Electronic Supporting Information

Organoruthenium(II) Nucleoside Conjugates as Colon Cytotoxic Agents

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Electronic Supporting Information available:

1. Spectroscopic characterization and combustion analysis.

Ligand **L1**: η = 89 %; FTIR (KBr): 2230 cm^{-1} ($\upsilon_{C\equiv N}$); ^{1}H NMR (DMSO–*d6*, 400 MHz): 1.84 (s, 3H, CH_3), 2.01–2.22 (m, 2H, 2H2'), 3.53–3.64 (m, 2H, 2H5'), 3.78 (dd, 1H, *J*= 6.7, 3.5, H4'), 4.23–4.27 (m, 1H, H3'), 5.01–5.10 (comp., 3H, CH_2Ph + OH), 5.24 (d, 1H, *J*= 4.2, OH), 6.20 (t, 1H, *J*= 6.6, H1'), 7.43 (d, 2H, *J*= 8.1, $H_{2,6}Ph$), 7.78 (d, 2H, *J*=8.1, $H_{3,5}Ph$), 7.85 (s, 1H, H6); ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.9 (CH_3), 40.5 (C2'), 43.6 (CH_2Ph), 61.2 (C5'), 70.2 (C3'), 84.9 (C1'), 87.4 (C4'), 108.5 (C_4Ph) 109.9 (C5), 118.7 (C≡N), 128.3 ($C_{2,6}Ph$), 132.3 ($C_{3,5}Ph$), 135.3 (C6), 142.8 (C_1Ph), 150.5 (C2), 162.6 (C4).

Ligand **L2**: η = 86 %; FTIR (KBr): 2231 cm^{-1} ($\upsilon_{C\equiv N}$); ^{1}H NMR (DMSO–*d6*, 400 MHz): 1.85 (s, 3H, CH_3), 2.29–2.35 (m, 1H, H2'), 2.40–2.45 (m, 1H, H2'), 3.59–3.68 (m, 2H, 2H5'), 3.84 (br, 1H, H4'), 4.40

(t, 1H, *J*= 6.0, H3'), 5.05 (m, 2H CH_2Ph), 5.25 (br, 1H, OH), 6.13 (t, 1H, *J*= 5.6, H1'), 7.44 (d, 2H, *J*= 7.6, $H_{2,6}Ph$), 7.78 (d, 2H, *J*= 7.7, $H_{3,5}Ph$), 7.84 (s, 1H, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.8 (CH_3), 36.4 (C2'), 43.6 (CH_2Ph), 59.8 (C3'), 60.6 (C5'), 84.2 (C4'), 84.6 (C1'), 108.6 (C_4Ph) 110.0 (C5), 118.7 (C≡N), 128.3 ($C_{2,6}Ph$), 132.3 ($C_{3,5}Ph$), 135.3 (C6), 142.8 (C_1Ph), 150.4 (C2), 162.6 (C4).

Ligand **L3**: *η* = 79 %; FTIR (KBr): 2229 cm^{-1} ($\upsilon_{C\equiv N}$). ^1H NMR (DMSO–*d6*, 400 MHz): 2.12–2.23 (m, 2H, 2H2'), 3.55–3.58 (comp., 2H, 2H5'), 3.81 (t, 1H, *J*= 3.2, H4'), 4.22–4.27 (m, 1H, H3'), 5.07 (s, 2H, CH_2Ph), 5.19 (t, 1H, *J*= 4.8, OH), 5.25 (d, 1H, *J*= 4.4, OH), 6.10 (t, 1H, *J*= 6.3, H1'), 7.45 (d, 2H, *J*= 8.1, $H_{2,6}Ph$), 7.78 (d, 2H, *J*=8.1, $H_{3,5}Ph$), 8.55 (s, 1H, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 41.0 (C2'), 44.9 (CH_2Ph), 60.5 (C5'), 67.8 (C5), 69.6 (C3'), 85.9 (C1'), 87.8 (C4'), 110.0 (C_4Ph) 118.7 (C≡N), 128.3 ($C_{2,6}Ph$), 132.3 ($C_{3,5}Ph$), 142.4 (C_1Ph), 144.1 (C6), 150.2 (C2), 159.6 (C4).

Ligand **L4**: *η* = 82 %; FTIR (KBr): 2230 cm^{-1} ($\upsilon_{C\equiv N}$); ^1H NMR (DMSO–*d6*, 400 MHz): 3.58–3.63 (m, 1H, H5'), 3.71–3.76 (m, 1H, H5'), 3.86–3.88 (m, 1H, H4'), 3.99–4.06 (comp., 2H, H2' + H3'), 5.02–5.10 (comp., 3H, CH_2Ph + OH), 5.32 (t, 1H, *J*= 4.6, OH), 5.46 (d, 1H, *J*= 5.1, OH), 5.76 (t, 1H, *J*= 2.1, H1'), 7.49 (d, 2H, *J*= 8.1, $H_{2,6}Ph$), 7.79 (d, 2H, *J*=8.1, $H_{3,5}Ph$), 8.50 (d, 1H, J_{H-F}= 7.2, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 44.1 (CH_2Ph), 59.9 (C5'), 68.9 (C2'), 74.0 (C3'), 84.5 (C4'), 89.6 (C1'), 110.1 (C_4Ph) 118.7 (C≡N), 124.1 (d, $^2J_{C-F}$= 34.7, C6) 128.3 ($C_{2,6}Ph$), 132.3 ($C_{3,5}Ph$), 139.4 (d, $^1J_{C-F}$= 226.7, C5), 142.1 (C_1Ph), 149.2 (C2), 156.5 (d, $^2J_{C-F}$= 26.1, C4).

