BOKU UNIVERSITY

## TECHNOLOGY OFFER

# A Greener Biotechnological Route to Zwitterionic Glycans for Immune Screening

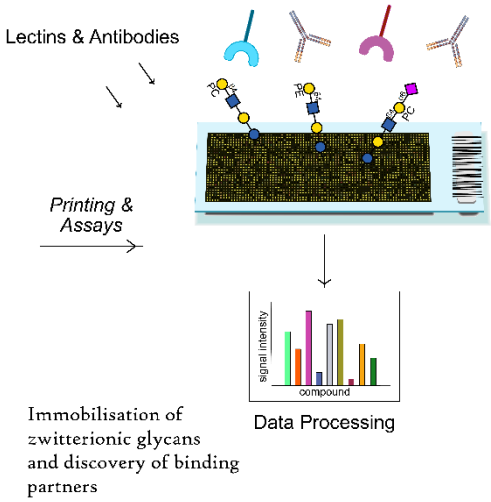
**The technology offers a holistic platform for the enzymatic synthesis and display of zwitterionic standard glycans to study their interaction with the host immune system. The process requires only three steps – enzymatic reaction, purification and printing on glass slides – and replaces the conventional, laborious chemical synthesis with a resource-efficient "green chemistry" approach. At its core is a novel bacterial phosphorylcholine transferase with outstanding broad donor and acceptor substrate tolerance.**

### BACKGROUND

Phosphorylcholine (PC)-modified zwitterionic glycans play a double-edged role in host–pathogen interactions, they allow parasites to access their host and to evade the host's immune system at the same time. The molecular mechanisms of the interaction of these structures with the human innate immune system remain poorly understood, hindering the development of effective therapeutics. Systematic investigation is limited by the lack of simple structurally defined standards that imitate relevant natural zwitterionic motifs. Existing glycan microarrays contain mainly anionic, neutral, or isolated natural PC-containing glycans; comprehensive arrays of defined zwitterionic structures are not available. Isolation of naturally occurring glycans is limited by their low abundance and by the risks of cultivating pathogenic organisms. Conventional chemical synthesis of PC-glycans is lengthy, complex, and relies on harsh reagents. Until now, no recombinantly expressible PC transferase that accepts simple sugar-only substrates had been available.

### TECHNOLOGY

Using a single bacterial phosphorylcholine transferase, recombinantly expressed in *E. coli* and easy to scale up, zwitterionic products can be produced in just one conversion step. By varying the terminal monosaccharides (acceptors) or the donor substrate, an entire library of zwitterionic standard glycans is generated from simple precursors, mimicking natural PC-containing glycans found in pathogenic bacteria, fungi and parasites. The products are then immobilised using the well-established technology of glycan microarrays and screened for interaction with immune proteins.




### BENEFITS

- Only three process steps: enzymatic reaction, purification, printing on glass slides
- "Green chemistry" approach instead of time-consuming chemical synthesis with harsh reagents
- Single enzyme, recombinantly expressible in *E. coli*, with easy scale-up
- Outstanding broad donor and acceptor substrate tolerance enables an entire standard library
- Defined, reproducible standards without the need to grow pathogenic organisms

**REFERENCE:**
2026-04

**OPTIONS:**
- R&D Cooperation
- Licensing
- Transfer

**KEYWORDS:**
Zwitterionic glycans glycan microarrays, phosphorylcholine transferase

**TECHNOLOGY READINESS LEVEL**
Validated in the lab (TRL4)

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