ELECTRONIC SUPPLEMENTARY INFORMATION FOR:

The effect of incorporation of carboxylic acid functionalities in 2,2'-bipyridine on the biological activity of the complexes formed: Synthesis, structure, DNA/protein interaction, antioxidant activity and cytotoxicity

Thangavel Sathiya Kamatchi,^a Nataraj Chitrapriya,^b Sarvana Loganthan Ashok Kumar,^c Jang Yoon Jung,^b Frank R. Fronczek,^c Horst Puschmann,^d Karuppannan Natarajan^{*a}

^aDepartment of Chemistry, Bharathiar University, Coimbatore 641046, India. *E-mail:* k_natraj6@yahoo.com; Tel.: +91 422 2428319; Fax: +91 422 2422387.
^bDepartment of Chemistry, Yeungnam University, Gyeongsan City, Gyeong-buk, 712-749, Republic of Korea.
^cDepartment of Chemistry, Louisiana State University, Baton Rouge, LA 70803, USA.
^dDepartment of Chemistry, Durham University, Durham, DH1 3KE, UK.

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Fig. S1 ¹H NMR spectrum of complex 1





Complex 1Complex 3Ru1A-N1A2.086(3)Ru1B-N1B2.081(5)Ru1-N12.076(3)Ru1A-N2A2.077(3)Ru1B-N2B2.087(5)Ru1-N22.090(3)Ru1A-S1A2.2322(5)Ru1B-S1B2.2366(15)Ru1-S22.2258(9)Ru1A-S1A2.2322(15)Ru1B-S1B2.2366(15)Ru1-S22.229(14)Ru1A-Cl1A2.42229(14)Ru1B-Cl1B2.4209(15)Ru1-Cl22.4289(9)Bond angles(°)N1-Ru1-N278.70(1)N1-Ru1-S191.28(8)N1A-Ru1A-S1A91.47(14)N1-Ru1-S2100.01(8)N1A-Ru1A-S1A91.47(14)N1-Ru1-S191.28(8)N1A-Ru1A-Cl2A83.62(14)N1-Ru1-S191.28(8)N1A-Ru1A-Cl2A83.62(14)N1-Ru1-S191.35(8)N2A-Ru1A-S1A99.24(14)N1-Ru1-S191.35(8)N2A-Ru1A-S1A89.28(14)N2-Ru1-S191.35(8)N2A-Ru1A-Cl2A86.66(14)N2-Ru1-S193.40(8)N2A-Ru1A-Cl2A86.66(14)N2-Ru1-S193.40(8)N2A-Ru1A-Cl2A80.66(14)N2-Ru1-Cl285.5(8)S1A-Ru1A-S2A92.8(6)S1-Ru1-Cl287.55(8)S1A-Ru1A-S2A92.8(6)S1-Ru1-Cl285.5(8)S1A-Ru1A-S2A92.8(6)S1-Ru1-Cl287.55(4)S2A-Ru1A-Cl2A86.6(14)N2-Ru1-Cl285.5(4)S1A-Ru1A-S2A92.8(5)S2-Ru1-Cl289.55(4)S1A-Ru1A-S2A92.8(5)S2-Ru1-Cl289.55(4)S1A-Ru1A-S2A91.3(5)S1-Ru1-Cl2 <th colspan="6">Interatomic distances (Å)</th>	Interatomic distances (Å)						
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Complex 1					Complex 3	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Ru1A–N1A	2.0860	(3)	Ru1B–N1B	2.081(5)	Ru1–N1	2.076(3)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Ru1A–N2A	2.077	3)	Ru1B–N2B	2.087(5)	Ru1–N2	2.090(3)
