Supporting Information

Synthesis and anticancer activity evaluation of η^5-$C_5(CH_3)_4R$ ruthenium complexes bearing chelating diphosphine ligands

Andrea Rodríguez-Bárzano, Rianne M. Lord, Aida M. Basri, Roger M. Phillips, A. John Blacker and Patrick C. McGowan

Hydrophobicity Studies. Equal volumes of octanol and NaCl-saturated water (to prevent complexes from undergoing hydrolysis) were stirred overnight at room temperature and then separated to give octanol-saturated water and water-saturated octanol. Accurate amounts of complexes **1** and **2** were dissolved in water-saturated octanol (25 ml) as stock solutions. 2 ml of octanol-saturated water were placed in a centrifuge tube and 2 ml of the water-saturated octanol stock solutions layered on top. The mixtures were shaken for 4 hours using an IKA Vibrax VXC machine at 500 $gmin^{-1}$. Six repeats were analysed. The layers were separated and the water-saturated octanol layer retained for UV/vis spectroscopy analysis. Using the maximum absorbance (λ_{max}) of each complex and previous individual calibration graphs, the average of the six runs gave the final $[C]_{org}$. The following equations were used to determine the partition coefficients of complexes **1** and **2** and hence whether the compounds are predominantly hydrophilic or hydrophobic:

$$Log\ P = Log\left(\frac{[C]_{org}}{[C]_{aq}}\right)$$

$$[C]_{aq} = [C]_{org}stock - [C]_{org}final$$

Results:

	Log P
1	0.57 ± 0.03
2	0.63 ± 0.08

Both complexes **1** and **2** are slightly hydrophobic, but their Log P and IC_{50} values are too similar to draw conclusions about hydrophobicity/cytotoxic activity relationships.