Ligand **L5**: *η* = 79 %; FTIR (KBr): 2230 cm^{-1} ($\upsilon_{C\equiv N}$). ^1H NMR (DMSO–*d6*, 400 MHz): 1.80 (s, 3H, CH_3), 3.58–3.67 (m, 2H, 2H5'), 4.80 (br, 1H, H4'), 5.02–5.11 (comp., 3H, CH_2Ph + OH), 5.93 (d, 1H, *J*= 5.8, H3'), 6.42 (d, 1H, *J*= 6.0, H2'), 6.87 (s, 1H, H1'), 7.45 (d, 2H, *J*= 8.0, $H_{2,6}Ph$), 7.78–7.81 (comp., 3H, $H_{3,5}Ph$ + H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.8 (CH_3), 43.6 (CH_2Ph), 62.1 (C5'), 87.5 (C4'), 90.1 (C1'), 108.2 (C_4Ph) 110.0 (C5), 118.7 (C≡N), 125.8 (C3'), 128.4 ($C_{2,6}Ph$), 132.4 ($C_{3,5}Ph$), 135.2 (C2'), 136.0 (C6), 142.8 (C_1Ph), 150.9 (C2), 162.7 (C4). Anal. Calcd. for $C_{18}H_{17}N_3O_4 \cdot 0.1CH_2Cl_2$: C, 62.50; H, 4.98; N, 12.08. Found: C, 62.13, H, 5.26; N, 12.21.

Ligand **L6**: *η* = 73 %; FTIR (KBr): 2232 cm^{-1} ($\upsilon_{C\equiv N}$). ^1H NMR (DMSO–*d6*, 400 MHz): 0.83–0.86 (comp., 6H, $2CH_3$), 1.20–1.30 (comp., 16H, $8CH_2$), 1.49–1.54 (comp., 4H, CH_2), 1.87 (s, 3H, CH_3–Thy), 2.16–2.20 (m, 4H, $2CH_2CO$), 2.44–2.48 (m, 2H, 2H2'), 4.13–4.16 (m, 1H, H4'), 4.23–4.31 (m, 2H, 2H5'), 5.07 (s, 2H, CH_2Ph), 5.22 (t, 1H, *J*= 3.2, H3'), 6.20 (t, 1H, *J*= 7.0, H1'), 7.40 (d, 2H, *J*= 8.0, $H_{2,6}Ph$), 7.62 (s, 1H, H6), 7.85 (d, 2H, *J*=8.0, $H_{3,5}Ph$). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.7 (CH_3–Thy), 13.9 (CH_3), 22.0, 24.3, 28.3, 31.1, 33.3, 35.8 (CH_2) 40.0 (C2'), 43.7 (CH_2Ph), 63.4 (C5'), 73.6 (C3'), 81.2 (C4'), 85.2 (C1'), 109.1 (C_4Ph) 110.0 (C5), 118.7 (C≡N), 128.4 ($C_{2,6}Ph$), 132.3 ($C_{3,5}Ph$), 135.1 (C6), 142.6 (C_1Ph), 150.4 (C2), 162.5 (C4), 172.5, 172.7 (OC=O).

Compound **1Ru**: yellow; η = 86 %. FTIR (KBr): 2234 cm^{-1} ($\upsilon_{C\equiv N}$). ^{1}H NMR (DMSO–*d6*, 400 MHz): 1.83 (s, 3H, CH_3), 2.06–2.13 (m, 2H, 2H2'), 2.63–2.68 (m, 4H, CH_2CH_2, DPPE) 3.58–3.61 (m, 2H, 2H5'), 3.78 (br, 1H, H4'), 4.25 (br, 1H, H3'), 4.92 (comp., 7H, η^5–C_5H_5 + CH_2Ph), 5.06 (br, 1H, OH), 5.26 (br, 1H, OH), 6.16 (t, 1H, *J*= 6.8, H1'), 6.55 (d, 2H, *J*= 8.0, $H_{3,5}Ph$), 7.17 (d, 2H, *J*= 7.6, $H_{2,6}Ph$), 7.08 (br, 4H, DPPE), 7.48–7.54 (m, 12H, DPPE), 7.84 (s, 1H, H6), 7.91 (br, 4H, DPPE). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.9 (CH_3), 27.4 (CH_2CH_2, DPPE), 40.0* (C2'), 43.8 (CH_2Ph), 61.2 (C5'), 70.2 (C3'), 82.1 (η^5–C_5H_5), 84.9 (C1'), 87.4 (C4'), 108.5 (C_4Ph), 109.0 (C5), 127.8 ($C_{2,6}Ph$), 128.9 (t, J_{CP}= 4.8, C_{meta}DPPE), 130.4 (d, J_{CP}= 22.1, C_{ipso}DPPE), 130.7 (t, J_{CP}= 4.9, C_{ortho}DPPE), 131.7 ($C_{3,5}Ph$), 133.0 (t, J_{CP}= 5.1, C_{para}DPPE), 135.3 (C6), 143.3 (C_1Ph), 150.4 (C2), 162.6 (C4); C≡N undisclosed; * under DMSO signal. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 711.2, PF_6^-), 78.9 (DPPE). Anal. Calcd. for $C_{49}H_{48}F_6N_3O_5P_3Ru{\cdot}0.4CH_2Cl_2$: C, 53.90; H, 4.47; N, 3.81. Found: C, 53.89; H, 4.35; N, 3.85.