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Ru1A–S1A	2.2322	2(15)	Ru1B-S1B	2.2366(15)	Ru1–S1	2.2258(9)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Ru1A–S2A	2.2888	3(16)	Ru1B–S2B	2.2885(15)	Ru1–S2	2.291(1)
RulA-Cl2A 2.4310(15) RulB-Cl2B 2.4309(16) Rul-Cl2 2.4289(9) Bond angles(°) N1A-RulA-N2A 78.17(19) N1-Rul-N2 78.70(1) N1A-RulA-SlA 91.47(14) N1-Rul-Sl 91.28(8) N1A-RulA-SlA 91.47(14) N1-Rul-Sl 91.28(8) N1A-RulA-SlA 91.47(14) N1-Rul-Sl 91.00(18) N1A-RulA-ClA 83.62(14) N1-Rul-Cl1 170.99(8) N1A-RulA-ClA 83.62(14) N1-Rul-Cl2 85.58(8) N2A-RulA-SlA 99.74(14) N2-Rul-Sl 21.75.55(8) N2A-RulA-ClA 86.66(14) N2-Rul-Cl1 93.40(8) N2A-RulA-ClA 86.66(14) N2-Rul-Cl2 85.55(8) SlA-RulA-ClA 92.68(6) Sl-Rul-Cl2 85.55(8) SlA-RulA-ClA 92.13(5) Sl-Rul-Cl2 92.94(4) SlA-RulA-ClA 92.13(5) Sl-Rul-Cl2 175.96(4) SlA-RulA-ClA 92.13(5) Sl-Rul-Cl2 92.94(4) SlA-RulA-ClA 92.13(5) Sl-Rul-Cl2 90.1(4)	Ru1A–Cl1A	2.4222	29(14)	Ru1B–Cl1B	2.4209(15)	Ru1–Cl1	2.414(1)
Bond angles(*)N1A-Ru1A-N2A78.17(19)N1-Ru1-N278.70(1)N1A-Ru1A-S1A91.47(14)N1-Ru1-S191.28(8)N1A-Ru1A-S2A175.34(14)N1-Ru1-S2100.01(8)N1A-Ru1A-Cl1A94.10(13)N1-Ru1-Cl1170.99(8)N1A-Ru1A-Cl2A83.62(14)N1-Ru1-Cl285.58(8)N2A-Ru1A-S1A89.28(14)N2-Ru1-S2175.55(8)N2A-Ru1A-S1A89.28(14)N2-Ru1-S2175.55(8)N2A-Ru1A-S1A99.74(14)N2-Ru1-S2175.55(8)N2A-Ru1A-Cl2A86.66(14)N2-Ru1-S292.94(4)S1A-Ru1A-S2A92.68(6)S1-Ru1-S292.94(4)S1A-Ru1A-Cl2A86.66(14)N2-Ru1-Cl285.55(8)S1A-Ru1A-Cl2A92.68(6)S1-Ru1-Cl2175.96(4)S2A-Ru1A-Cl1A94.18(5)S1-Ru1-Cl2175.96(4)S2A-Ru1A-Cl2A92.13(5)S2-Ru1-Cl193.22(4)S1A-Ru1A-Cl2A92.13(5)S2-Ru1-Cl290.11(4)Cl1A-Ru1A-Cl2A92.13(5)Cl-Ru1-Cl289.55(4)Cl1A-Ru1A-Cl2A92.13(5)Cl-Ru1-Cl289.55(4)Cl1A-Ru1A-Cl2A99.1(3)Cl4-S1-O5105.6(3)Cl1B-S2A-ClCA99.1(3)Cl4-S1-O5105.6(3)Cl1B-S2A-ClCA99.1(3)Cl4-S1-O5105.6(3)Cl1B-S2A-Cl2B93.80(16)S1B-Ru1B-S1B92.47(14)N1B-Ru1B-S1B92.47(14)N2B-Ru1B-S1B92.47(14)N2B-Ru1B-S1B92.47(14)N2B-Ru1B-Cl2B93.80(6)S1B-Ru1B-Cl2B93.30(6)S1B-	Ru1A–Cl2A	2.4310)(15)	Ru1B–Cl2B	2.4309(16)	Ru1–Cl2	2.4289(9)
