SUPPORTING INFORMATION

NTP synthesis.

*N- (2-nitro-3-trifluoromethyl-phenyl) acetamide (1)*-Trifluoroacetamide (10g, 50mmol) was added over 10 min. (in 1g portions) to 12.5g of a mixture containing equal parts of HNO₃ (d=1.52) and (CH₃COO)₂O cooled to 0°C (4.2ml HNO₃ and 5.8ml (CH₃COO)₂O). The reaction was continued for 15min. at 0°C and than 4h at room temperature. The white precipitate (the wanted product) was filtered and washed with 5ml of (CH₃COO)₂O (24% yield, 2.9g, 11.7mmol). TLC (CH₂Cl₂/MeOH, 98:2): Rf= 0.30; ¹H NMR(250MHz, d₆–DMSO, ppm) 10.19(1H, s, N-H), 7.94-7.82(3H, m, aromH), 2.05(3H, s, CH₃); ¹³C NMR(62,9MHz, d₆–DMSO, ppm) 168.73(C=O), 141.54, 131.96, 131.53, 123.72, 123.64, 121.28 (*arom C*), 112.2 (CF₃), 20.1 (CH₃); ESI-MS: 266.0 ([M+NH₄]+);

*2-Nitro-3-trifluoromethyl-phenylamine (2)* – The solution of 1 (2g, 8.1mmol) in 25ml of 0.1 M NaOH was refluxed until the starting material was consumed (90 min. monitored by TLC). The reaction was than cooled to room temperature, extracted with CH₂Cl₂, and the organic phase was dried over MgSO₄ and solvent evaporated. Product was obtained as yellow crystals in 84% yield(1.40g). TLC (CH₂Cl₂/MeOH, 99:1): Rf= 0.63; ¹H NMR(250MHz, CDCl₃, ppm) 7.37 (1H, m, 5H), 7.11(2H, m, 4H,6H), 5.02 (2H, s, NH₂); ¹³C NMR(62,9MHz, CDCl₃, ppm): 145.1, 136.3, 132.3, 125.1, 120.1, 117.2 (*arom C*), 111.8(CF₃); ESI-MS: 205.6([M-H]⁺);

*4-Trifluoromethyl-1H-benzimidazole (3)*- 2 (1.4g, 6,8mmol) was dissolved in abs. EtOH (50ml). PtO₂ (150 mg, 0.65mmol) was added and allowed to react in an H₂ atmosphere for 2h (TLC control, CH₂Cl₂/MeOH, 99/1, Rf=0.5). The reaction mixture was than filtered over Celite and the filtrate was evaporated. Crude product was dissolved in 90% HCOOH (100ml) and heated under reflux for 3h. HOAc was evaporated to obtain crude product, which was purified by
FC(CH$_2$Cl$_2$/MeOH, 9/1) in 94% yield (1.2g). TLC(CH$_2$Cl$_2$/MeOH, 9/1): Rf= 0.41; $^1$H NMR(250MHz, $d_6$-DMSO, ppm) 8.40 (1H, d, J=3.83Hz, 7H), 7.90 (1H, s, NH), 7.54 (1H, d, J=4.68Hz, 5H), 7.36 (1H, m, 6H); $^{13}$C NMR(62.9MHz, $d_6$-DMSO, ppm) 163.62, 145.54, 126.00, 123.30, 121.98, 119.60, 119.20 (arom C), 114.10(CF$_3$); ESI-MS: 186.7 ([M+H];