Compound **2Ru**: yellow; η = 83 %. FTIR (KBr): 2232 cm^{-1} ($\upsilon_{C\equiv N}$). ^{1}H NMR (DMSO–*d6*, 400 MHz): 1.86 (s, 3H, CH_3), 2.09–2.15 (m, 2H, 2H2'), 3.59–3.64 (m, 2H, 2H5'), 3.80 (br, 1H, H4'), 4.28 (br, 1H, H3'), 4.66 (s, 5H, η^5–C_5H_5), 5.04–5.08 (comp., 3H, CH_2Ph + OH), 5.28 (br, 1H, OH), 6.21 (t, 1H, *J*= 6.4, H1'), 7.08 (br, 14H, $H_{3,5}Ph$ + PPh_3), 7.30–7.43 (comp., 24H, $H_{2,6}Ph$ + PPh_3), 7.88 (s, 1H, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.9 (CH_3), 40.0* (C2'), 43.1 (CH_2Ph), 61.2 (C5'), 70.2 (C3'), 84.0 (η^5–C_5H_5), 85.0 (C1'), 87.5 (C4'), 108.5 (C_4Ph) 109.5 (C5), 128.3 ($C_{2,6}Ph$), 128.4 (t, J_{CP}= 4.6, $C_{meta}PPh_3$), 130.1 ($C_{para}PPh_3$) 132.3 ($C_{3,5}Ph$), 132.9 (t, J_{CP}= 5.1, $C_{ortho}PPh_3$), 135.1 (d, J_{CP}= 22.1, $C_{ipso}PPh_3$), 135.4 (C6), 143.7 (C_1Ph), 150.5 (C2), 162.6 (C4); C≡N undisclosed; * under DMSO signal. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 711.4, PF_6^-), 41.7 (PPh_3). Anal. Calcd. for $C_{59}H_{54}F_6N_3O_5P_3Ru{\cdot}0.4CH_2Cl_2$: C, 58.14; H, 4.50; N, 3.42. Found: C, 58.00, H, 4.34; N, 3.51.

Compound **3Ru**: yellow; η = 89 %; FTIR (KBr): 2233 cm^{-1} ($\upsilon_{C\equiv N}$); ^{1}H NMR (DMSO–*d6*, 400 MHz): 1.83 (s, 3H, CH_3), 2.27–2.33 (m, 2H, 2H2'), 2.37–2.44 (m, 2H, 2H2'), 2.57–2.77 (m, 4H, CH_2CH_2, DPPE) 3.59–3.70 (m, 2H, 2H5'), 3.82–3.86 (br, 1H, H4'), 4.40 (dd, 1H, *J*= 12.4, 5.5, H3'), 4.92 (comp., 7H, η^5–C_5H_5 + CH_2Ph), 5.25 (t, 1H, *J*= 5.0, OH), 6.08 (t, 1H, *J*= 6.4, H1'), 6.55 (d, 2H, *J*= 8.2, $H_{3,5}Ph$), 7.17 (d, 2H, *J*= 8.4, $H_{2,6}Ph$), 7.34 (br, 4H, DPPE), 7.48–7.55 (m, 12H, DPPE), 7.82 (s, 1H, H6), 7.89–7.93 (br, 4H, DPPE). ^{13}C NMR (DMSO–*d6*, 100 MHz): 13.3 (CH_3), 27.5 (CH_2CH_2, DPPE), 36.9 (C2'), 44.0 (CH_2Ph), 60.3 (C3'), 61.5 (C5'), 82.6 (η^5–C_5H_5), 84.7 (C4'), 85.0 (C1'), 109.0 (C_4Ph), 109.5 (C5), 128.3 ($C_{2,6}Ph$), 129.4 (t, J_{CP}= 4.8, C_{meta}DPPE), 130.9 (d, J_{CP}= 42.5, C_{ipso}DPPE), 131.2 (t, J_{CP}= 5.1, C_{ortho}DPPE), 132.2 ($C_{3,5}Ph$), 133.5 (t, J_{CP}= 5.2, C_{para}DPPE), 135.8 (C6), 143.7 (C_1Ph), 150.8 (C2), 163.0 (C4); C≡N undisclosed. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 713.2, PF_6^-),

78.9 (DPPE). Anal. Calcd. for $C_{49}H_{47}F_6N_6O_4P_3Ru{\cdot}0.2CH_2Cl_2$: C, 53.28; H, 4.31; N, 7.58. Found: C, 53.10; H, 4.24; N, 7.33.

Compound **4Ru**: yellow; η = 89 %; FTIR (KBr): 2233 cm^{-1} ($\upsilon_{C\equiv N}$); ^{1}H NMR (DMSO–*d6*, 400 MHz): 1.87 (s, 3H, CH_3), 2.30–2.47 (m, 2H, 2H2'), 3.60–3.68 (m, 2H, 2H5'), 3.86 (br, 1H, H4'), 4.43 (br, 1H, H3'), 4.67 (s, 5H, η^5–C_5H_5), 5.06 (s, 2H CH_2Ph), 5.27 (br, 1H, OH), 6.13 (s, 1H, H1'), 7.08 (br, 14H, $H_{3,5}Ph$ + PPh_3), 7.30–7.45 (comp, 20H, $H_{2,6}Ph$ + PPh_3), 7.86 (s, 1H, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.9 (CH_3), 36.4 (C2'), 43.6 (CH_2Ph), 59.8 (C3'), 60.6 (C5'), 84.1 (η^5–C_5H_5), 84.6 (C4'), 86.1 (C1'), 108.6 (C_4Ph) 109.9 (C5), 128.3 ($C_{2,6}Ph$), 128.4 (t, J_{CP}= 4.5, $C_{meta}PPh_3$), 130.1 ($C_{para}PPh_3$) 132.3 ($C_{3,5}Ph$), 132.9 (t, J_{CP}= 5.1, $C_{ortho}PPh_3$), 135.2 (comp., $C_{ipso}PPh_3$ + C6), 143.6 (C_1Ph), 150.4 (C2), 162.6 (C4); C≡N undisclosed. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 710.4, PF_6^-), 41.6 (PPh_3). Anal. Calcd. for $C_{59}H_{53}F_6N_6O_4P_3Ru{\cdot}0.5CH_2Cl_2$; C, 56.69; H, 4.32; N, 6.67. Found: C, 56.36; H, 4.31; N, 6.55.