Bond angles(°) N1-Ru1-N2 78.70(1) N1A-Ru1A-N2A 78.17(19) N1-Ru1-N2 78.70(1) N1A-Ru1A-S1A 91.47(14) N1-Ru1-S1 91.28(8) N1A-Ru1A-S2A 175.34(14) N1-Ru1-S1 91.28(8) N1A-Ru1A-C12A 83.62(14) N1-Ru1-C12 85.58(8) N2A-Ru1A-S1A 89.28(14) N2-Ru1-S1 91.35(8) N2A-Ru1A-S1A 89.28(14) N2-Ru1-S2 175.55(8) N2A-Ru1A-C12A 86.66(14) N2-Ru1-C12 85.55(8) N2A-Ru1A-C12A 92.68(6) S1-Ru1-S2 92.94(4) S1A-Ru1A-C1A 94.18(5) S1-Ru1-C12 93.40(8) S1A-Ru1A-C1A 94.18(5) S1-Ru1-C12 87.55(8) S1A-Ru1A-C1A 92.68(6) S1-Ru1-C12 175.96(4) S2A-Ru1A-C1A 92.13(5) S2-Ru1-C12 90.11(4) S1A-Ru1A-C1A 89.31(5) C1-Ru1-C12 89.55(4) C11A-S1A-C1A 89.31(5) C1-Ru1-C12 89.55(4) C11A-S1A-C1A 90.13) C14-S1-O5 104.90(2)			. /				
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Bond angles(°)					
$\begin{array}{llllllllllllllllllllllllllllllllllll$	N1A-Ru1A-N	I2A	78.17((19)		N1-Ru1-N2	78.70(1)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	N1A-Ru1A-S	1A	91.47	14)		N1-Ru1-S1	91.28(8)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	N1A-Ru1A-S	2A	175.34	4(14)		N1-Ru1-S2	100.01(8)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	N1A-Ru1A-C	Cl1A	94.10((13)		N1-Ru1-Cl1	170.99(8)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	N1A-Ru1A-C	Cl2A	83.62	14)		N1-Ru1-Cl2	85.58(8)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	N2A-Ru1A-S	1A	89.28	14)		N2-Ru1-S1	91.35(8)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	N2A-Ru1A-S	2A	99.74(14)		N2-Ru1-S2	175.55(8)
N2A-Ru1A-Cl2A $86.66(14)$ N2-Ru1-Cl2 $85.55(8)$ S1A-Ru1A-S2A92.68(6)S1-Ru1-S292.94(4)S1A-Ru1A-Cl1A94.18(5)S1-Ru1-Cl193.22(4)S1A-Ru1A-Cl2A174.17(6)S1-Ru1-Cl2175.96(4)S2A-Ru1A-Cl1A87.73(5)S2-Ru1-Cl1 $87.55(4)$ S2A-Ru1A-Cl2A92.13(5)S2-Ru1-Cl290.11(4)Cl1A-Ru1A-Cl2A89.31(5)Cl-Ru1-Cl2 $89.55(4)$ C11A-S1A-Cl2A96.8(3)C13-S1-Cl4101.10(3)C11A-S1A-O1A107.3(3)C13-S1-O5104.90(2)C1BA-S2A-ClCA99.1(3)C14-S1-O5105.6(3)C1BA-S2A-O3A105.2(3)C15-S2-Cl699.50(3)N1B-Ru1B-N2B78.84(19)C15-S2-O6106.20(2)N1B-Ru1B-S1B89.44(14)C16-S2-O6104.20(2)N1B-Ru1B-S1B92.47(14)N2B-Ru1B-Cl2B86.45(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl2B83.27(14)S1B-Ru1B-Cl2B83.27(14)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B82.9(5)S2B-Ru1B-Cl2B90.32(6)C11B-Ru1B-Cl2B90.32(6)C11B-Ru1B-Cl2B90.32(6)C11B-Ru1B-Cl2B90.39(5)C11B-S1B-Cl2B96.6(3)S1B-S1B-Cl2B96.6(3)	N2A-Ru1A-C	Cl1A	171.63	3(15)		N2-Ru1-Cl1	93.40(8)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	N2A-Ru1A-C	Cl2A	86.66((14)		N2-Ru1-Cl2	85.55(8)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	S1A-Ru1A-S2	2A	92.68	6)		S1-Ru1-S2	92.94(4)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	S1A-Ru1A-C	11A	94.18	5)		S1-Ru1-Cl1	93.22(4)