2',3',5'-Tri-O-acetyl-1'-deoxy-1'-(4-trifluoromethyl-1-N-benzimidazole-1-yl)-β-D-ribofuranose (4)- To a suspension of 3 (1.2g, 6.4mmol) in AcN (50ml) was added N,O-bis(trimethylsilyl)acetamide (2.40ml, 9.90mmol) and heated under reflux for 15min. After the mixture was cooled to room temperature, 1,2,3,5-Tetra-O-acetyl-β-D-ribofuranose (2.1g, 6.55mmol) in AcN (20ml) and trimethylsilyl trifluoromethanesulfonate (1.5ml, 8.16mmol) was added and heated under reflux for 2.5h. After cooling the reaction mixture to room temperature, it was treated with a 5% NaHCO$_3$ solution and extracted with CH$_2$Cl$_2$. The organic phase was dried (over MgSO$_4$) and evaporated and the residue purified by means of preparative HPLC(MN Nucleoprep 100-20 from Macherey-Nagel, n-Hexane:Ethyl acetate, 10:25). The title compound was the faster migrating isomer, and obtained as a white foam (70%, 2.0g). TLC (CH$_2$Cl$_2$/MeOH, 95:5): Rf= 0.40; $^1$H NMR (400MHz, $d_6$ DMSO, ppm) 8.69 (1H, s, 2H), 8.10 (1H, d, J=8.2Hz, 5H), 7.64 (1H, d, J=7.56Hz, 7H), 7.49 (1H, m, 6H), 6.42 (1H, d, J=6.08Hz, 1H'), 5.70 (1H, t, J=6.22Hz, 2H'), 5.05 (1H, m, 3H'), 4.39 (1H, m, 4H'), 4.20 (2H, m, 5H'), 2.11 (3H, s, CH$_3$), 2.08 (3H, s, CH$_3$), 2.04 (3H, s, CH$_3$); $^{13}$C NMR (100,6 MHz, $d_6$-DMSO, ppm) 171.5, 169.08, 169.00 (C=O), 144.36 (C2), 142.40, 133.90, 122.70, 120.25, 120.20, 120.18 (arom C), 114.5 (CF$_3$), 86.71 (C1'), 78.21 (C4') 71.30 (C2'), 69.18 (C3'), 62.53 (C5'), 20.10, 19.91, 19.58 (CH$_3$); ESI-MS: 445.4 ([M+H]$^+$);

2',3',5'-Tri-O-acetyl-1'-deoxy-1'-(4-trifluoromethyl-3-N-benzimidazole-1-yl)-β-D-ribofuranose (5)- was obtained by the same procedure as 4 as the slower migrating isomer
during preparative HPLC (MN Nucleoprep 100-20 from Macherey-Nagel, n-Hexane:Ethyl acetate, 10:25) separation. Product was obtained as white foam (27%, 0.77 g). TLC (CH₂Cl₂/MeOH, 95:5): Rf=0.40; ¹H NMR (400MHz, d₆ DMSO, ppm) 8.67 (1H, s, 2H), 7.84 (1H, d, J=8.3Hz, 7H), 7.62 (1H, d, J=8.20Hz, 5H), 7.50 (1H, m, 6H), 6.38 (1H, d, J=6.10Hz, 1H'), 5.70 (1H, t, J=6.30Hz, 2H'), 5.10 (1H, m, 3H'), 4.42 (1H, m, 4H'), 4.18 (2H, m, 5H'), 2.09 (3H, s, CH₃), 2.07 (3H, s, CH₃), 2.06 (3H, s, CH₃); ¹³C NMR (100,6 MHz, d₆ -DMSO, ppm) 170.5, 169.10, 169.00 (C=O), 145.10 (C2), 142.40, 134.00, 122.70, 120.30, 120.20, 120.16 (arom C), 113.5 (CF₃), 87.00 (C1'), 78.41 (C4') 71.10 (C2'), 69.20 (C3'), 62.50 (C5'), 20.10, 19.90, 19.70 (CH₃); ESI-MS: 445.4 ([M+H]⁺);

1'-deoxy-1'-(4-trifluoromethyl-1-N-benzimidazole-1-yl)-β-D-ribofuranose (6) - 4 (1g, 2.25mmol) was dissolved in MeOH (25ml) and 185 l of MeONa/ MeOH (5.4M, Fluka) was added at room temperature. TLC showed that the reaction was complete after 60 min., at which time it was neutralized with DOWEX 50, filtered and evaporated. A white foam was obtained in 92% yield (0.66 g, 2.07 mmol); TLC (CH₂Cl₂/MeOH, 9:1): Rf=0.28; ¹H NMR (400MHz, d₆ DMSO, ppm) 8.64 (1H, s, 2H), 8.11 (1H, d, J=8.20 Hz, 7H), 7.60 (1H, d, J=7.56Hz, 5H), 7.42 (1H, m, 6H), 5.95 (1H, d, J=6.28Hz, 1H'), 5.51 (1H, d, J=6.44Hz, 2'O'H), 5.26 (1H, d, J=4.68Hz, 3OH'), 5.15 (1H,t, J=5.12Hz, 5OH'), 4.38 (1H, q, J= 5.84 Hz, 2H'), 4.16 (1H, m, 3H'), 4.01 (1H, m, 4H'), 3.66 (2H, m, 5H'); ¹³C NMR (100,6 MHz, d₆ -DMSO, ppm): 143.10 (C2), 136.05, 130.10, 128.10, 125.10, 125.00, 124.10 (arom C), 114.10 (CF₃), 89.00 (C1'), 86.10 (C4'), 74.10 (C2'), 70.00 (C3'), 62.10 (C5'); ESI-MS: 317.30 ([M-H]⁻);