Compound **5Ru**: yellow; η = 82 %; FTIR (KBr): 2234 cm^{-1} ($\upsilon_{C\equiv N}$). ^{1}H NMR (DMSO–*d6*, 400 MHz): 2.36–2.45 (m, 2H, 2H2'), 2.64–2.69 (m, 4H, CH_2CH_2, DPPE) 3.56–3.68 (m, 2H, 2H5'), 3.82 (d, 1H, *J*= 3.2, H4'), 4.26 (br, 1H, H3'), 4.92 (s, 5H, η^5–C_5H_5), 4.94 (s, 2H, CH_2Ph), 5.20 (t, 1H, *J*= 4.6, OH), 5.26 (d, 1H, *J*= 4.2, OH), 6.07 (t, 1H, *J*= 6.2, H1'), 6.55 (d, 2H, *J*= 8.2, $H_{3,5}Ph$), 7.19 (d, 2H, *J*= 8.2, $H_{2,6}Ph$), 7.35 (br, 4H, DPPE), 7.48–7.56 (m, 12H, DPPE), 7.89–7.93 (br, 4H, DPPE), 8.54 (s, 1H, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 27.8 (CH_2CH_2, DPPE), 40.0* (C2'), 45.3 (CH_2Ph), 61.0 (C5'), 68.3 (C5), 70.1 (C3'), 82.6 (η^5–C_5H_5), 86.3 (C1'), 88.2 (C4'), 109.5 (C_4Ph), 128.3 ($C_{2,6}Ph$), 129.4 (t, J_{CP}= 4.8, C_{meta}DPPE), 130.9 (d, J_{CP}= 43.8, C_{ipso}DPPE), 131.3 (t, J_{CP}= 5.2, C_{ortho}DPPE), 132.2 ($C_{3,5}Ph$), 133.5 (m, C_{para}DPPE), 143.3 (C_1Ph), 144.6 (C6), 150.2 (C2), 159.6 (C4); C≡N undisclosed; * under DMSO signal. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 712.1, PF_6^-), 78.9 (DPPE). Anal. Calcd. for $C_{48}H_{45}F_6IN_3O_5P_3Ru{\cdot}0.1CH_2Cl_2$: C, 48.65; H, 3.84; N, 3.54. Found: C, 48.36; H, 3.74; N, 3.41

Compound **6Ru**: yellow; η = 79 %; FTIR (KBr): 2230 cm^{-1} ($\upsilon_{C\equiv N}$). ^{1}H NMR (DMSO–*d6*, 400 MHz): 2.16–2.20 (m, 2H, 2H2'), 3.58–3.68 (m, 2H, 2H5'), 3.83 (d, 1H, *J*= 3.0, H4'), 4.27 (m, 1H, *J*= 3.9, H3'), 4.66 (s, 5H, η^5–C_5H_5) 5.08 (s, 2H, CH_2Ph), 5.26 (br, 2H, 2OH), 6.11 (t, 1H, *J*= 6.3, H1'), 7.08 (comp., 14H, $H_{2,6}Ph$ + PPh_3), 7.31–7.45 (comp., 20H, $H_{3,5}Ph$ + PPh_3), 8.58 (s, 1H, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 40.0* (C2'), 44.9 (CH_2Ph), 60.8 (C5'), 67.9 (C5), 69.6 (C3'), 84.1 (η^5–C_5H_5), 85.9 (C1'), 87.7 (C4'), 109.5 (C_4Ph), 128.3 ($C_{2,6}Ph$), 128.4 (t, J_{CP}= 4.6, $C_{meta}PPh_3$), 130.1 ($C_{para}PPh_3$) 132.3 ($C_{3,5}Ph$), 132.9 (t, J_{CP}= 5.2, $C_{ortho}PPh_3$), 135.2 (t, J_{CP}= 21.2, $C_{ipso}PPh_3$), 143.3 (C_1Ph), 144.3 (C6), 150.2 (C2), 159.6 (C4); C≡N undisclosed; * under DMSO signal. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 710.5, PF_6^-), 41.7 (PPh_3). Anal. Calcd. for $C_{58}H_{51}F_6IN_3O_5P_3Ru$: C, 53.38; H, 3.94; N, 3.22. Found: C, 53.02; H, 4.08; N, 3.17.

Compound **7Ru**: yellow; η = 79 %. FTIR (KBr): 2232 cm^{-1} ($\upsilon_{C\equiv N}$). ^{1}H NMR (DMSO–*d6*, 400 MHz): 2.63–2.70 (m, 4H, CH_2CH_2, DPPE) 3.61 (d, 1H, *J*= 11.5, H5'), 3.73 (d, 1H, *J*= 12.0, H5'), 3.88 (br, 1H, H4'), 4.01 (br, 2H, H2' + H3'), 4.92 (comp., 7H, η^5–C_5H_5 + CH_2Ph), 5.12 (d, 1H, *J*= 4.6, OH), 5.33 (t, 1H, *J*= 4.2, OH), 5.42 (t, 1H, *J*= 4.2, OH), 5.72 (s, 1H, H1'), 6.55 (d, 2H, *J*= 8.2, $H_{3,5}Ph$), 7.23 (d, 2H, *J*= 8.2, $H_{2,6}Ph$), 7.35 (br, 4H, DPPE), 7.48–7.54 (m, 12H, DPPE), 7.89–7.93 (br, 4H, DPPE), 8.49 (d, 1H, J_{HF}= 7.1, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 27.0 (CH_2CH_2, DPPE), 44.0 (CH_2Ph), 59.9 (C5'), 68.9 (C2'), 74.0 (C3'), 82.1 (η^5–C_5H_5), 84.6 (C4'), 89.5 (C1'), 109.2 (C_4Ph), 109.5 (C5), 127.8 ($C_{2,6}Ph$), 128.9 (m, C_{meta}DPPE), 130.4 (d, J_{CP}= 42.5, C_{ipso}DPPE), 130.8 (m, C_{ortho}DPPE), 131.7 ($C_{3,5}Ph$), 133.1 (m, C_{para}DPPE), 136.9 (C6), 142.5 (C_1Ph), 149.1 (C2), 156.3 (C4); C≡N undisclosed. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 710.7, PF_6^-), 78.9 (DPPE). Anal. Calcd. for $C_{48}H_{45}F_7N_3O_6P_3Ru{\cdot}0.5CH_2Cl_2$: C, 51.58; H, 4.11; N, 3.72. Found: C, 51.32; H, 3.96; N, 3.73.