S2A-Ru1A-Cl1A $87.73(5)$ S2-Ru1-Cl1 $87.55(4)$ S2A-Ru1A-Cl2A92.13(5)S2-Ru1-Cl290.11(4)Cl1A-Ru1A-Cl2A89.31(5)Cl-Ru1-Cl2 $89.55(4)$ C11A-S1A-Cl2A96.8(3)Cl3-S1-Cl4101.10(3)C11A-S1A-O1A107.3(3)Cl3-S1-O5104.90(2)C1BA-S2A-C1CA99.1(3)Cl4-S1-O5105.6(3)C1BA-S2A-O3A105.2(3)Cl5-S2-C1699.50(3)N1B-Ru1B-N2B78.84(19)Cl5-S2-O6106.20(2)N1B-Ru1B-S1B89.44(14)Cl6-S2-O6104.20(2)N1B-Ru1B-S2B98.74(14)N16-S2-O6104.20(2)N1B-Ru1B-Cl1B172.30(15)N18-Ru1B-S2B13.25(14)N2B-Ru1B-S1B92.47(14)S1B-Ru1B-S2B93.83(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-Cl2B83.27(14)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B93.25(5)S1B-Ru1B-Cl2B90.32(6)Cl1B-Ru1B-Cl2B90.39(5)C11B-S1B-Cl2B90.39(5)Cl1B-S1B-Cl2B96.6(3)	S1A-Ru1A-C	12A	174.17	7(6)		S1-Ru1-Cl2	175.96(4)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	S2A-Ru1A-C	11A	87.73((5)		S2-Ru1-Cl1	87.55(4)
Cl1A-Ru1A-Cl2A 89.31(5) Cl-Ru1-Cl2 89.55(4) C11A-S1A-C12A 96.8(3) C13-S1-C14 101.10(3) C11A-S1A-O1A 107.3(3) C13-S1-O5 104.90(2) C1BA-S2A-C1CA 99.1(3) C14-S1-O5 105.6(3) C1BA-S2A-O3A 105.2(3) C15-S2-C16 99.50(3) N1B-Ru1B-N2B 78.84(19) C15-S2-O6 106.20(2) N1B-Ru1B-S1B 89.44(14) C16-S2-O6 104.20(2) N1B-Ru1B-S1B 99.74(14) N1B-Ru1B-S2D 104.20(2) N1B-Ru1B-S1B 92.47(14) C16-S2-O6 104.20(2) N1B-Ru1B-S1B 92.47(14) V16-S2-O6 104.20(2) N1B-Ru1B-S1B 92.47(14) V28-Ru1B-S1B 92.47(14) N2B-Ru1B-S1B 92.47(14) V28-Ru1B-S2B 93.83(14) N2B-Ru1B-C1B 93.83(14) V28-Ru1B-C1B 93.25(5) S1B-Ru1B-C1B 93.25(5) S1B-Ru1B-C1B 93.25(5) S1B-Ru1B-C1B 88.29(5) S2B-Ru1B-C1B 88.29(5) S2B-Ru1B-C1B 90.32(6) C11B-Ru1B-C12B 90.39(5) C11B-S1B-C12B 96.6(3) <t< td=""><td>S2A-Ru1A-C</td><td>12A</td><td>92.13</td><td>(5)</td><td></td><td>S2-Ru1-Cl2</td><td>90.11(4)</td></t<>	S2A-Ru1A-C	12A	92.13	(5)		S2-Ru1-Cl2	90.11(4)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cl1A-Ru1A-0	Cl2A	89.31(5)		Cl-Ru1-Cl2	89.55(4)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	C11A-S1A-C	12A	96.8(3	$\tilde{\mathbf{b}}$		C13-S1-C14	101.10(3)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	C11A-S1A-O	1A	107.3((3)		C13-S1-O5	104.90(2)