1'-deoxy-1'-(4-trifluoromethyl-3-N-benzimidazole-1-yl)-β-D-ribofuranose (7) - 5 (0.5g, 1.12mmol) was dissolved in MeOH (25ml) and 185 l of MeONa/ MeOH (5.4M, Fluka) was added at room temperature. TLC showed that the reaction was complete after 60 min., at which
point it was neutralized with DOWEX 50, filtered and evaporated. A white foam was obtained in 
93% yield (0.33g, 1.03mmol); TLC (CH₂Cl₂/MeOH, 9:1): Rf=0.28; ¹H NMR (400MHz, d₆ 
DMSO, ppm) 8.25 (1H, s, 2H), 7.80 (1H, d, J=8.00 Hz, 7H), 7.50 (1H, d, J=7.56Hz, 5H), 7.44 
(1H, m, 6H), 6.00 (1H, d, J=6.30Hz, 1H'), 5.50 (1H, d, J=6.50Hz, 2'OH), 5.28 (1H, d, J=4.70Hz, 
3OH'), 5.20 (1H, t, J=5.12Hz, 5OH'), 4.32 (1H, q, J= 5.86 Hz, 2H'), 4.10 ( 1H, m, 3H'), 4.00 
(1H, m, 4H'), 3.64 (2H, m, 5H'); ¹³C NMR (100.6 MHz, d₆ -DMSO, ppm): 142.10 (C2), 136.10, 
130.10, 128.10, 125.20, 125.05, 124.10 (arom C), 114.20 (CF₃), 89.00 (C1'), 86.20 (C4'), 74.20 
(C2'), 70.00 ( C3'), 62.10 (C5'); ESI-MS: 316.90 ([M-H]⁻);

5-Trifluoromethyl-1H-benzimidazole (8)- 3,4-diaminobenzofluoride (2.2g, 12.5mmol) was 
heated under reflux with 90% HCOOH for 3h. HCOOH was than evaporated and crude product 
purified by FC (CH₂Cl₂/MeOH, 9:1). Yield was 90% (2.10g); TLC (CH₂Cl₂/MeOH, 9:1): 
Rf=0.57; ¹H NMR (250MHz, d₆-DMSO, ppm): 12.87 (1H, s, NH), 8.46 (1H, s, 2H), 8.01 (1H, s, 
4H), 7.78 (1H, d, J=8.42Hz, 6H), 7.51 (1H, dd, J=8.48Hz, J=1.63Hz, 7H); ¹³C NMR (60.9 MHz, 
d₆ -DMSO, ppm): 142.05 (C2), 140.50, 138.10, 121.10, 119.10, 119.70, 119.20 (arom C, CF₃); 
ESI-MS: 187.0 ([M+H]⁺);