Compound **8Ru**: yellow; η = 79 %. FTIR (KBr): 2229 cm^{-1} ($\upsilon_{C\equiv N}$). ^{1}H NMR (DMSO–*d6*, 400 MHz): 3.57–3.61 (m, 1H, H5'), 3.70–3.75 (m, 1H, H5'), 3.84–3.87 (m, 1H, H4'), 4.00 (br, 2H, H2' + H3'), 4.66 (s, 5H, η^5–C_5H_5), 4.92 (s, 2H, CH_2Ph), 5.12 (d, 1H, *J*= 4.6, OH), 5.33 (t, 1H, *J*= 4.2, OH), 5.42 (t, 1H, *J*= 4.2, OH), 5.72 (s, 1H, H1'), 7.08 (br, 14H, $H_{3,5}Ph$ + PPh_3), 7.30–7.43 (comp., 24H, $H_{2,6}Ph$ + PPh_3), 8.49 (d, 1H, J_{HF}= 7.1, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 44.0 (CH_2Ph), 59.8 (C5'), 69.1 (C2'), 74.2 (C3'), 84.1 (η^5–C_5H_5), 84.6 (C4'), 89.5 (C1'), 109.1 (C_4Ph), 109.5 (C5), 127.7 ($C_{2,6}Ph$), 128.4 (t, J_{CP}= 4.6, $C_{meta}PPh_3$), 130.1 ($C_{para}PPh_3$) 132.3 ($C_{3,5}Ph$), 132.9 (t, J_{CP}= 5.1, $C_{ortho}PPh_3$), 135.1 (d, J_{CP}= 22.1, $C_{ipso}PPh_3$), 136.9 (C6), 142.5 (C_1Ph), 149.1 (C2), 156.3 (C4); C≡N undisclosed. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 711.4, PF_6^-), 41.5 (PPh_3). Anal. Calcd. for $C_{58}H_{51}F_7N_3O_6P_3Ru$: C, 57.43; H, 4.24; N, 3.46. Found: C, 57.77; H, 3.93; N, 3.15.

Compound **9Ru**: yellow; η = 81 %; FTIR (KBr): 2233 cm^{-1} ($\upsilon_{C\equiv N}$). ^{1}H NMR (DMSO–*d6*, 400 MHz): 1.78 (s, 3H, CH_3), 2.63–2.68 (m, 4H, CH_2CH_2, DPPE) 3.62 (m, 2H, 2H5'), 4.80 (br, 1H, H4'), 4.89–4.94 (comp., 7H, η^5–C_5H_5 + CH_2Ph), 5.03 (br, 1H, OH), 5.91 (d, 1H, *J*= 5.9, H3'), 6.43 (d, 1H, *J*= 5.8, H2'), 6.57 (d, 2H, *J*= 8.0, $H_{3,5}Ph$), 6.83 (s, 1H, H1'), 7.19 (d, 2H, *J*= 8.0, $H_{2,6}Ph$), 7.31–7.39 (m, 4H, DPPE), 7.45–7.55 (m, 12H, DPPE), 7.78 (s, 1H, H6), 7.88–7.93 (m, 4H, DPPE). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.7 (CH_3), 27.2 (CH_2CH_2, DPPE), 43.5 (CH_2Ph), 62.1 (C5'), 82.1 (η^5–C_5H_5), 87.5 (C4'), 90.0 (C1'), 108.1 (C_4Ph), 109.0 (C5), 125.7 (C3'), 127.9 ($C_{2,6}Ph$), 128.9 (t, J_{CP}= 4.6, C_{meta}DPPE), 130.3 (d, J_{CP}= 44.3, C_{ipso}DPPE), 130.6 (t, J_{CP}= 5.1, C_{ortho}DPPE), 131.7 ($C_{3,5}Ph$), 133.0 (m, C_{para}DPPE), 135.2 (C2'), 136.0 (C6), 143.2 (C_1Ph), 150.7 (C2), 162.6 (C4), C≡N undisclosed. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 712.2, PF_6^-), 78.9 (DPPE). Anal. Calcd. for $C_{49}H_{46}F_6N_3O_4P_3Ru$: C, 56.11; H, 4.42; N, 4.01. Found: C, 56.47; H, 4.31; N, 3.78.

