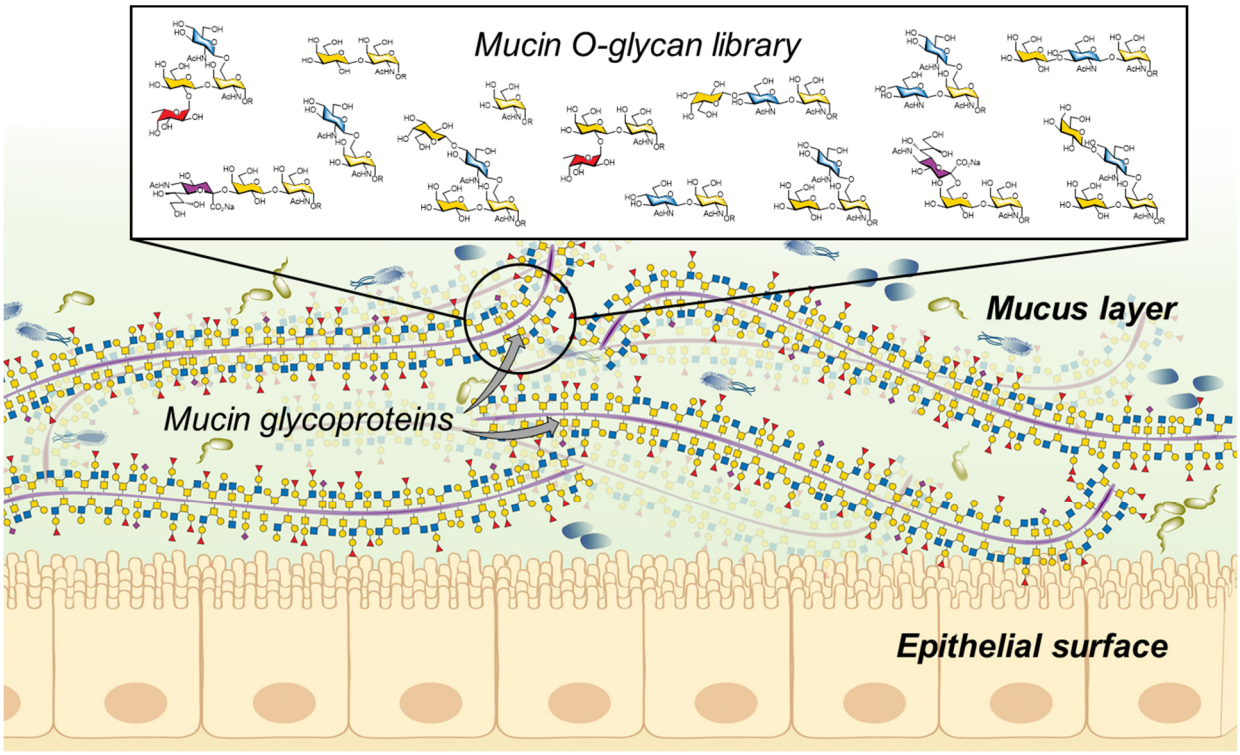
Synthesis & development of carbohydrate-based anti-infectives

Glycans (*i.e.*, carbohydrates) are an important family of natural products which coat all cell surfaces and play essential roles in cell signaling and function. Many diseases are characterized by changes in glycan composition, suggesting their potential utility as a therapeutic target.

The mucosal barrier is well-established to play an important role in microbiome development and as a first line of host defense. Although this has traditionally been attributed to its physicochemical properties, several recent publications indicate that mucin glycoproteins (the main protein component of mucus) and their associated glycans can regulate gene expression and are capable of attenuating virulence in diverse, cross-kingdom pathogens, including Gram-negative bacteria, Gram-positive bacteria, and fungi [1-4].

In efforts to better understand the mechanism(s)-of-action of these virulence-attenuating glycans for the design of novel therapeutics, we have been developing methods to produce individual mucin glycan structures [5,6] at a scale sufficient to assess their virulence-attenuating properties in diverse assay formats. This MSc project will be focused on producing new complex glycans through a combination of synthetic chemistry and enzymatic transformations. Anti-virulence capacity of the produced glycans will then be evaluated in biological assays.



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