2’,3’,5’-Tri-O-acetyl-1’-deoxy-1’-(5-trifluoromethyl-1-N-benzimidazole-1-yl)-β-D- 
ribofuranose (9)- To a suspension of 8 (1.5g, 8.05mmol) in AcN (50ml) was added N,O-
bis(trimethylsilyl)acetamide (3.00ml, 12.00mmol) and heated under reflux for 15min. After the 
mixture was cooled to room temperature, 1,2,3,5-Tetra-O-acetyl-β-D-ribofuranose (2.60g, 
8.05mmol) in AcN (20ml) and trimethylsilyl trifluoromethanesulfonate (1.8ml,10mmol) were 
added and heated under reflux for 2.5h. After cooling the reaction mixture to room temperature, 
it was treated with a 5% NaHCO₃ solution and extracted with CH₂Cl₂. The organic phase was 
dried (over MgSO₄) and evaporated and the residue purified by means of preparative HPLC(MN
Nucleoprep 100-20 from Macherey-Nagel, n-Hexane:Ethyl acetate, 10:20). The title compound was obtained as the faster migrating isomer (57%, 2.04g). TLC (CH₂Cl₂/MeOH, 95:5): Rf= 0.55; ᵃH NMR (400MHz, d₆ DMSO, ppm) 8.72 (1H, s, 2H), 8.10 (1H, s, 4H), 7.99 (1H, d, J=8.58Hz, 7H), 7.68 (1H, d, J=8.55Hz, 6H), 6.42 (1H, d, J=6.20Hz, 1H’), 5.68 (1H, t, J=6.28Hz, 2H’), 5.44 (1H, m, 3H’), 4.56-4.37 (2H, m, 4H’,5H’), 2.07 (3H, s, CH₃), 2.06 (3H, s, CH₃), 2.04 (3H, s, CH₃); ᵃC NMR (100,6 MHz, d₆ -DMSO, ppm) 170.10, 169.70, 169.00 (C=O), 145.10 (C2), 144.40, 134.00, 123.10, 120.30, 120.20, 120.16 (arom C), 113.6 (CF₃), 87.00 (C1’), 78.40 (C4’) 71.20 (C2’), 69.80 (C3’), 62.70 (C5’), 20.20, 19.90, 19.80 (CH₃); ESI-MS: 445.0 ([M+H]+);

2’,3’,5’-Tri-O-acetyl-1’-deoxy-1’-(5-trifluoromethyl-3-N-benzimidazole-1-yl)-β-D-ribofuranose (10) - was obtained by the same procedure as 9 as the slower migrating isomer during preparative HPLC separation (MN Nucleoprep 100-20 from Macherey-Nagel, n-Hexane:Ethyl acetate, 10:20). Product was obtained as a white foam (40%, 1.43g). TLC (CH₂Cl₂/MeOH, 95:5): Rf=0.55; ᵃH NMR (400MHz, d₆ DMSO, ppm) : 8.75 (1H, s, 2H), 8.21 (1H, s, 4H), 7.92 (1H, d, J=8.48Hz, 7H), 7.61 (1H, d, J=8.68Hz, 6H), 6.49 (1H, d, J=6.16Hz, 1H’), 5.69 (1H, t, J=6.20Hz, 2H’), 5.44 (1H, m, 3H’), 4.40 (1H, m, 4H’), 2.08 (3H, s, CH₃), 2.06 (3H, s, CH₃), 2.03 (3H, s, CH₃); ᵃC NMR (100,6 MHz, d₆ -DMSO, ppm) 170.10, 169.70, 169.00 (C=O), 145.00 (C2), 144.40, 134.00, 123.10, 120.30, 120.20, 120.10 (arom C), 114.0 (CF₃), 87.00 (C1’), 78.50 (C4’) 71.20 (C2’), 69.90 (C3’), 62.70 (C5’), 20.20, 19.90, 19.80 (CH₃); ESI-MS: 445.0 ([M+H]+);