Compound **10Ru**: yellow; η = 85 %; FTIR (KBr): 2232 cm^{-1} ($\upsilon_{C\equiv N}$). ^{1}H NMR (DMSO–*d6*, 400 MHz): 1.82 (s, 3H, CH_3), 3.64 (m, 2H, 2H5'), 4.67 (s, 5H, η^5–C_5H_5), 4.82 (br, 1H, H4'), 5.03–5.13 (comp.,

3H, CH_2Ph + OH), 5.94 (d, 1H, *J*= 5.2, H3'), 6.45 (d, 1H, *J*= 5.3, H2'), 6.88 (s, 1H, H1'), 7.05–7.11 (comp., 14H, $H_{3,5}Ph$ + PPh_3), 7.28–7.44 (comp., 14H, $H_{2,6}Ph$ + PPh_3), 7.82 (s, 1H, H6). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.8 (CH_3), 43.6 (CH_2Ph), 62.1 (C5'), 84.1 (η^5–C_5H_5), 87.5 (C4'), 90.1 (C1'), 108.2 (C_4Ph) 110.0 (C5), 125.8 (C3'), 128.2–128.4 ($C_{2,6}Ph$ + $C_{meta}PPh_3$), 130.1 ($C_{para}PPh_3$) 132.4 ($C_{3,5}Ph$), 132.9 ($C_{ortho}PPh_3$), 135.2 ($C_{ipso}PPh_3$), 135.4 (C2'), 136.1 (C6), 142.8 (C_1Ph), 150.9 (C2), 162.7 (C4); C≡N undisclosed. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 710.7, PF_6^-), 41.6 (PPh_3). Anal. Calcd. for $C_{59}H_{52}F_6N_3O_4P_3Ru$: C, 60.31; H, 4.46; N, 3.58. Found: C, 60.62; H, 4.15; N, 3.69.

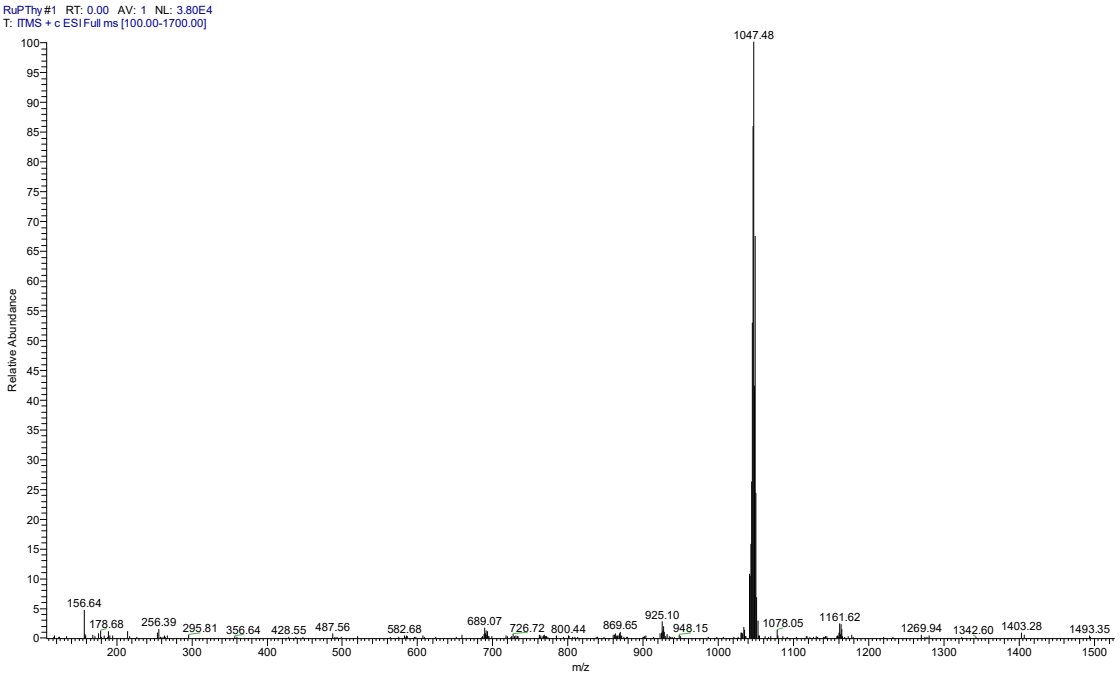
Compound **11Ru**: yellow; η = 74 %; FTIR (KBr): 2234 cm^{-1} ($\upsilon_{C\equiv N}$). ^1H NMR (DMSO–*d6*, 400 MHz): 0.84–0.89 (comp., 6H, $2CH_3$Oct), 1.24 (comp., 16H, $8CH_2$, Oct), 1.51–1.54 (comp., 4H, CH_2, Oct), 1.83 (s, 3H, CH_3Thy), 2.32–2.36 (comp., 5H, $2CH_2CO$ + H2'), 2.44–2.48 (m, 1H, H2'), 2.62–2.69 (m, 4H, CH_2CH_2, DPPE) 4.15 (br, 1H, H4'), 4.27 (m, 2H, 2H5'), 4.88–4.99 (comp., 7H, CH_2Ph + η^5–C_5H_5), 5.23 (br, 1H, H3'), 6.16 (t, 1H, *J*= 6.8, H1'), 6.55 (d, 2H, *J*=8.0, $H_{3,5}Ph$), 7.18 (d, 2H, *J*= 8.0, $H_{2,6}Ph$), 7.35 (br, 4H, DPPE), 7.48–7.54 (m, 12H, DPPE), 7.60 (s, 1H, H6), 7.89–7.93 (m, 4H, DPPE). ^{13}C NMR (DMSO–*d6*, 100 MHz): 12.7 (CH_3Thy), 13.8, 13.9 (CH_3Oct), 22.0, 24.3 (CH_2, Oct), 27.3 (CH_2CH_2, DPPE) 28.3, 31.0, 33.3 (CH_2, Oct), 40.0* (C2'), 43.8 (CH_2Ph), 63.3 (C5'), 73.5 (C3'), 81.1 (C4'), 82.1 (η^5–C_5H_5), 85.2 (C1'), 109.0 (C_4Ph, C5), 127.8 ($C_{2,6}Ph$), 128.9–129.0 (m, C_{meta}DPPE), 130.4 (d, J_{CP}= 40.3, C_{ipso}DPPE), 130.7 (t, J_{CP}= 5.0, C_{ortho}DPPE), 131.7 ($C_{3,5}Ph$), 133.0 (t, J_{CP}= 5.1, C_{para}DPPE), 135.1 (C6), 143.1 (C_1Ph), 150.3 (C2), 162.5 (C4), 172.5, 172.7 (OC=O); C≡N undisclosed. ^{31}P NMR (DMSO–*d6*, 162 MHz): -144.2 (qt, J_{PF}= 710.5, PF_6^-), 78.9 (PPh_3). Anal. Calcd. for $C_{65}H_{76}F_6N_3O_7P_3Ru{\cdot}0.5CH_2Cl_2$: C, 57.77; H, 5.69; N, 3.09. Found: C, 57.46; H, 5.37; N, 3.20.

