 3H, 19-H_3), 1.14-1.28 (m, 2H), 1.35 (s, 9H, 4”-*t*Bu-$\underline{CH_3}$), 1.38-1.57 (m, 7H), 1.69-1.81 (m, 3H), 1.96 (m, 1H), 2.07 (m, 1H), 2.39 (m, 2H), 3.47 (m, 1H, 17-H), 4.02 (m, 1H, 3-H), 4.57 (d, 1H, *J* = 5.4 Hz, 1-H), 5.25 (d, 1H, *J* = 10.5 Hz, 3-OH), 7.47 (d, 2H, *J* = 8.1 Hz, 3″-H and 5″-H), 7.76 (d, 2H, *J* = 8.1 Hz, 2″-H and 6″-H), 7.88 (s, 1H, 5′-H); ESI-MS: 492 $[M+H]^+$; Anal. Calcd for $C_{31}H_{45}N_3O_2$ C, 75.72; H, 9.22; N, 8.55. Found: C, 75.59; H, 9.04; N, 8.77.

1α-[4′-Cyclopropyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstane-3β,17β-diol (11e)



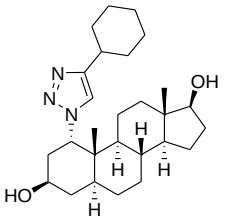
ubstrate: **7e** (0.27 mmol) was used for the synthesis as described in the **General procedure 4.7.** Compound **11e** was obtained as a white solid (101 mg, 94%), mp 257-260 °C, R_f = 0.22 (ss H); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.07 (m, 1H), 0.72 (s, 3H, 18-H_3), 0.74-0.88 (m, 4H), 0.97 (m, 2H), 1.03 (s, 3H, 19-H_3), 1.15-1.24 (m, 2H), 1.32-1.44 (m, 6H), 1.47-1.59 (m, 2H), 1.66-1.78 (m, 3H), 1.93-2.03 (m, 3H), 2.35 (m, 2H), 3.54 (m, 1H, 17-H), 3.96 (m, 1H, 3-H), 4.40 (d, 1H, *J* = 5.8 Hz, 1-H), 5.50 (d, 1H, *J* = 11.1 Hz, 3-OH), 7.29 (s, 1H, 5′-H); ESI-MS: 400 $[M+H]^+$; Anal. Calcd for $C_{24}H_{37}N_3O_2$ C, 72.14; H, 9.33; N, 10.52. Found: C, 72.33; H, 9.15; N, 10.69.

1α-[4′-Cyclopentyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstane-3β,17β-diol (11f)



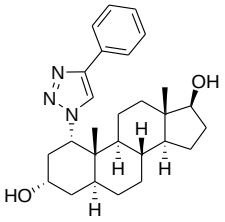
Substrate: **7f** (0.26 mmol) was used for the synthesis as described in the **General procedure 4.7.** Compound **11f** was obtained as a white solid (102 mg, 92%), mp 255-256 °C, R_f = 0.24 (ss G); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.02 (m, 1H), 0.68 (m, 1H), 0.72 (s, 3H, 18-H_3), 0.75-0.84 (m, 2H), 1.03 (s, 3H, 19-H_3), 1.15-1.45 (m, 9H), 1.47-1.77 (m, 9H), 2.00 (m, 2H), 2.10 (m, 2H), 2.35 (m, 2H), 3.19 (m, 1H), 3.51 (m, 1H, 17-H), 3.97 (m, 1H, 3-H), 4.41 (d, 1H, *J* = 5.2 Hz, 1-H), 5.72 (d, 1H, *J* = 11.3 Hz, 3-OH), 7.31 (s, 1H, 5′-H); ESI-MS: 428 $[M+H]^+$; Anal. Calcd for $C_{26}H_{41}N_3O_2$ C, 73.03; H, 9.66; N, 9.83. Found: C, 73.21; H, 9.82; N, 9.62.