1’-deoxy-1’-(5-trifluoromethyl-1-N-benzimidazole-1-yl)-β-D-ribofuranose (11) - 9 (0.74g, 1.67mmol) was dissolved in MeOH (15ml) and 111 l of MeONa/ MeOH (5.4M, Fluka) was added at room temperature. TLC showed that the reaction was complete after 60min. It was then
neutralized with DOWEX 50, filtered and evaporated. A white foam was obtained in 91% yield (0.48g, 1.87 mmol); TLC (CH₂Cl₂/MeOH, 9:1): Rf=0.36; ¹H NMR (250MHz, d₆ DMSO, ppm) 8.68 (1H, s, 2H), 8.02 (2H, m, 4H, 7H), 7.58 (1H, d, J=8.40Hz, 6H), 5.95 (1H, d, J=6.13Hz, 1H’), 5.51 (1H, d, J=7.50Hz, 2’OH), 5.20 (1H, d, J=4.68Hz, 3OH’), 5.15 (1H, t, J=5.12Hz, 5OH’), 4.37 (1H, q, J=5.50Hz, 2H’), 4.13 (1H, m, 3H’), 4.00 (1H, m, 4H’), 3.66 (2H, m, 5H’); ¹³C NMR (100.6 MHz, d₆-DMSO, ppm): 143.10 (C2), 137.05, 132.10, 128.10, 125.10, 125.00, 124.10 (arom C), 114.10 (CF₃), 88.90 (C1’), 86.20 (C4’), 74.20 (C2’), 70.20 (C3’), 62.300 (C5’); ESI-MS: 316.8 ([M-H]-); 1’-deoxy-1’-(5-trifluoromethyl-3-N-benzimidazole-1-yl)-β-D-ribofuranose (12)- 10 (0.34g, 0.8 mmol) was dissolved in MeOH (15ml) and 111_l of MeONa/MeOH (5.4 M, Fluka) was added at room temperature. TLC showed that the reaction was complete after 60 min. It was then neutralized with DOWEX 50, filtered and evaporated. A white foam was obtained in 90% yield (0.22g, 0.73 mmol); TLC (CH₂Cl₂/MeOH, 9:1): Rf=0.37; ¹H NMR (250 MHz, d₆ DMSO, ppm) 8.68 (1H, s, 2H), 8.34 (1H, s, 4H), 7.88 (1H, d, J=6.40Hz, 7H), 7.55 (1H, d, J=8.55Hz, 6H), 5.99 (1H, d, J=6.40Hz, 1H’), 5.52 (1H, d, J=6.45Hz, 2’OH), 5.28 (1H, d, J=4.70Hz, 3OH’), 5.20 (1H, t, J=5.12Hz, 5OH’), 4.36 (1H, q, J=5.40 Hz, 2H’), 4.13 (1H, m, 3H’), 4.02 (1H, q, J=2.95Hz, 4H’), 3.51 (2H, m, 5H’); ¹³C NMR (100.6 MHz, d₆-DMSO, ppm): 141.10 (C2), 136.10, 132.10, 129.10, 125.20, 125.10, 124.10 (arom C), 114.40 (CF₃), 88.10 (C1’), 87.20 (C4’), 75.20 (C2’), 71.00 (C3’), 62.20 (C5’); ESI-MS: 316.90 ([M-H]-); 2’,3’,5’-Tri-O-acetyl-1’-deoxy-1’-(4-nitro-1-N-benzimidazole-1-yl)-β-D-ribofuranose (1) (13)- To a suspension of 4-nitrobenzimidazole (2) (256 mg, 1.57 mmol) and 1,2,3,5-tetra-O-acetyl-β-D-ribofuranose (649 mg, 2.04 mmol) in AcN (30 ml) was added N,O-bis(trimethylsilyl)acetamide (0.5 ml, 2.04 mmol) and heated under reflux for 30 min. After 30
minutes, the benzimidazole was not completely dissolved. At this time trimethylsilyl
trifluoromethanesulfonate (0.37ml, 2.04mmol) was added and the solution allowed to heated
under reflux for 2h. The reaction mixture was cooled to room temperature, treated with saturated
NaHCO$_3$ solution, and extracted with CH$_2$Cl$_2$. The organic phase was dried (over MgSO$_4$) and
evaporated. The crude material was purified by silica chromatography using 20% EtOAc in
CH$_2$Cl$_2$ to produce a homogeneous white foam (77%, 507mg).

$1'$-deoxy-$1'$-(4-nitro-1-N-benzimidazole-1-yl)-$\beta$-D-ribofuranose (2) (14)- Protected nucleoside
13 (486mg, 1.1 mmol) was dissolved in MeOH (5mL) and treated with 1M K$_2$CO$_3$ (3mL) at
room temperature for 4 hours. The solvent was removed under vacuum and the crude material
dissolved in 10 mL hot water. The title compound was purified by crystallization upon cooling
to room temperature (57%, 187mg). $^1$H NMR (500 MHz, $d_6$-DMSO, ppm) 8.78 (1H, s, 2H), 8.28
(1H, dd, J=8 Hz and 1 Hz, 7H), 8.08(1H, dd, J=8 Hz and 1 Hz, 5H), 7.48(1H, dd, J=8Hz and
8Hz, 6H), 5.99(1H, d, J=6 Hz, 1H’), 5.59(1H, br, 2’-OH), 5.30(1H, br, 3’-OH), 5.22(1H, br, 5’-
OH), 4.37(1H, br m, 2H’), 4.14(1H, br m, 3H’), 4.02(1H, br m, 4H’), 3.67(2H, br m, 5H’);
Isomeric and anomeric conformation were determined by 2-D COSY and 1-D GOESY
experiments.