2– X-ray crystallographic data

Table S1. Crystal data and structure refinement parameters for compounds **3Ru**.

Compound	**3Ru**
Empirical formula	$C_{49}H_{41}F_6N_6O_4P_3Ru$
Formula weight	1085.86
Temperature	150(2) K
Wavelength	0.71073 A
Crystal system	Triclinic
space group	P -1
a/Å	9.1748(9)
b/Å	14.2480(13)
c/Å	19.9453(18)
α/deg.	108.534(4)
β/ deg.	93.246(5)
γ/ deg.	105.595(4)
V/Å^3	2352.1(4)
Z	2
d_{calcd}/g·cm^{-3}	1.533
μ/mm^{-1}	0.512
F(000)	1104
θ limits/deg	2.389 to 26.078
Limiting indices	-11<=h<=11;
	-17<=k<=16;
	-19<=l<=24
Reflections collected/unique	34065/9184
	[R(int) = 0.0531]
Completeness to θ/deg, (%)	98.9 %
Data/restr./param.	9184 / 7 / 611
GOF on F^2	1.058
Final *R* indices [I>2σ(I)]	R_1 = 0.0634;
	wR_2 = 0.1531
R indices (all data)	R_1 = 0.0837;
	wR_2 = 0.1641
Largest diff. peak and hole / e.Å^{-3}	1.089 and -0.690

2Ru: 0h



2Ru: 72h

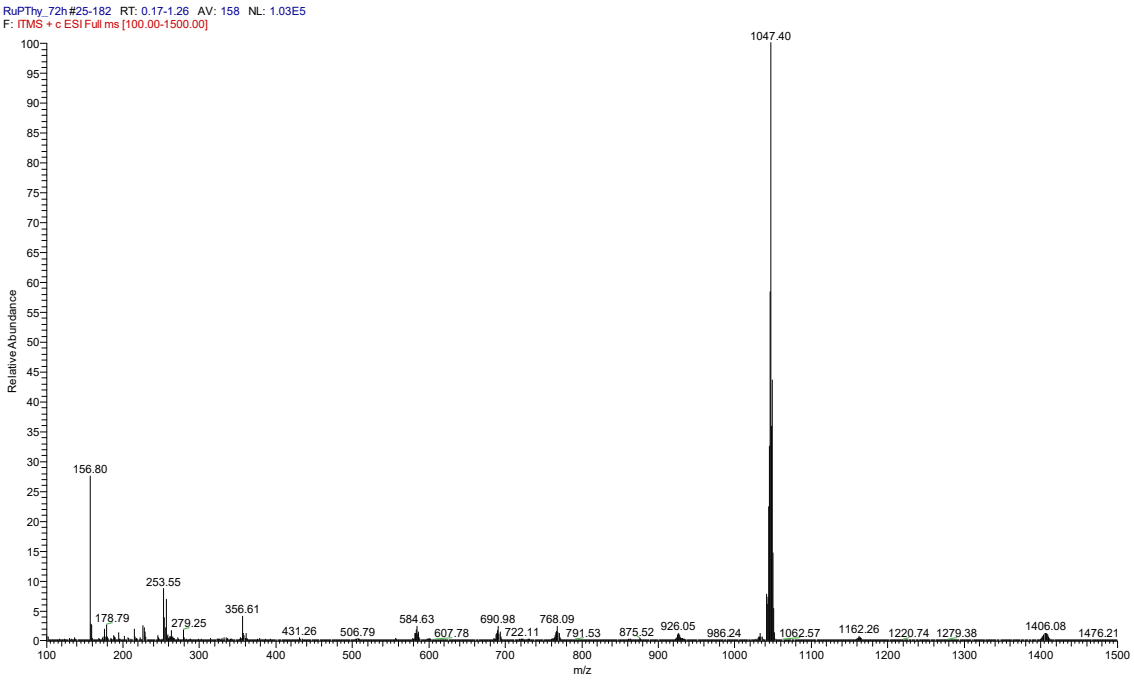
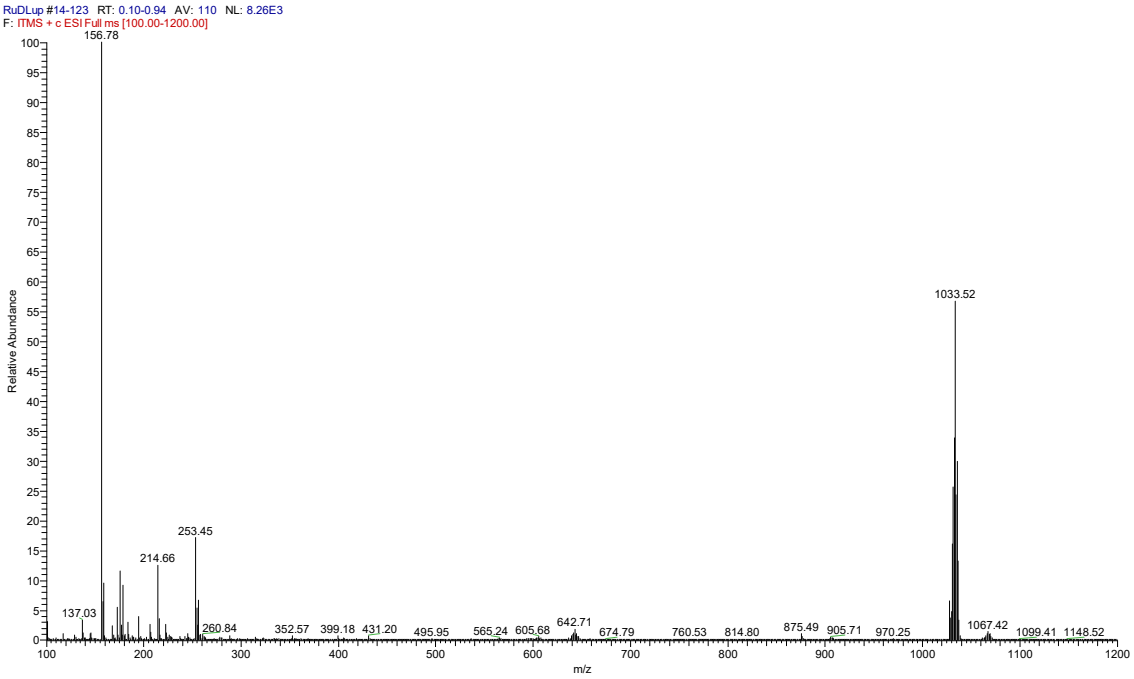


