GLYCOCONJUGATE METAL COMPLEXES AS LECTIN-TARGETING ANTI-ADHESIVES AGAINST PATHOGENS AND SENSORS

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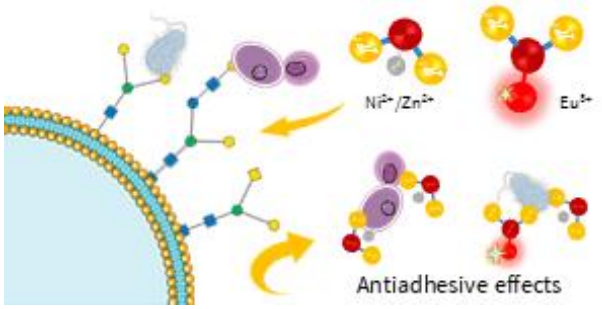
Carbohydrate–lectin interactions are key to the pathology of many bacterial and fungal infections, including by *P. aeruginosa (PA)* [1]. PA is categorised a WHO critical-priority pathogen, due to lack of new treatments and diagnostics, and rising antimicrobial ressistance. Targeting the lectins of *PA* has become an area of increasing interest in glycoconjugate chemistry [2]. While various multivalent glyconconjugate approaches are reported, use of coordination chemistry in designing lectin-targeting compounds is not widely explored. Metal complexes confer glycoconjugates with properties include well-defined coordination geometry, metal-centred charge and redox behaviour and potential additional medicinal effects. Carbohydrate-functionalised coordination-complexes can exploit properties of both carbohydrates and metals to address healthcare challenges.

We synthesised Ru^{2+}-centred glycoclusters, whose ability to inhibit *PA* biofilm formation depended on the identity and presentation of the carbohydrate motif [3a]. We demonstrated galactoside ligands can bind *PA*'s LecA lectin with micromolar affinity and both its Tb^{3+} complex and a boronic acid analogues can act as sensors for galactophilic lectins [3b]. Several examples of glycoconjugate complexes with *d*- and *f*-metal ions also inhibit fungal adhesion by *C. albicans* to human buccal epithelial cells, or demonstrate *in vitro* anti-biofilm activity against *PA*, further demonstrating therapeutic promise of these systems [3c]. Ligand strcuture modifies biological activity, but moreover the identity of metal ion and stroichiometry of the complex modulate biological activity not seen for ligands alone, even though activity is carbohydrate-mediated. This presents an impactful role for coordination chemistry in such targeted antimicrobial systems.



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