

GlycoPol™ - Novel Glycopolymers for Therapeutic Targeting and Delivery

GlycoPol™ is a novel glycopolymer technology for targeting and delivery of therapeutic cargos to specific glycan receptors on selected cells and tissues. The ability to “structurally tune” the sugar composition of each GlycoPol™ for a specific cell or tissue type allows the targeting and delivery of biologics, such as proteins, peptides, oligonucleotides and nanoparticulates, and small molecule therapeutics. Furthermore, GlycoPol™ binding and uptake into cultured cells demonstrates the potential for intracellular delivery of a range of drug entities.

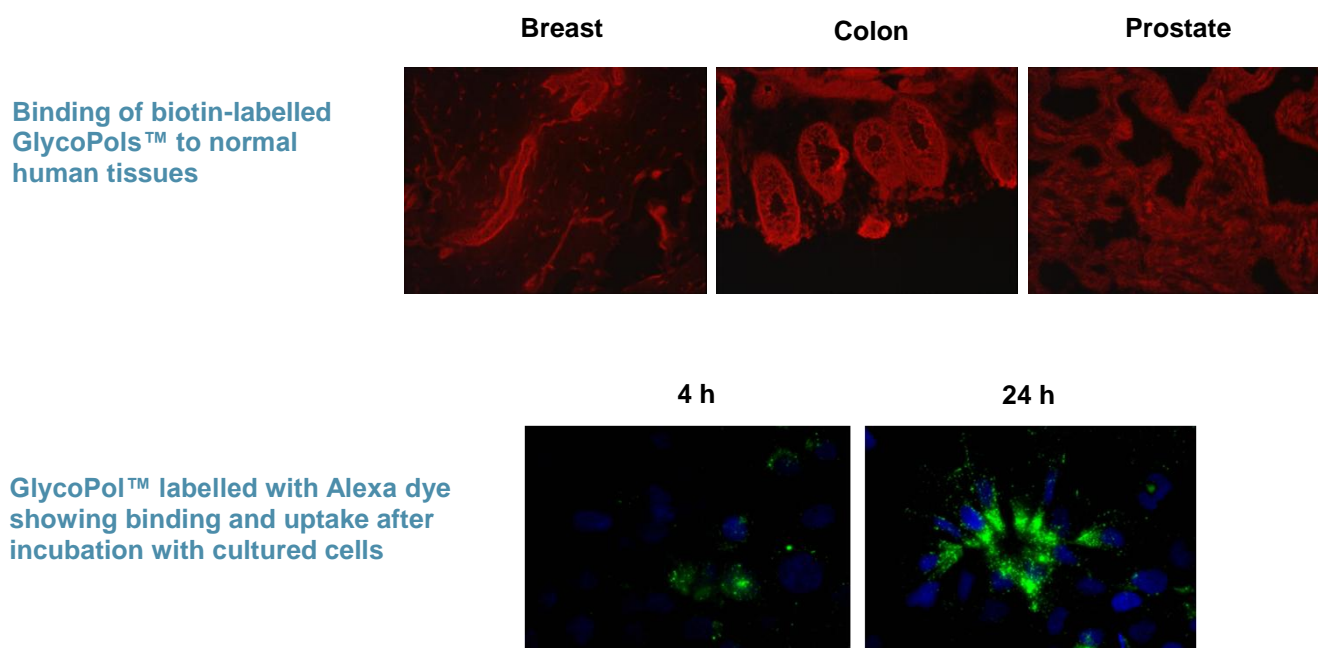
GlycoPol™: Background

Carbohydrates are information-rich molecules involved in a number of important biological processes including cell-cell recognition, cell-protein interactions and the targeting of hormones, antibodies and toxins. Many glycan-receptor interactions are polyvalent, whereby multiple interactions potentiate the effect of a single sugar component. The pharmacokinetics, pharmacodistribution, solubility, stability and receptor binding of biomolecules are all influenced by their carbohydrate composition.