Figure S1-A: ESI(+)-MS spectra of **2Ru**, at 0h (top) and after 72h (bottom) of incubation in H_2O/DMSO (19:1).

5Ru: 0h



5Ru: 72h

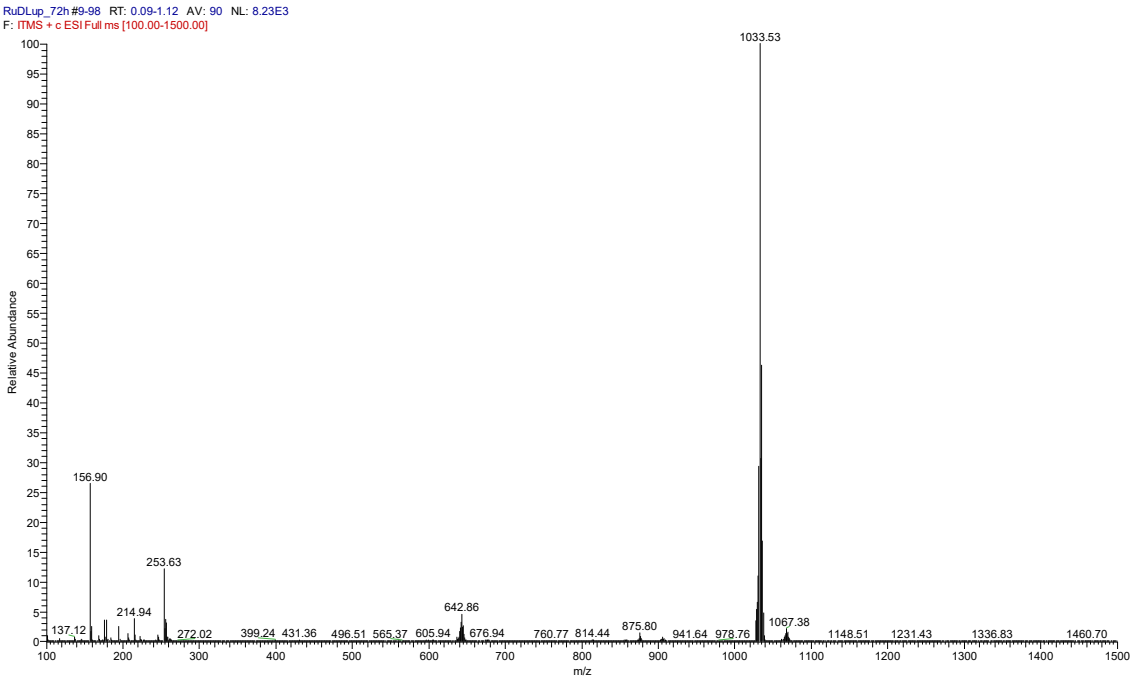


Figure S1-B: ESI(+)-MS spectra of **5Ru**, at 0h (top) and after 72h (bottom) of incubation in H_2O/DMSO (19:1).

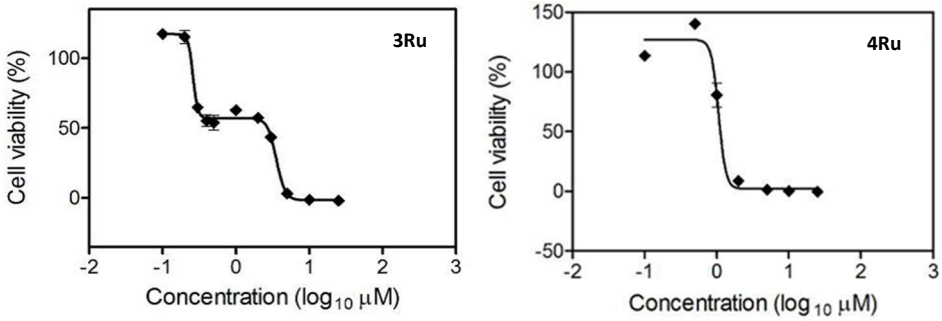


Figure S2. Abnormal (**3Ru**) *vs* normal (**4Ru**) dose-response curves.