Milk Banking in the Netherlands: The Dutch Human Milk Study

Willemijn E. Corpeleijn, MD
VUmc and the Emma Pediatric Hospital (AMC), Amsterdam (The Netherlands)

6th International Breastfeeding and Lactation Symposium, 15-16 April 2011
Amsterdam, The Netherlands

In recent years we have come to realize that early nutrition has a major impact on later functional outcome. Premature infants are born near a critical period of body- and organ growth (including brain growth). Impaired fetal and neonatal growth has been linked to various diseases in early (e.g. infections) and in later life (e.g. coronary heart disease and type 2 diabetes) but also to unfavorable neurodevelopment. Both the macro-nutrient quantity and quality of the diet consumed are of importance, especially for preterm infants. Expressed breast milk is the optimal choice of feeding for premature neonates. It has been shown that preterm infants fed human milk have a lower risk of developing Necrotising Enterocolitis (NEC) and late onset sepsis compared to infants fed preterm formula. Breast milk is also related to improved neurodevelopmental outcome, lower cardiovascular risk factors in later life, and increased maturation of the immature gut. Own mother's milk is often not available for preterm infants admitted to the Neonatal Intensive Care Unit (NICU) and therefore human milk banks have been established to provide these infants with pasteurized human donor milk, intuitively the best alternative when own mother's milk is not available. As the milk banking process (repetitive freeze-thawing, pasteurization and prolonged storage) affects several components of the milk, it is unclear whether donor milk offers advantages over preterm infant formula. Two meta-analyses have shown a reduction in Necrotizing Enterocolitis (NEC) incidence in low birth weight infants fed donor milk compared to those fed with formula. However donor milk fed infants showed slower growth rates in comparison to infants fed (preterm) formula. Decreased growth rate is associated with neurodevelopmental impairment. Interpretation of these results is hampered by the fact that in 7 of the 8 studies analyzed, pasteurized milk without fortification was given to the infants, which is not a reflection of current practice. Furthermore, there was a substantial heterogeneity between the studies and none of them were blinded. Most included trials were performed in the late 1970's and early 1980's while only one was performed after the year 2000. Clearly, we are in need of more randomized trials on the effects of donor milk and formula feeding in premature neonates.

Lyophilized and powdered donor milk was available for sick neonates in the Netherlands from the late 1940's. In 1973 however the Dutch Mother's Milk Bank was forced to close due to a decreasing offer of milk. No human milk bank has been opened in the Netherlands ever since. After the opening of the Sophia Human Milk Bank in Rotterdam, beginning of 2011, we will initiate a randomized trial to assess the effects of donor milk feeding in Very Low Birth Weight (VLBW) infants. Thousand VLBW infants, admitted to the ten Dutch NICU's, will be included in this study. As early nutrition is known to have a lifelong impact on many aspects of human physiology, outcome will be studied according to 6 Work Packages. 1. Neonatal growth & wellbeing 2. Immunity, allergy & gut health 3. Neurocognitive Development 4. Cardiovascular and Metabolic Consequences 5. (Epi)genetics 6. Cost-effectiveness. Infants will be studied during their initial hospital admission. Follow-up will be at 0-6 weeks corrected age (CA), 6 months CA, 1 year CA, 2 years CA, 6 years and 16 years of age. By this approach we hope to elucidate some of the underlying mechanism of the beneficial effects of human milk feeding.

Willemijn E. Corpeleijn, MD

Willemijn became interested in scientific research during her gradation project on Mother-to-child-transmission of HIV and Syphilis, at the Tygerberg Children's Hospital (Cape Town, South Africa). After obtaining her MSc in medicine she joined the neonatal research group of Professor Hans van Goudoever in the Sophia Children's Hospital in Rotterdam, the Netherlands. She worked on various projects on neonatal nutrition, including a study on intestinal amino acid metabolism in enterally fed preterm infants. This research was done in part at the Fudan Children's Hospital (Shanghai, PR China). After obtaining her medical degree in 2009 she started a research fellow-ship, again under the supervision of Hans van Goudoever, on the effects of human milk in preterm neonates in a nationwide randomized controlled trial: the Dutch Human Milk Study. Currently she is responsible for setting-up a human milk bank at the Sophia Children's Hospital. After obtaining her PhD she will apply for a paediatric residency in order to become a paediatrician.