1α-[4′-Cyclohexyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstane-3β,17β-diol (11g)



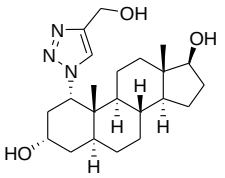
Substrate: **7g** (0.25 mmol) was used for the synthesis as described in the **General procedure 4.7.** Compound **11g** was obtained as a white solid (105 mg, 95%), mp 244-246 °C, R_f = 0.31 (ss G); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.01 (m, 1H), 0.68 (m, 1H), 0.72 (s, 3H, 18-H_3), 0.74-0.84 (m, 2H), 1.03 (s, 3H, 19-H_3), 1.16-1.58 (m, 14H), 1.66-1.81 (m, 6H), 1.94-2.03 (m, 4H), 2.35 (m, 2H), 2.78 (m, 1H), 3.51 (m, 1H, 17-H), 3.96 (m, 1H, 3-H), 4.41 (d, 1H, *J* = 5.2 Hz, 1-H), 5.73 (d, 1H, *J* = 11.3 Hz, 3-OH), 7.29 (s, 1H, 5′-H); ESI-MS: 442 $[M+H]^+$; Anal. Calcd for $C_{27}H_{43}N_3O_2$ C, 73.43; H, 9.81; N, 9.51. Found: C, 73.64; H, 9.67; N, 9.32.

4.7.8. 1α-[4′-Phenyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstane-3α,17β-diol (12a)



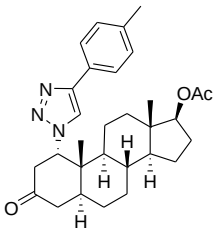
Substrate: **8a** (0.25 mmol) was used for the synthesis as described in the **General procedure 4.7.** Compound **12a** was obtained as a white solid (104 mg, 95%), mp 265-267 °C, R_f = 0.38 (ss G); ^{1}H NMR (500 MHz, MeOD): δ_H = 0.26 (m, 1H), 0.62 (m, 1H), 0.70 (s, 3H, 18-H$_3$), 0.76 (m, 2H), 1.14 (s, 3H, 19-H$_3$), 1.18 (m, 1H), 1.27-1.54 (m, 8H), 1.60 (m, 2H), 1.69 (m, 1H), 1.79-1.89 (m, 2H), 1.96 (m, 1H), 2.07 (m, 1H), 2.44 (m, 1H), 3.37 (t, 1H, *J* = 8.6 Hz, 17-H), 4.40 (m, 1H, 3-H), 4.59 (m, 2H, 1-H and OH), 7.33 (t, 1H, *J* = 7.4 Hz, 4″-H), 7.43 (t, 2H, *J* = 7.4 Hz, 3″-H and 5″-H), 7.82 (d, 2H, *J* = 7.4 Hz, 2″-H and 6″-H), 8.39 (s, 1H, 5′-H); ESI-MS: 436 [M+H]$^+$; Anal. Calcd for $C_{27}H_{37}N_3O_2$ C, 74.45; H, 8.56; N, 9.65. Found: C, 74.62; H, 8.73; N, 9.92.

1α-[4′-(*O*-Benzoyl)hydroxymethyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstane-3α,17β-diol (12i)