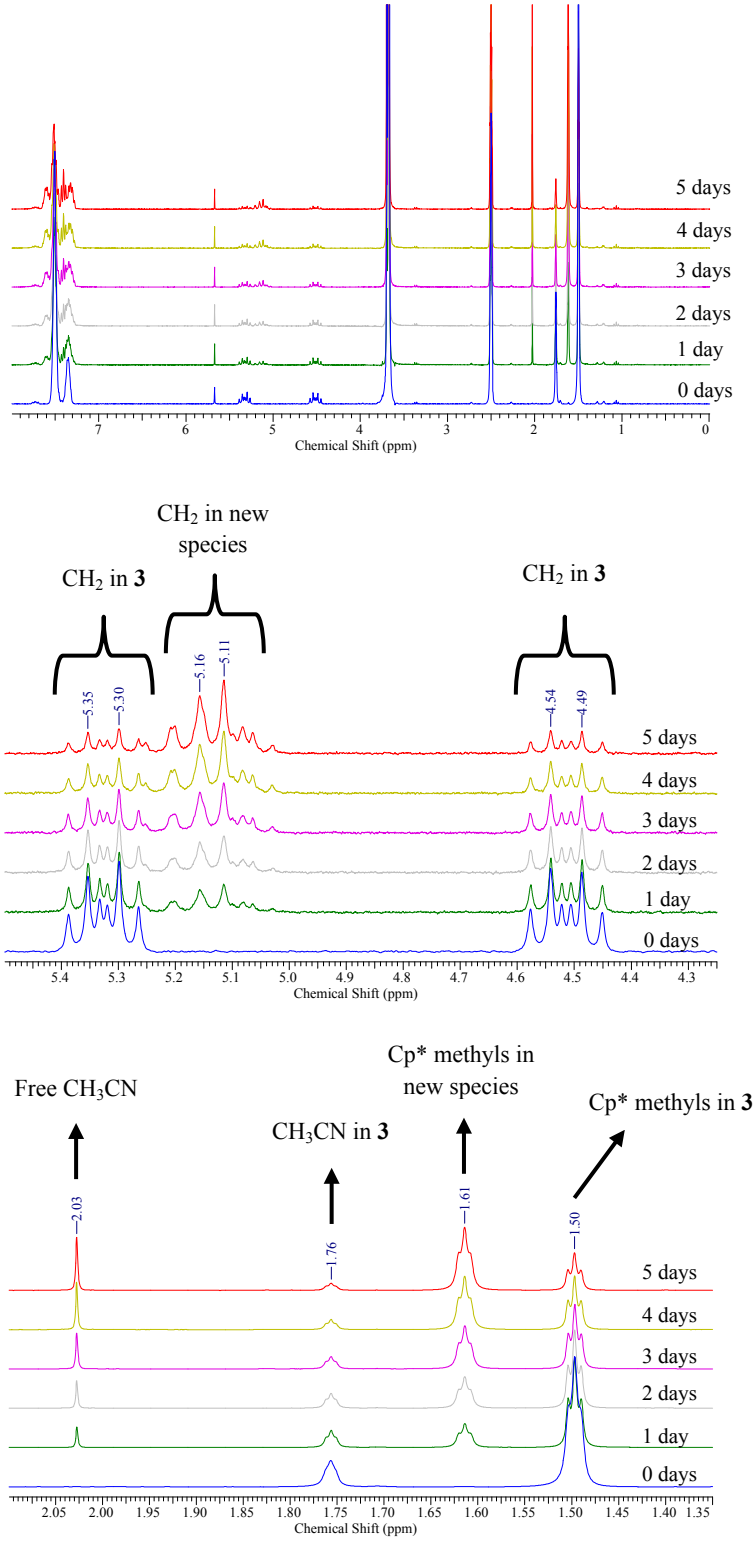

Fig. S1. ^{1}H NMR spectrum of **3** with changes observed over 5 days for a 10 mM solution of complex **3** in 90% deuterated DMSO and 10% deuterium oxide.

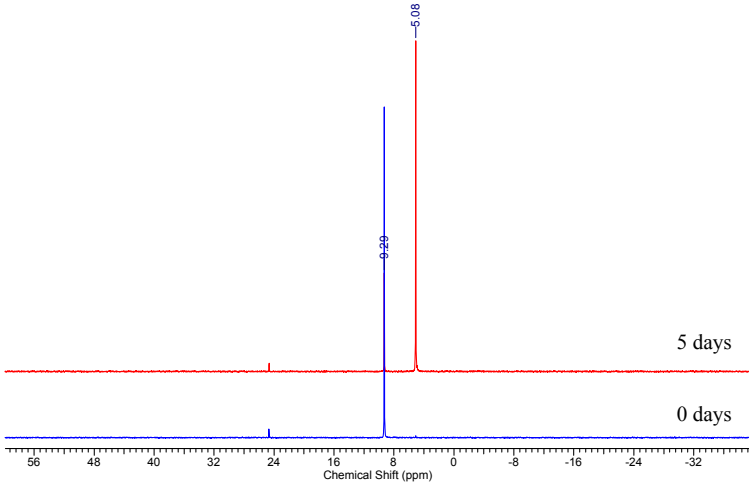

Fig. S2. ^{31}P NMR spectrum of **3** for a fresh 10 mM solution of complex **3** in 90% deuterated DMSO and 10% deuterium oxide, and the same sample after 5 days.

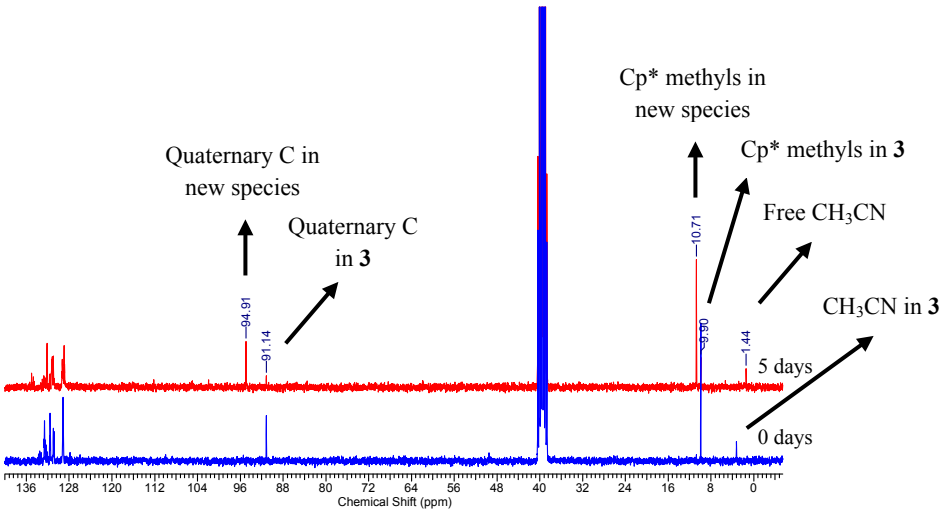

Fig. S3. ^{13}C NMR spectrum of **3** for a fresh 10 mM solution of complex **3** in 90% deuterated DMSO and 10% deuterium oxide, and the same sample after 5 days.

