

Multi-Targeted Metallodrugs Rationally Designed to Overcome Drug Resistance

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Drug resistance is a major health challenge with antimicrobial resistance in particular threatening the very core of modern medicine globally. Cancer drug resistance is also fast emerging as another serious threat. There is an urgent need therefore to rationally design and develop new therapeutics that can break the drug resistance paradigm.

The ability to fine-tune the properties of metal complexes has undoubtedly led to the advancement of innovative metallodrugs possessing either potent anti-microbial or anti-cancer properties. Our group has developed a series of multi-targeted platinum, ruthenium and copper complexes, all of which have shown potential to overcome cancer and anti-microbial drug resistance [1-6]. We have achieved this by targeting multiple orthogonal biological pathways and, in doing so, blocking the development of multiple intracellular escape mechanisms essential for cancer or bacterial cell survival. More specifically, we have rationally designed and developed complexes incorporating clinically used drugs (such as Vorinostat, Belinostat (histone deacetylase inhibitors), Ciprofloxacin (antibiotic)) or derivatives thereof as ligands. A summary of our drug design strategies, our metallodrugs (some of which have formed the basis of fruitful industrial collaborations) and their respective anti-cancer and anti-microbial properties, showcasing their ability to overcome resistance, will be presented.

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