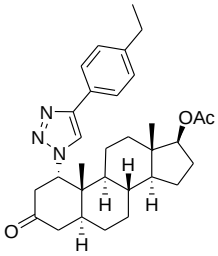
Substrate: **8h** (0.22 mmol) was used for the synthesis as described in the **General procedure 4.7.** Compound **12h** was obtained as a white solid (74 mg, 85%), mp 267-269 °C; ^{1}H NMR (500 MHz, MeOD): δ_H = 0.21 (m, 1H), 0.69 (s, 3H, 18-H$_3$), 0.70 (m, 3H), 1.12 (s, 3H, 19-H$_3$), 1.17 (m, 1H), 1.27-1.88 (m, 14H), 2.03 (m, 1H), 2.35 (m, 1H), 3.41 (m, 1H, 17-H), 4.30 (m, 1H, 3-H), 4.56 (bs, 1H, 1-H), 4.66 (s, 2H, *O*-CH$_2$), 7.96 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, MeOD): δ_C = 11.9 (C-18), 14.3 (C-19), 22.3 (CH$_2$), 24.2 (CH$_2$), 30.0 (CH$_2$), 30.6 (CH$_2$), 32.1 (CH$_2$), 37.3 (CH), 37.6 (2C, 2 × CH$_2$), 38.5 (CH$_2$), 39.6 (CH), 41.3 (C-10), 44.2 (C-13), 49.4 (CH), 52.3 (CH), 56.5 (*O*-CH$_2$), 66.6 and 66.8 (C-1 and C-3), 82.3 (C-17), 126.0 (C-5′), 147.7 (C-4′); ESI-MS: 390 [M+H]$^+$; Anal. Calcd for $C_{22}H_{35}N_3O_3$ C, 67.83; H, 9.06; N, 10.79. Found: C, 67.94; H, 9.19; N, 10.71.

17β-Acetoxy-1α-[4′-(4″-tolyl)-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3-one (13b)



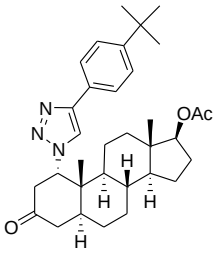
Following **General procedure 4.8.**, CH_2Cl_2/EtOAc (95:5) was used as eluent, yielding **2** (35 mg, 26%) and **13b** as a white solid (139 mg, 69%), mp 213-215 °C, R_f = 0.35 (ss C); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.38 (m, 1H), 0.70 (m, 1H), 0.81 (s, 3H, 18-H$_3$), 0.87-0.96 (m, 1H), 1.10 (m, 1H), 1.24 (s, 3H, 19-H$_3$), 1.30 (m, 3H), 1.42-1.59 (m, 5H), 1.78 (m, 1H), 1.91 (m, 1H), 2.01 (s, 3H, Ac-CH$_3$), 2.07 (m, 1H), 2.16 (m, 1H), 2.30 (m, 1H), 2.37 (s, 3H, 4″-CH$_3$), 2.48 (m, 1H), 2.66 (m, 1H), 2.95 (m, 1H), 4.51 (t, 1H, *J* = 8.2 Hz, 17-H), 5.00 (d, 1H, *J* = 5.0 Hz, 1-H), 7.22 (d, 2H, *J* = 7.7 Hz, 3″-H and 5″-H), 7.58 (s, 1H, 5′-H), 7.69 (d, 2H, *J* = 7.7 Hz, 2″-H and 6″-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.3 (C-18), 13.7 (C-19), 21.1 (Ac-CH$_3$), 21.1 (CH$_2$), 21.2 (4”-CH$_3$), 23.3 (CH$_2$), 27.4 (CH$_2$), 28.3 (CH$_2$), 30.0 (CH$_2$), 35.5 (CH), 36.4 (CH$_2$), 38.1 (CH), 40.0 (C-10), 42.7 (C-13), 43.0 (CH$_2$), 43.9 (CH$_2$), 47.4 (CH), 50.3 (CH), 64.5 (C-1), 82.3 (C-17), 119-5 (C-5′), 125.6 (2C, C-2″ and C-6″), 127.4 (C-1″), 129.5 (2C, C-3″ and C-5″), 138.1 (C-4″), 147.0 (C-4′), 170.9 (Ac-CO), 206.6 (C-3); ESI-MS: 490 [M+H]$^+$; Anal. Calcd for $C_{30}H_{39}N_3O_3$ C, 73.59; H, 8.03; N, 8.58. Found: C, 73.72; H, 8.20; N, 8.48.

