Glycomimetic ligands for mammalian C-type lectins

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Many C-type lectin receptors (CLRs) are essential components of the innate immune system that recognize and bind to pathogen-associated molecular patterns present on the surface of microorganisms. These receptors are also involved in several physiological processes, including cell adhesion, migration, and differentiation. Due to their role in disease and immunity, CLRs have emerged as potential targets for therapeutic intervention. However, the development of CLR-targeting drugs has been hampered by the lack of selective ligands.

In recent years, glycomimetic ligands have emerged as promising candidates for CLR targeting. These molecules are designed to mimic the structure and function of natural glycans and offer advantages over their natural substrates, including increased specificity, stability and bioavailability. Alternatively, allosteric modulation of CLRs has been reported and may offer an additional concept for the development of CLR targeted therapeutics.

I will present our approaches to developing glycomimetic and allosteric ligands for CLRs. Examples from immune cell targeted delivery of therapeutics will be covered, where CLR ligand are conjugated to lipid nanoparticle or other carriers. The ligand binds to the CLR on the target cells, leading to internalization and release of the payload intracellularly. This strategy offers several advantages over conventional drug delivery methods, including increased specificity and reduced toxicity as well as enhanced efficacy.

Bibliographic references:

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