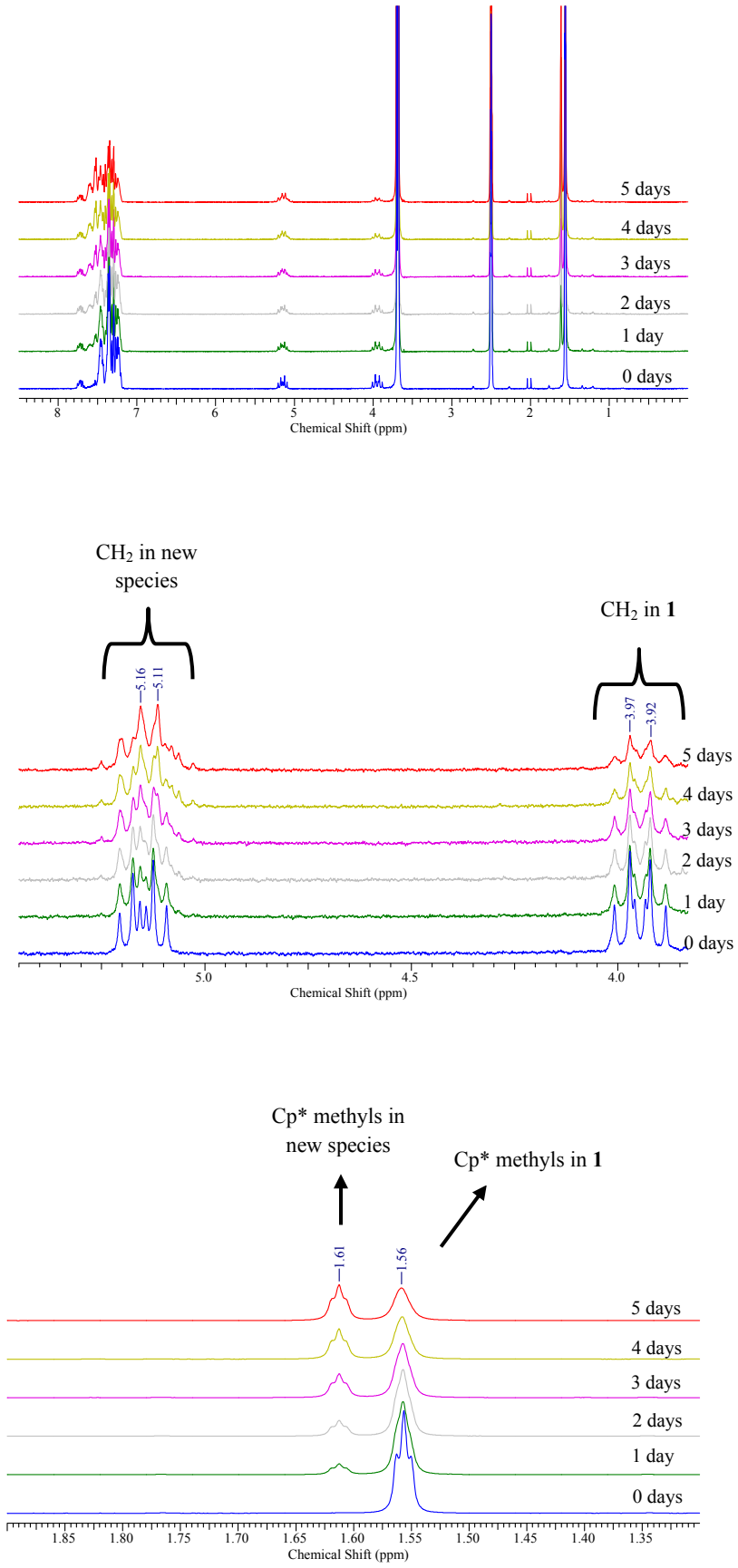

Fig. S4. ^{1}H NMR spectrum of **1** with changes observed over 5 days for a 10 mM solution of complex **1** in 90% deuterated DMSO and 10% deuterium oxide.