17β-Acetoxy-1α-[4′-(4″-ethylphenyl)-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3-one (13c)



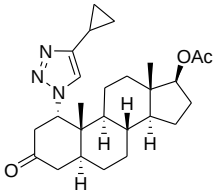
Following **General procedure 4.8.**, CH_2Cl_2/EtOAc (95:5) was used as eluent, yielding **2** (37 mg, 28%) and **13c** as a white solid (135 mg, 68%), mp 188-191 °C, R_f = 0.62 (ss C); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.38 (m, 1H), 0.70 (m, 1H), 0.81 (s, 3H, 18-H_3), 0.91 (m, 1H), 1.10 (m, 1H), 1.24 (t, 3H, J = 7.5 Hz, 4″-$CH_2\underline{CH_3}$), 1.25 (s, 3H, 19-H_3), 1.30 (m, 3H), 1.42-1.60 (m, 6H), 1.78 (m, 1H), 1.93 (m, 1H), 2.02 (s, 3H, Ac-CH_3), 2.07 (m, 1H), 2.16 (m, 1H), 2.32 (m, 1H), 2.51 (m, 1H), 2.67 (q, 2H, J = 7.5 Hz, 4″-$\underline{CH_2}CH_3$), 2.95 (m, 1H), 4.52 (t, 1H, J = 8.3 Hz, 17-H), 5.00 (d, 1H, J = 5.0 Hz, 1-H), 7.25 (d, 2H, J = 7.7 Hz, 3″-H and 5″-H), 7.59 (s, 1H, 5′-H), 7.72 (d, 2H, J = 7.7 Hz, 2″-H and 6″-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.3 (C-18), 13.7 (C-19), 15.5 (4″-$CH_2\underline{CH_3}$), 21.1 (Ac-CH_3), 21.1 (CH_2), 23.3 (CH_2), 27.4 (CH_2), 28.3 (CH_2), 28.7 (CH_2), 30.0 (CH_2), 35.6 (CH), 36.4 (CH_2), 38.1 (CH), 40.0 (C-10), 42.7 (C-13), 43.0 (CH_2), 43.9 (CH_2), 47.4 (CH), 50.3 (CH), 64.5 (C-1), 82.3 (C-17), 119.5 (C-5′), 125.7 (2C, C-2″ and C-6″), 127.6 (C-1″), 128.4 (2C, C-3″ and C-5″), 144.5 (C-4″), 147.1 (C-4′), 170.9 (Ac-CO), 206.6 (C-3); ESI-MS: 504 $[M+H]^+$; Anal. Calcd for $C_{31}H_{41}N_3O_3$ C, 73.92; H, 8.20; N, 8.34. Found: C, 73.77; H, 8.31; N, 8.58.

17β-Acetoxy-1α-[4′-(4″-*tert*-butylphenyl)-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3-one (13d)



Following **General procedure 4.8.**, CH_2Cl_2/EtOAc (95:5) was used as eluent, yielding **2** (23 mg, 19%) and **13d** as a white solid (149 mg, 75%), mp 213-216 °C, R_f = 0.64 (ss C); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.37 (m, 1H), 0.70 (m, 1H), 0.81 (s, 3H, 18-H_3), 0.91 (m, 1H), 1.10 (m, 1H), 1.25 (s, 3H, 19-H_3), 1.30 (m, 3H), 1.34 (s, 9H, 4″-*t*Bu-$\underline{CH_3}$), 1.42-1.60 (m, 6H), 1.78 (m, 1H), 1.93 (m, 1H), 2.02 (s, 3H, Ac-CH_3), 2.07 (m, 1H), 2.16 (m, 1H), 2.32 (m, 1H), 2.51 (m, 1H), 2.95 (m, 1H), 4.52 (t, 1H, J = 8.4 Hz, 17-H), 5.00 (d, 1H, J = 5.0 Hz, 1-H), 7.44 (d, 2H, J = 8.2 Hz, 3″-H and 5″-H), 7.61 (s, 1H, 5′-H), 7.74 (d, 2H, J = 8.2 Hz, 2″-H and 6″-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.3 (C-18), 13.7 (C-19), 21.0 (Ac-CH_3), 21.1 (CH_2), 23.3 (CH_2), 27.4 (CH_2), 28.3 (CH_2), 30.0 (CH_2), 31.2 (3C, 4″-*t*Bu-$\underline{CH_3}$), 34.7 (4″-*t*Bu-C), 35.6 (CH), 36.4 (CH_2), 38.1 (CH), 40.4 (C-10), 42.7 (C-13), 43.0 (CH_2), 43.9 (CH_2), 47.5 (CH), 50.3 (CH), 64.5 (C-1), 82.3 (C-17), 119.5 (C-5′), 125.4 (2C) and 125.8 (2C): (C-2″, C-3″, C-5″ and C-6″), 127.4 (C-1″), 147.0 (C-4′), 151.4 (C-4″), 171.0 (Ac-CO), 206.5 (C-3); ESI-MS: 532 $[M+H]^+$; Anal. Calcd for $C_{33}H_{45}N_3O_3$ C, 74.54; H, 8.53; N, 7.90. Found: C, 74.70; H, 8.36; N, 8.03.