$\begin{array}{llllllllllllllllllllllllllllllllllll$	C1BA-S2A-C	C1CA	99.1(3	$\tilde{\mathbf{b}}$		C14-S1-O5	105.6(3)
N1B-Ru1B-N2B78.84(19)C15-S2-O6106.20(2)N1B-Ru1B-S1B89.44(14)C16-S2-O6104.20(2)N1B-Ru1B-S2B98.74(14)C16-S2-O6104.20(2)N1B-Ru1B-Cl1B172.30(15)N1B-Ru1B-Cl2B86.45(14)N2B-Ru1B-S1B92.47(14)Yester (100.100)Yester (100.100)N2B-Ru1B-S2B173.25(14)Yester (100.100)Yester (100.100)N2B-Ru1B-Cl2B83.27(14)Yester (100.100)Yester (100.100)S1B-Ru1B-Cl2B93.80(6)Yester (100.100)Yester (100.100)S1B-Ru1B-Cl2B174.58(6)Yester (100.100)Yester (100.100)S2B-Ru1B-Cl2B90.32(6)Yester (100.100)Yester (100.100)C11B-Ru1B-Cl2B90.39(5)Yester (100.100)Yester (100.100)C11B-S1B-C12B96.6(3)Yester (100.100)Yester (100.100)	C1BA-S2A-C	03A	105.2((3)		C15-S2-C16	99.50(3)
N1B-Ru1B-S1B89.44(14)C16-S2-O6104.20(2)N1B-Ru1B-S2B98.74(14)N1B-Ru1B-S2B172.30(15)N1B-Ru1B-Cl1B172.30(15)N1B-Ru1B-Cl2B86.45(14)N2B-Ru1B-S1B92.47(14)N2B-Ru1B-S2B173.25(14)N2B-Ru1B-Cl1B93.83(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B88.29(5)S2B-Ru1B-Cl2B90.32(6)C11B-Ru1B-Cl2B90.39(5)C11B-S1B-C12B96.6(3)96.6(3)S104.20(2)	N1B-Ru1B-N	2B	78.84(19)		C15-S2-O6	106.20(2)
N1B-Ru1B-S2B98.74(14)N1B-Ru1B-Cl1B172.30(15)N1B-Ru1B-Cl2B86.45(14)N2B-Ru1B-S1B92.47(14)N2B-Ru1B-S2B173.25(14)N2B-Ru1B-Cl1B93.83(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl1B93.25(5)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B88.29(5)S2B-Ru1B-Cl2B90.32(6)Cl1B-Ru1B-Cl2B90.39(5)C11B-S1B-C12B96.6(3)	N1B-Ru1B-S	1B	89.44((14)		C16-S2-O6	104.20(2)
N1B-Ru1B-Cl1B172.30(15)N1B-Ru1B-Cl2B86.45(14)N2B-Ru1B-S1B92.47(14)N2B-Ru1B-S2B173.25(14)N2B-Ru1B-Cl1B93.83(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl1B93.25(5)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B88.29(5)S2B-Ru1B-Cl2B90.32(6)Cl1B-Ru1B-Cl2B90.39(5)C11B-S1B-C12B96.6(3)	N1B-Ru1B-S	2B	98.74((14)			
