Docket #: S11-047

Purified Mucin Glycans as a Milk-oligosaccharide Substitute

Researchers at Stanford University have discovered that mucin glycans (carbohydrates secreted in mucus) may be a valuable additive to infant formula. Mucin glycans are consumed by bacterial residents of the intestine via the same pathways the bacteria use to consume the oligosaccharides found in human breast milk. Human milk oligosaccharides (HMOs) are also structurally similar to mucin glycans. Both families of molecules may be able to facilitate assembly of the microbiota of the human gut shortly after birth. Mammalian mucin glycans can be readily released and purified from mucin proteins, which might be sourced from cows or pigs. These mucin glycans could then be added to commercial infant formula to mimic the function of human milk oligosaccharides.

The innovators have demonstrated that the polysaccharide utilization loci up-regulated during growth in HMO are the same loci mobilized when Bacteroides, a dominant genus within the intestinal microbiota of westerners, use structurally similar host mucus glycans.

Applications

- **Infant formula** - can be added to infant formula to mimic the function of human milk oligosaccharides

Advantages

- **Improved formulation** - addition of mucin glycans would make infant formula more closely resemble human breast milk
- **Prophylactic** - may help prevent invasion of pathogens in the intestines by aiding in the assembly of the natural microbiota of the gut

Publications

- Macrobal et al., ”Bacteroides in the Infant Gut Consume Milk Oligosaccharides via Mucus-Utilization Pathways.” *Cell Host & Microbe.* 2011 Oct; 10.1016/j.chom.2011.10.007. Epub 2011 Oct 27.

Patents

- Published Application: 20120207882
- Published Application: 20140187474
- Published Application: 20200216508
- Issued: 8,795,746 (USA)

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