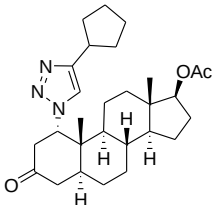
17β-Acetoxy-1α-[4′-cyclopropyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3-one (13e)



Following **General procedure 4.8.**, CH_2Cl_2/EtOAc (80:20) was used as eluent, yielding **2** (34 mg, 24%) and **13e** as a white solid (141 mg, 71%), mp 176-179 °C, R_f = 0.47 (ss E); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.30 (m, 1H), 0.72 (m, 1H), 0.80 (s, 3H, 18-H_3), 0.82-0.89 (m, 2H), 0.90-0.97 (m, 3H), 1.08 (m, 1H), 1.20 (s, 3H, 19-H_3), 1.23-1.33 (m, 2H), 1.39-1.60 (m, 6H), 1.73 (m, 1H), 1.83-1.93 (m, 2H), 2.02 (s, 3H, Ac-CH_3), 2.05-2.16 (m, 2H), 2.28 (dd, 1H, J = 16.6 Hz, J = 13.0 Hz), 2.45 (m, 1H), 2.58 (d, 1H, J = 16.8 Hz), 2.89 (dd, 1H, J = 16.8 Hz, J = 6.1 Hz), 4.55 (t, 1H, J = 8.3 Hz, 17-H), 4.88 (d, 1H, J = 5.0 Hz, 1-H), 7.11 (s, 1H, 5′-H); ^{13}C NMR (125

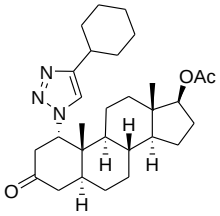
MHz, $CDCl_3$):δ_C = 6.6 (C-1″), 7.8 and 8.0 (C-2″ and C-3″), 12.3 (C-18), 13.7 (C-19), 21.0 (CH_2), 21.1 (Ac-CH_3), 23.3 (CH_2), 27.4 (CH_2), 28.3 (CH_2), 30.0 (CH_2), 35.5 (CH), 36.4 (CH_2), 38.1 (CH), 39.9 (C-10), 42.7 (C-13), 43.1 (CH_2), 43.9 (CH_2), 47.4 (CH), 50.4 (CH), 64.3 (C-1), 82.3 (C-17), 120.2 (C-5′), 149.2 (C-4′), 171.0 (Ac-CO), 206.7 (C-3); ESI-MS: 440 $[M+H]^+$; Anal. Calcd for $C_{26}H_{37}N_3O_3$ C, 71.04; H, 8.48; N, 9.56. Found: C, 71.31; H, 8.32; N, 9.74.

