RECOMBINANT PRODUCTION OF HUMAN MILK OLIGOSACCHARIDES AND THEIR DERIVATIVES FOR GLYCOCONJUGATION

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Human milk oligosaccharides (HMOs) are the third largest group of human breast milk compounds, with less nutritional, rather than bioactive, functions such as prebiotics, immunomodulators, or neurostimulators [1]. Research into their bioactivity is limited by the complex synthesis, and therefore the high cost of HMOs. We were able to solve this problem by using genetically engineered bacterial cell factories, creating recombinant production strains able to produce selected HMOs *in vivo* [2]. By cultivating the strains in a fed-batch bioreactor, followed by tailored isolation procedures, we are able to achieve gram-scale production of HMOs at a favourable price. Fast and efficient biotechnological synthesis unlocks the opportunity for glycoconjugation of isolated HMOs on various carriers. Multivalent presentation can amplify the interaction of HMOs with gut microbiota or cells of the immune system and facilitate the detection and visualization of these interactions [3]. Suitable carriers can also be used for high-throughput screening of HMO interactions with various compounds such as lectins, cytokines, interleukins, drugs, etc. The interdisciplinary approach of engineered recombinant strains offers a suitable platform for carbohydrate synthesis, which can speed up the research on these highly valuable compounds.

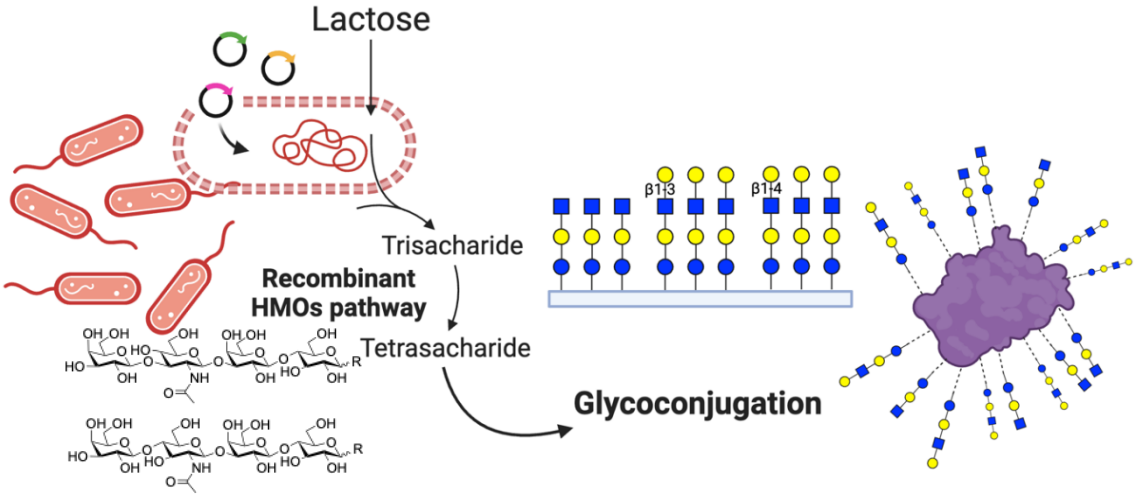

Figure 1. Schematic representation of HMOs recombinant synthesis with its possible glycoconjugation on various carriers.

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References:

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