N1B-Ru1B-Cl2B86.45(14)N2B-Ru1B-S1B92.47(14)N2B-Ru1B-S2B173.25(14)N2B-Ru1B-Cl1B93.83(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl1B93.25(5)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B88.29(5)S2B-Ru1B-Cl2B90.32(6)Cl1B-Ru1B-Cl2B90.39(5)C11B-S1B-C12B96.6(3)	N1B-Ru1B-C	11B	172.30	0(15)			
N2B-Ru1B-S1B92.47(14)N2B-Ru1B-S2B173.25(14)N2B-Ru1B-Cl1B93.83(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl1B93.25(5)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B88.29(5)S2B-Ru1B-Cl2B90.32(6)Cl1B-Ru1B-Cl2B90.39(5)C11B-S1B-Cl2B96.6(3)	N1B-Ru1B-C	12B	86.45((14)			
N2B-Ru1B-S2B173.25(14)N2B-Ru1B-Cl1B93.83(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl1B93.25(5)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B88.29(5)S2B-Ru1B-Cl2B90.32(6)Cl1B-Ru1B-Cl2B90.39(5)C11B-S1B-C12B96.6(3)	N2B-Ru1B-S	1B	92.47(14)			
N2B-Ru1B-Cl1B93.83(14)N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl1B93.25(5)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B88.29(5)S2B-Ru1B-Cl2B90.32(6)Cl1B-Ru1B-Cl2B90.39(5)C11B-S1B-C12B96.6(3)	N2B-Ru1B-S	2B	173.25	5(14)			
N2B-Ru1B-Cl2B83.27(14)S1B-Ru1B-S2B93.80(6)S1B-Ru1B-Cl1B93.25(5)S1B-Ru1B-Cl2B174.58(6)S2B-Ru1B-Cl1B88.29(5)S2B-Ru1B-Cl2B90.32(6)Cl1B-Ru1B-Cl2B90.39(5)C11B-S1B-C12B96.6(3)	N2B-Ru1B-C	11B	93.83((14)			
S1B-Ru1B-S2B 93.80(6) S1B-Ru1B-Cl1B 93.25(5) S1B-Ru1B-Cl2B 174.58(6) S2B-Ru1B-Cl1B 88.29(5) S2B-Ru1B-Cl2B 90.32(6) Cl1B-Ru1B-Cl2B 90.39(5) C11B-S1B-Cl2B 96.6(3)	N2B-Ru1B-C	12B	83.27((14)			
S1B-Ru1B-Cl1B 93.25(5) S1B-Ru1B-Cl2B 174.58(6) S2B-Ru1B-Cl1B 88.29(5) S2B-Ru1B-Cl2B 90.32(6) Cl1B-Ru1B-Cl2B 90.39(5) C11B-S1B-Cl2B 96.6(3)	S1B-Ru1B-S2	2B	93.80((6)			
S1B-Ru1B-Cl2B 174.58(6) S2B-Ru1B-Cl1B 88.29(5) S2B-Ru1B-Cl2B 90.32(6) Cl1B-Ru1B-Cl2B 90.39(5) C11B-S1B-Cl2B 96.6(3)	S1B-Ru1B-C	l1B	93.25((5)			
S2B-Ru1B-Cl1B 88.29(5) S2B-Ru1B-Cl2B 90.32(6) Cl1B-Ru1B-Cl2B 90.39(5) C11B-S1B-Cl2B 96.6(3)	S1B-Ru1B-C	l2B	174.58	8(6)			
S2B-Ru1B-Cl2B 90.32(6) Cl1B-Ru1B-Cl2B 90.39(5) C11B-S1B-Cl2B 96.6(3)	S2B-Ru1B-C	l1B	88.29((5)			
Cl1B-Ru1B-Cl2B 90.39(5) Cl1B-S1B-Cl2B 96.6(3)	S2B-Ru1B-C	l2B	90.32((6)			
C11B-S1B-C12B 96.6(3)	Cl1B-Ru1B-C	Cl2B	90.39((5)			
	C11B-S1B-C	12B	96.6(3	5)			
C11B-S1B-O1B 107.2(3)	C11B-S1B-O	1B	107.2((3)			
C1BB-S2B-C1CB 98.4(3)	C1BB-S2B-C	1CB	98.4(3	5)			
C1BB-S2B-O3B 105.9(3)	C1BB-S2B-O	3B	105.9((3)			