$2'$,3',5'$-Tri-O-benzoyl-$1'$-deoxy-$1'$-(5,6-difluoro-1-N-benzimidazole-1-yl)-$\beta$-D-ribofuranose
(3) (15)- To a suspension of 5,6-difluorobenzimidazole (4) (200 mg, 1.30 mmol) and 1-O-acetyl-
2,3,5-tri-O-benzoyl-$\beta$-D-ribofuranose (413 mg, 0.81mmol) in 1,2-dichloroethane (13ml) was
added N,O-bis(trimethylsilyl)acetamide (0.45ml, 1.95mmol) and heated under reflux for 30 min.
After 30 minutes, trimethylsilyl trifluoromethanesulfonate (0.35ml, 1.95mmol) was added and
the solution allowed to heated under reflux for 2h. The reaction mixture was cooled to room
temperature, treated with saturated NaHCO$_3$ solution, and extracted with CH$_2$Cl$_2$. The organic
phase was dried over Na$_2$SO$_4$ and evaporated. The protected nucleoside was purified by means of crystallization from 1:1 EtOAc/hexanes (47%, 230 mg). TLC (1:1 EtOAc/hexanes): R$_f$=0.25;

$^1$H NMR (500MHz, CDCl$_3$, ppm) 8.56 (1H, s, 2H), 8.10 (2H, dd, J=8.5 Hz and 1 Hz Bz), 8.01 (2H, dd, J=8.5 Hz and 1.5 Hz, Bz), 7.96 (1H, dd, J=8.5Hz and 1.5 Hz, Bz), 7.68-7.57 (5H, m, arom), 7.52 (2H, dd, J=8 Hz and 7.5 Hz, Bz), 7.46- 7.40 (4H, m, arom), 6.37 ( 1H, d, J=5.5Hz, 1H’), 5.99 (1H, dd, J=5.5 Hz and 5.5 Hz, 2H’), 5.93 (1H, dd J= 4.5 Hz and 5.5 Hz, 3H’), 4.92-4.82 (2H, m, 4H’,5H’), 4.83 (1H, m, 5’);

1’-deoxy-1’-(5,6-difluoro-1-N-benzimidazole-1-yl)-β-D-ribofuranose (16) - 15 (188 mg, 314 µmol) was dissolved in ammonia saturated methanol (5 mL) overnight. The solvent was removed by reduced pressure evacuation and the residue purified by silica chromatography using 10% MeOH in EtOAc (58%, 51.4 mg). $^1$H NMR (500 MHz, $d_6$-DMSO, ppm) 8.52 (1H, s, 2H), 8.03 (1H, dd, J=7.5 Hz and 7.5 Hz 4H), 7.76 (1H, dd, J=7.5 Hz and 7.5 Hz, 7H), 5.84 (1H, d, J=6.5 Hz, 1H’), 5.47 (1H, d, J=6.5 Hz, 2’-OH), 5.25 (2H, br dd, 3’ and 5’-OH), 4.32 ( 1H, m, 2H’, 4.10(1H, m, 3H’), 3.98(1H, m, 4H’), 3.66(2H, m, 5H’); $^{19}$F NMR (470 MHz, $d_6$-DMSO, ppm) –142.96 (m), -144.88 (m)

General method of phosphorylation- Nucleosides were phosphorylated according to the previously reported method here described for compound 17. Nucleoside 16 (13.4 mg, 46.8 µmol) was dried by azeotroping with toluene (1mL) 3 times, dissolved in trimethyl phosphate (0.5 mL) and cooled to 0°C. Phosphoryl chloride (5.7 µL, 60.9 µmol) was added to the cooled solution and the reaction incubated overnight at 4°C. The reaction was treated with 1M tributylammonium pyrophosphate (304µL, 304 µmol) and tributylamine (72 µL, 304 µmol) and allowed to stir at 4°C for 1 hour. The reaction was quenched with the addition of 1M TEAB (2
mL) and diluted to 50 mL with water. The product was purified by anion exchange chromatography using DEAE cellulose bicarbonate form (DE52, Whatman) using a linear gradient of 0 to 0.7 M TEAB. Fractions containing triphosphate were combined, concentrated to dryness, resuspended in water (5mL) and lyophilized to provide purified sample (27%, 13 µmol).

