



Human Milk Oligosaccharides (HMOs)

Did you know that HMOs are not only important for healthy infant development, but can also serve as a prebiotic for adults, contribute to combating allergies and diabetes and enhance the effectiveness of vaccines and antibiotics? And did you know that the main reason they are not used more often is that they have been so hard to come by... until now!

BACKGROUND

There are over 200 different structures of HMOs in human breast milk in 100-1000-fold higher concentrations compared to cow, goat or sheep. HMOs are one of the most complex naturally occurring carbohydrate structures and the reason why breast milk is so important for infant nutrition. They act as important prebiotics, promoting the growth of beneficial bacteria in the infant's gut, stimulate a healthy immune system and protect directly against various pathogens by preventing them from binding to epithelial cell linings in the baby's gut. Furthermore, HMOs contribute to brain development and have anti-inflammatory properties. The production of HMOs, however, has so far been very challenging due to their structural complexity and the intricate enzymatic process required for their synthesis leaving only purification from human milk as an economically viable source.

TECHNOLOGY

acib has described and optimized several enzymes for regioselective glycosyl transfer and glycosidic modifications. In a recent project, acib has developed modular enzymatic steps that can be integrated into cascade reactions to produce a variety of specific HMOs in *E. coli*. This platform technology was demonstrated for the production of 6'-sialyl-lactose, 3'-sialyl-lactose and 2'-fucosyl-lactose and can be used for many other HMOs. acib also has experience in analysis, purification and upscaling of HMOs.

OFFER

acib offers a unique opportunity for natural HMO-production using enzymatic cascades (and metabolic engineering). acib provides knowhow in bioprocess technology design, ensuring seamless transition from laboratory to industrial-scale production. Intellectual property (IP) generated during the collaboration can be transferred to you, our investor/industrial partner. acib has 30+ years of experience and has worked successfully with >250 industry partners.

acib offers you the opportunity to establish cost-efficient bioproduction of valuable HMOs.

acib-EXPERTS:

Prof. Dr. Bernd Nidetzky
Dr. Barbara Petschacher
Dr. Christiane Luley

DEVELOPMENT STATUS:

TRL 4 (technology validated in lab)

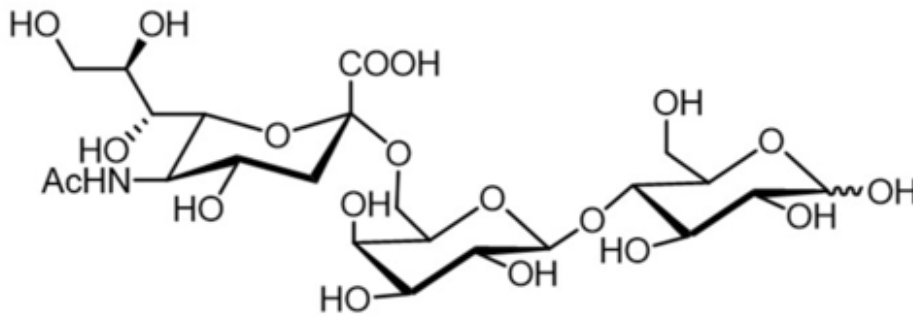
KEYWORDS:

Human milk oligosaccharides
Prebiotics
Natural
Enzyme cascades
Sustainable
Glycosylation
Infant nutrition
Gut health

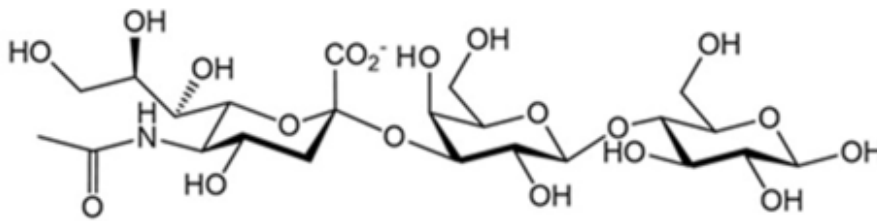
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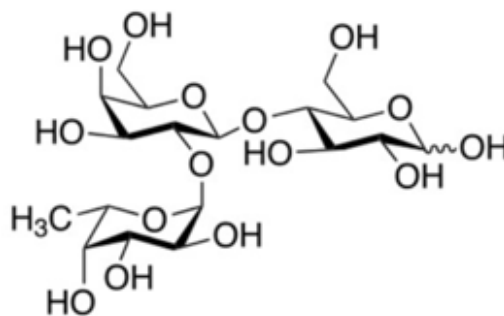
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6'-Sialyl-lactose



3'-Sialyl-lactose



2'-Fucosyl-lactose