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Antibacterial activity of polypyridinearene ruthenium(II) complexes

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Few studies concerning antibacterial activity of ruthenium complexes have been published but all of them have been performed on small limited number of strains^{1,2}. In this study complex 1 ($[(\eta^6\text{-toluene})\text{Ru}(\text{ppf})\text{Cl}]\text{PF}_6$) and complex 2 ($[(\eta^6\text{-}p\text{-cymene})\text{Ru}(\text{ppf})\text{Cl}]\text{PF}_6$) where ppf is pyrido[2',3':5,6]pyrazino[2,3-f][1,10]phenanthroline were investigated as antibacterial agents. Previous study proved the cytotoxicity of these compounds³. The structural difference between 1 and 2 reflected through the presence or absence of isopropyl group onto one of the ligand (toluene), resulted in significant different activity against melanoma cells³. Five strains of Gram-positive bacteria (*C. sporagenes*, *M. flavus*, *B. subtilis*, *S. lutea* and *S. aureus*), and four strains of Gram-negative bacteria (*S. enteritidis*, *P. vulgaris*, *P. aeruginosa* and *E. coli*) were used for study of antibacterial activity of 1 and 2. While 2 did not show activity against most strains, complex 1 showed good results against all strains, but the best against *Clostridium sporagenes* and *Proteus vulgaris*. The obtained antibacterial activity of the complexes was in accordance with the nuclease activity obtained by plasmid DNA cleavage study. Complex 2 showed higher damaging effect to supercoiled DNA, than complex 1. Minor structural modifications of arene moiety resulted in major difference in activity of the complexes.

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References

1. Nasiri Sovari S, Zobi F. Recent studies on the antimicrobial activity of transition metal complexes of groups 6–12. *Chemistry* 2020;2:418-52.
2. Pasdar H, Hedayati Saghavaz B, Foroughifar N, Davallo M. Synthesis, characterization and antibacterial activity of novel 1,3-diethyl-1,3-bis(4-nitrophenyl)urea and its metal(II) complexes. *Molecules* 2017;22:2125.

3. Pavlović M, Nikolić S, Gligorijević N, Dojčinović B, Arandelović S, Grgurić-Šipka S, Radulović S. New organoruthenium compounds with pyrido[2',3':5,6] pyrazino[2,3-f][1,10]phenanthroline: synthesis, characterization, cytotoxicity, and investigation of mechanism of action. *J Biol Inorg Chem* 2019;24:297-310.