Quality of the triphosphate was determined by RP-HPLC using a Waters Spherisorb ODS analytical column (4.6x150 mm) and a gradient of 20 mM TEAAc to 35% AcN in 20 mM TEAAc over 50 minutes at 1 mL/min. Purity was determined by Area % at the optimal extinction coefficient.

5'-triphospho-1'-deoxy-1'-(5,6-difluoro-1-N-benzimidazole-1-yl)-β-D-ribofuranose (17) - ESI⁺-MS: 527 [MH₃]⁺, 549 [MH₄Na]⁺, 571 [MH₃Na₂]⁺

5'-triphospho-1'-deoxy-1'-(4,6-difluoro-1-N-benzimidazole-1-yl)-β-D-ribofuranose (18) - ESI⁺-MS: 527 [MH₃]⁺, 549 [MH₄Na]⁺, 571 [MH₃Na₂]⁺

5'-triphospho-1'-deoxy-1'-(4-trifluoromethyl-1-N-benzimidazole-1-yl)-β-D-ribofuranose (19) - ESI⁺-MS: 559[MH₃]⁺, 581 [MH₄Na]⁺, 603 [MH₃Na₂]⁺

5'-triphospho-1'-deoxy-1'-(4-trifluoromethyl-3-N-benzimidazole-1-yl)-β-D-ribofuranose (20) - ESI⁺-MS: 559[MH₃]⁺, 581 [MH₄Na]⁺, 603 [MH₃Na₂]⁺

5'-triphospho-1'-deoxy-1'-(5-trifluoromethyl-1-N-benzimidazole-1-yl)-β-D-ribofuranose (21) - ESI⁺-MS: 559[MH₃]⁺, 581 [MH₄Na]⁺, 660 [MH₃-N(CH₂CH₃)₃]⁺

5'-triphospho-1'-deoxy-1'-(5-trifluoromethyl-3-N-benzimidazole-1-yl)-β-D-ribofuranose (22) - ESI⁺-MS: 559[MH₃]⁺, 581 [MH₄Na]⁺, 603 [MH₃Na₂]⁺

5'-triphospho-1'-deoxy-1'-(4-nitro-1-N-benzimidazole-1-yl)-β-D-ribofuranose (23) - ESI⁺-MS:
624 [MHNa₄]⁺

5'-triphospho-1'-deoxy-1'-([N²-guanosyl]-β-D-ribofuranose (24)- ESI⁻-MS: 726

[MH₅₋₂N(CH₂CH₃)₂]⁺

5'-triphospho-1'-deoxy-1'-(N⁹-purinyl)-β-D-ribofuranose (25)- ESI⁻-MS: 695

[MH₅₋₂N(CH₂CH₃)₂]⁺

5'-triphospho-1'-deoxy-1'-(1-deaza-N⁹-purinyl)-β-D-ribofuranose (26)- ESI⁺-MS: 593

[MH₅₋₂N(CH₂CH₃)₂]⁺, 694 [MH₅₋₂N(CH₂CH₃)₂]⁺

5'-triphospho-1'-deoxy-1'-(4-amino-1-N-benzimidazole-1-yl)-β-D-ribofuranose (27)-

Compound 23 (150 µL, 30 mM, 4.5 μmol) in water was diluted with 170 µL 2mM KH₂PO₄ buffer in a 5 mL round bottom flask. Pd on carbon (5 mg, 10% Pd) was added to the solution and the mixture was degassed under reduced pressure. The atmosphere was replaced with H₂ and allowed to stir for 3 hours. The catalyst was removed by filtering through a plug of celite and washed with distilled water (600 µL). Compound 25 was isolated by semi-preparative HPLC using a Beckman Ultrasphere ODS column (10 x 250 mm 5 µm particle size) using a gradient of 100 mM TEAAc pH 5.5 to 35% AcN in 100 mM TEAAc. ESI⁺-MS: 506 [MH₃]⁺, 528 [MH₄Na]⁺, 550 [MH₃Na₂]⁺; ε = 264 nm, 286 nm (ref)