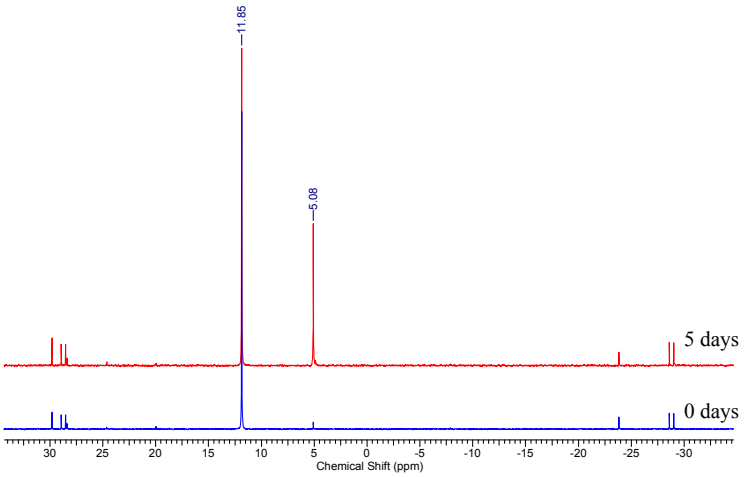

Fig. S5. ^{31}P NMR spectrum of **1** for a fresh 10 mM solution of complex **1** in 90% deuterated DMSO and 10% deuterium oxide, and the same sample after 5 days.

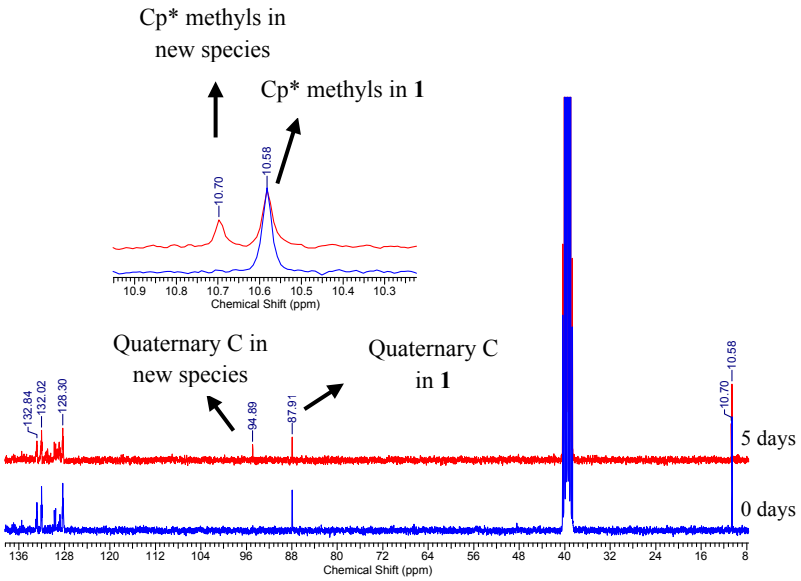

Fig. S6. ^{13}C NMR spectrum of **1** for a fresh 10 mM solution of complex **1** in 90% deuterated DMSO and 10% deuterium oxide, and the same sample after 5 days.

Table S1. Crystallographic data for complex **3**.

formula	$C_{37}H_{40}F_6NP_2RuSb$
formula weight [g mol^{-1}]	897.46
crystal system	Triclinic
space group	$P\ \bar{1}$
a [Å]	10.8236(19)
b [Å]	11.4240(19)
c [Å]	15.162(3)
α [°]	91.890(8)
β [°]	99.060(8)
γ [°]	95.244(8)
V [Å^3]	1841.5(5)
Z	2
T [K]	150(2)
ρ_{calcd} [mg m^{-3}]	1.619
μ [mm^{-1}]	1.288
transmission factors [max/min]	0.8303 and 0.6403
crystal size [mm]	0.38 x 0.27 x 0.15
θ_{max} [°]	30.23
total reflns	64879
unique reflns, R_{int}	10824, 0.0641
reflns with $F^2 > 2\sigma(F^2)$	9339
no. of parameters	439
R_1, wR_2 [$F^2 > 2\sigma(F^2)$]	0.0243, 0.0539
R_1, wR_2 (all data)	0.0312, 0.0635
GOF (S)	1.06
largest difference peak and hole [e Å^{-3}]	0.493 and -0.449