

Study Questions
April 26, 2016

Milk oligosaccharides

Human milk oligosaccharides (HMO) are complex unconjugated glycans that are highly abundant in human milk, but currently not present in infant formula.

1. More than 150 different HMO have been identified so far. Why so few and why so many?
2. How women synthesize HMO is not yet fully understood. Why is it challenging to study HMO biosynthesis? Can you develop two different hypotheses on how HMO are synthesized? How would you test each hypothesis?
3. HMO amount and composition vary between women. What could determine this variation? What could be a benefit to have variation between women? Can we exploit those interindividual variations when we study HMO benefits?
4. The milk of Secretor mothers contains high concentrations of 2'-fucosyllactose (2'FL). In sharp contrast, the milk of Nonsecretor mothers contains almost no 2'FL. What could be potential consequences?
5. Early during lactation, most HMO are excreted with the newborn's feces. After a while, HMO degradation products are excreted. Why is there a shift over time? Could the shift also affect protein degradation?
6. Why is it challenging to study HMO effects?
7. Oligosaccharides are found in the milk of most other mammals. How are HMO different from oligosaccharides found in the milk of other mammals? Speculate why human milk is different.
8. Infant formula does not yet contain HMO. What could be potential consequences? Some infant formula contains different oligosaccharides. What kind? Where do they come from? Why have they been added? Are there potential risks to add oligosaccharides other than HMO?
9. The "Developmental Origins of Health and Disease" (DOHaD) approach links early life events during pregnancy and the neonatal period to health and disease later in life. What could be potential mechanisms how HMO benefit the neonate with long-term implications for health and disease?
10. HMO benefit the infant, but could they also benefit the mother? Can you speculate on potential mechanisms?
11. It's usually the neonate that receives HMO with the mother's milk. Could there be potential benefits to provide adults with HMO? What would be examples of how adults could benefit from HMO?
12. How would you make HMO available for research and application?
13. Individual HMO have recently been approved for use in infant and adult nutrition. What are potential applications? What are potential risks? If you had to create the "ideal" infant formula, what HMO(s) would you add and at what concentration(s)?