The rationale behind GlycoPol™ is that it offers a novel approach to produce glycan mimetics for engineering the carbohydrate content of a biomolecule, to produce glycan or polysaccharide mimetics, or to introduce carbohydrate on to molecules that are unglycosylated. Depending on the carbohydrate composition of the attached glycopolymer, this presents the opportunity not only to target the biomolecule to a glycan receptor on a specific tissue, but also to modulate the biological activity of a particular biomolecule.

Human Tissue and Cell Binding and Uptake Studies

A range of GlycoPols™, comprising chain lengths of between 6 and 100 units and several different mono- and disaccharides, have been evaluated for binding to twenty-five normal and inflamed human tissues and cultured cells. The GlycoPols™ show specific and selective binding, together with various degrees of tissue specificity depending on sugar content, indicating these novel polymers can be used to target ‘cargos’ to tissues. Cell binding of a specific GlycoPol™ followed by cell uptake was also observed.



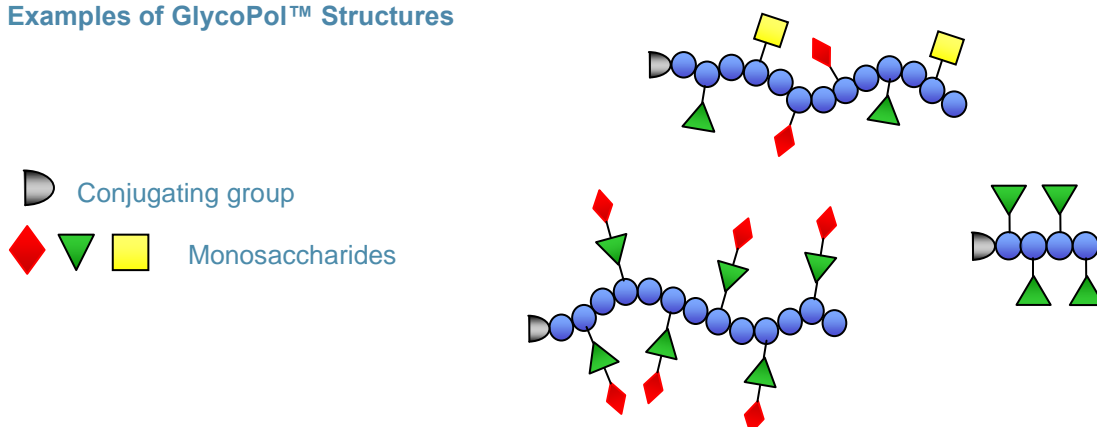
Structure and Design Versatility

The structure of GlycoPols™ is based on pendent sugars covalently attached to a polymer backbone. This provides the flexibility to design GlycoPols™ for a particular target receptor. Structural tuning of GlycoPols™ can be achieved by varying a number of parameters:

- The choice of sugars to be incorporated, eg mono-, di- and polysaccharides, and mixtures of these
- The length of the polymer backbone, eg glycopolymers from 6 to 100+ units in length can be produced
- GlycoPols™ can be covalently linked to their therapeutic cargos via thiols or amines

GlycoPols™ are easily prepared. Firstly, a polymer backbone incorporating a conjugation group is synthesised with tight control over the polymer chain length. Secondly, the desired sugar molecules are “clicked” on to the backbone to produce the glycopolymer. Libraries of glycopolymers featuring materials with polymer backbones of identical size, but differing only in the pendent sugar moieties, can be readily prepared. Such libraries can be screened for GlycoPols™ that bind to specific cells or tissues.

Some Examples of GlycoPol™ Structures



Intellectual Property

GlycoPol™ is protected by a series of granted patents and patent applications. The patent coverage includes the glycopolymers and the processes to produce them as well as GlycoPol™-biomolecule conjugates.

Commercial Strategy

WEP's business strategy is to establish collaborations and partnerships with pharmaceutical and biotechnology companies wishing to develop novel GlycoPol™ versions of therapeutic cargos to enhance their therapeutic effect. A typical collaboration starts with WEP working with its collaborators to define and produce the optimal GlycoPol™ for the purpose.

The Company's objective is to license-out GlycoPol™ for specific target molecules and/or applications on either an exclusive or non-exclusive basis and to manufacture the relevant GlycoPols™ for its partners.