

## The value of human milk in the NICU

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It is well shown that Breastfeeding is a highly accessible, low-cost public health measure and that way far from just a life-style choice. All the reasons that make breast-milk the best food for full-term babies are doubly applicable in the case of premature infants. The benefits of Human Milk for premature babies range from lower NEC- and RPM-Incidence, a reduced frequency of nosocomial infections to better neuro-development and long-term outcome, i.e. higher scores in developmental testing's at the age of five years. There is a greater commitment to using mother's own milk or donor milk over infant formula worldwide. This is also the major driver for the emergence of new donor human milk banks worldwide as "one of the most exciting developments in infant nutrition this past decade" <sup>1</sup>.

Nevertheless, there are some misconception as well:

### **Misconception 1: Energy and macronutrient content of human milk are fixed for both, preterm and term milk.**

We calculate in our NICU's daily the adequate protein- and caloric intake for preterms based on an adopted and fixed macro- and micronutrient content of preterm human milk. However, the caloric as well as the protein content of mother's milk is varying between different lactating mothers and in the specific individual as well (intra- and inter-individual fluctuations). The increased use of donor milk has further exposed this problem due to its lower protein content compared to preterm milk. No wonder that sometimes our calculations are wrong and the babies' growth does not follow the expected growth charts, because we perform a "blind compensation" at least for protein. There are movements in different NICU's to develop a more precise customized fortification: More and more NICU's work with different kinds of milk analyzers to overcome these problems. We have to keep in mind that they are still no standard of care, unless we have valid data and evidence. In addition, as point-of-care devices in the NICU they will have to be involved in quality assurance measures as good clinical practice.

### **Misconception 2: Just more calories are better.**

Some years ago, we were attempting to grow preterms better by giving them more carbohydrates and fat mostly by formula through a modular approach with individual supplements. With that approach we generated mostly fatter babies who still did not followed the anthropometric goals defined by the accepted intrauterine growth charts. Nowadays we focus on both: adequate growth along the percentiles but also for the right body-composition to prevent the appearance of a metabolic syndrome later on.

**Misconception 3: More protein makes always healthier preterms.**

Adequate protein intake is essential for body and brain growth. On the other side, we need to be careful for providing excessive amounts of protein. An over dose of protein could lead to metabolic acidosis, exceeded weight gain as well as higher rates of nosocomial infections and the risk for development of metabolic problems later in life.

**Misconception 4: Adequate growth is guaranteed by sufficient energy and protein intake.**

Growth rate or weight gain is always a balance between energy/protein intake and energy consumption: Extensive and long lasting stress or pain, serious neonatal complications and significant increased energy consumption e.g. by high work of breathing (WOB) will influence postnatal growth. Additionally very immature preterms could show problems to metabolize the offered nutrients.

**Misconception 5: Exclusive breast-feeding puts premature infants on risk for adverse outcomes.**

It has been demonstrated that insufficient growth during NICU hospitalization was associated with the later onset of cognitive disorders as well as poor outcome. That is why, neonatologists argues that breastfeeding alone could put preterm infants on a higher risk of worse outcomes due to caloric and protein undernutrition. In fact, exclusive breastfeeding caused a less satisfactory growth during hospitalization; but was paradoxically followed by better psychomotor development (K-ABC and ASQ questionnaire at the age of 5 and 2 years) and higher weight, height and cranial perimeter values versus non-breastfed infants in two cohort studies in France <sup>2</sup>. This effect was dose-dependent. This association of less satisfactory growth during hospitalization with better psychomotor development was referred to by the authors as the "apparent breastfeeding paradox in very preterm infants".

**References**

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