Title

Chemical synthesis of *Acinetobacter baumannii* K glycans

Authors

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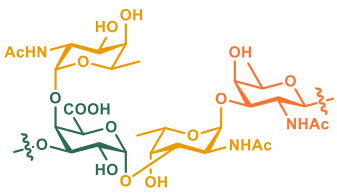
Poster presentation

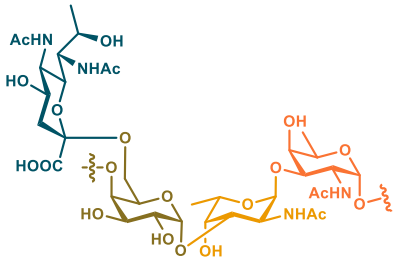
Antimicrobial resistance (AMR) of the *Acinetobacter baumannii* Gram-negative bacterium, which is a major cause of healthcare-associated infections, is increasing at an alarming rate. This emerging clinical crisis has motivated the WHO to categorize *A. baumannii* in the highest pathogen priority tier for the development of novel antimicrobials. This bacterium is able to survive for months on hospital surfaces, which can necessitate quarantining or even reconstructing entire wards during an outbreak. This astonishing ability to persist in inhospitable environments can be mainly attributed to the carbohydrate capsule that envelops the bacterium, which enables water retention and provides protection against the host immune system. The tightly stacked capsular polysaccharides (CPS) that make up the A. baumannii capsule are composed of repeating oligosaccharides termed K units. These oligosaccharides feature an incredible structural diversity, as the chemical structures of more than 64 different K units have been identified. Monosaccharides that make up the K units include derivatives of commonly encountered sugars as well as various rare sugar types. A particularly interesting class of such sugars is the nonulosonic acid family, which is composed of nine-carbon monosaccharides that contain a three-carbon exocyclic side chain connected to an α-keto acid pyranose ring. The nonulosonic acids that have thus far been identified in A. baumannii are: acinetaminic acid, legionaminic acid and pseudaminic acid as well as their C-8 epimers.

As mentioned previously, A. baumannii strains are becoming increasingly resistant to antibiotics, emphasizing the need to develop alternative treatment options. Glycoconjugate vaccines, in which bacterial oligosaccharides are conjugated to a carrier protein, have emerged as cost-effective interventions to prevent various infectious diseases. However, the vast structural diversity of A. baumannii K units make antigen selection difficult. In order to overcome this challenge, well-defined synthetic K unit oligosaccharides can be used to establish an exact structure-immunogenicity relationship.

K70



K73



K87