17β-Acetoxy-1α-[4′-cyclopentyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3-one (13f)



Following **General procedure 4.8.**, CH_2Cl_2/EtOAc (95:5) was used as eluent, yielding **2** (34 mg, 24%) and **13f** as a white solid (147 mg, 73%), mp 194-196 °C, R_f = 0.53 (ss E); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.27 (m, 1H), 0.71 (m, 1H), 0.80 (s, 3H, 18-H_3), 0.90 (m, 1H), 1.03 (m, 1H), 1.21 (s, 3H, 19-H_3), 1.27 (m, 3H), 1.40-1.84 (m, 13H), 2.02 (s, 3H, Ac-CH_3), 2.07-2.18 (m, 4H), 2.28 (dd, 1H, *J* = 16.5 Hz, *J* = 13,0 Hz), 2.45 (m, 1H), 2.60 (d, 1H, *J* = 16.8 Hz), 2.89 (dd, 1H, *J* = 16.8 Hz, *J* = 6.0 Hz), 3.14 (m, 1H), 4.53 (t, 1H, *J* = 8.4 Hz, 17-H), 4.88 (d, 1H, *J* = 5.4 Hz, 1-H), 7.12 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.4 (C-18), 13.7 (C-19), 21.0 (CH_2), 21.1 (Ac-CH_3), 23.3 (CH_2), 25.1 (CH_2), 27.4 (CH_2), 28.2 (CH_2), 30.1 (CH_2), 33.1 (CH_2), 33.3 (CH_2), 35.5 (CH), 36.4 (2C, 2 × CH_2), 36.6 (CH), 38.0 (CH), 39.9 (C-10), 42.7 (C-13), 43.0 (CH_2), 43.9 (CH_2), 47.5 (CH), 50.5 (CH), 64.2 (C-1), 82.4 (C-17), 120.1 (C-5′), 151.8 (C-4′), 171.0 (Ac-CO), 206.7 (C-3); ESI-MS: 468 $[M+H]^+$; Anal. Calcd for $C_{28}H_{41}N_3O_3$ C, 71.91; H, 8.84; N, 8.99. Found: C, 72.04; H, 9.05; N, 9.25.

17β-Acetoxy-1α-[4′-cyclohexyl-1′*H*-1′,2′,3′-triazol-1′-yl]-5α-androstan-3-one (13g)



Following **General procedure 4.8.**, CH_2Cl_2/EtOAc (80:20) was used as eluent, yielding **2** (34 mg, 24%) and **13g** as a white solid (142 mg, 72%), mp 202-204 °C, R_f = 0.42 (ss D); ^{1}H NMR (500 MHz, $CDCl_3$): δ_H = 0.25 (m, 1H), 0.70 (m, 1H), 0.80 (s, 3H, 18-H_3), 0.90 (m, 1H), 1.21 (s, 3H, 19-H_3), 1.25-1.60 (m, 14H), 1.69-1.84 (m, 5H), 2.02 (s, 3H, Ac-CH_3), 2.08-2.18 (m, 4H), 2.28 (dd, 1H, *J* = 16.5 Hz, *J* = 12.9 Hz), 2.46 (m, 1H), 2.62 (d, 1H, *J* = 16.8 Hz), 2.73 (m, 1H), 2.89 (dd, 1H, *J* = 16.8 Hz, *J* = 6.0 Hz), 4.53 (t, 1H, *J* = 8.2 Hz, 17-H), 4.88 (d, 1H, *J* = 5.2 Hz, 1-H), 7.10 (s, 1H, 5′-H); ^{13}C NMR (125 MHz, $CDCl_3$): δ_C = 12.4 (C-18), 13.7 (C-19), 21.1 (CH_2), 21.2 (Ac-CH_3), 23.3 (CH_2), 26.0 (3C, 3 × CH_2), 27.4 (CH_2), 28.3 (CH_2), 30.1 (CH_2), 32.9 (2C, 2 × CH_2), 35.1 (CH), 35.5 (CH), 36.5 (CH_2), 38.0 (CH), 40.0 (C-10), 42.7 (C-13), 43.0 (CH_2), 43.9 (CH_2), 47.5 (CH), 50.5 (CH), 64.2 (C-1), 82.4 (C-17), 119.8 (C-5′), 152.8 (C-4′), 171.1 (Ac-CO), 206.7 (C-3); ESI-MS: 482 $[M+H]^+$; Anal. Calcd for $C_{29}H_{43}N_3O_3$ C, 72.31; H, 9.00; N, 8.72. Found: C, 72.47; H, 9.19; N, 8.55.