 Table S1 Selected geometrical parameters for complexes 1 and 3

Fig. S2 Plot of [DNA]/ $(\varepsilon_a - \varepsilon_f)$ vs [DNA] for the titration of CT-DNA with complexes 1-3 and solid line is linear fitting of the data



Table S2 Correlation equation and R² value of 1-3 for plot of $[DNA]/(\varepsilon_a - \varepsilon_f)$ vs [DNA]

Complexes	Correlation equation	R ² value
1	$y = 4 \times 10^{-6} x + 0.0009$	0.913
2	$y = 2 \times 10^{-5} x + 0.0015$	0.967
3	$y = 5 \times 10^{-6} x + 1.0016$	0.974

Complexes	Correlation equation	R ² value
1	y = -2.803 x + 100.33	0.938
2	y = -5.005 x + 100.77	0.979
3	y = -3.592 x + 101.20	0.950

Table S3 Correlation equation and R^2 value for EB–DNA fluorescence quenching by complexes 1-3

Fig. S3 Stern–Volmer plots for EB–DNA quenching by the ruthenium complexes at different temperatures



Table S4 Correlation equation and R² value of 1-3 for Stern–Volmer plots for EB–DNA quenching by the ruthenium complexes at different temperatures

Complexes	Correlation equation		R ² value	
	27 °C	45 °C	27 °C	45 °C
1	y = 0.027 x + 0.970	y = 0.001 x + 1.004	0.969	0.460
2	y = 0.051 x + 1.036	y = 0.012 x + 1.002	0.986	0.877
3	y = 0.031 x + 0.992	y = 0.004 x + 0.998	0.987	0.984

Table S5 Correlation equation and \mathbb{R}^2 value of the EB and complexes on viscosity of DNA

Complexes	Correlation equation	R ² value
1	y = 0.049 x + 0.998	0.094
2	y = 0.060 x + 1.005	0.127
3	y = -0.061 x + 1.005	0.134
EB	y = 1.393 x + 1.027	0.887

Fig. S4 UV-Visible absorption spectra of BSA (1 μ M) in the absence and presence of the complexes 1-3 (10 μ M).



Fig. S5 Plot of I_0/I vs log [Q]



Table S6 Correlation equation and R^2 value of complexes 1-3 for plot of I_0/I vs log [Q]

Complexes	Correlation equation	R ² value
1	y = 0.136 x + 0.402	0.985
2	y = 0.117 x + 0.622	0.990
3	y = 0.032 x + 1.042	0.876

Fig. S6 Plot of log $[(F_0-F)/F]$ vs log [Q]



Table S7 Correlation equation and R^2 value of the complexes 1-3 for plot of log $[(F_0\mathcase F)/F]$ vs log [Q]

Complexes	Correlation equation	R ² value
1	y = 1.337 x + 6.577	0.995
2	y = 1.246 x + 6.123	0.998
3	y = 1.052 x + 4.763	0.928

Fig. S7 Synchronous spectra of BSA (1 μ M) in the presence of increasing amounts of the complexes 1-3 for a wavelength difference of $\Delta\lambda = 15$ nm. The arrow shows the emission intensity changes upon increasing concentration of complex



Fig. S8 Synchronous spectra of BSA (1 μ M) in the presence of increasing amounts of the complexes 1-3 for a wavelength difference of $\Delta \lambda = 60$ nm. The arrow shows the emission intensity changes upon increasing concentration of compound





Fig. S9 Plausible mechanisms for DPPH radical scavenging and metal chelating activity for complex 3

A and B : DPPH radical scavenging by H⁺donation

C : Metal chelation by free carboxylic acid groups

D : Coordination of Fe by neutral oxygen atom of DMSO