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Dr Nicholas Embleton is Consultant Neonatal Paediatrician, Newcastle Hospitals NHS Foundation Trust, and Honorary Reader in Neonatal Medicine, Newcastle University, Newcastle upon Tyne, UK. He qualified in medicine in 1990 and has developed a broad portfolio of translational research (see www.neonatalresearch.net). These include large-scale NIHR funded collaborative trials of feeding and immunonutrients (lactoferrin) in the UK that are recruiting ~5000 preterm infants (www.npeu.ox.ac.uk/elfin), along with mechanistic microbiomic and metabolomic studies (MAGPIE study) funded by the MRC/EME. In addition, he coordinates the Newcastle Preterm Birth Growth study that has tracked the growth and metabolic outcomes of children who were born preterm into late adolescence, including measures of

insulin sensitivity, body composition, and muscle function, along with epigenetic correlates. He is also clinical lead for a series of qualitative studies exploring the experiences of parents (and the staff who cared for them) who suffered a reproductive or neonatal loss (the Butterfly project). He is a member of European Society of Pediatric Gastroenterology, Hepatology and Nutrition Committee of Nutrition, chaired the British Association of Perinatal Medicine working party on donor expressed breast milk (2016), and is chair of the UK based multi-disciplinary Neonatal Nutrition Network (N3). Further information on research projects, publications, presentations are available on the website as well as links to guidelines and education for staff in the area of twin loss. (www.neonatalresearch.net/butterfly-project)

The Importance of Human Milk for the Preterm Infant

There are overwhelming data to show that human breast milk is superior to formula milk when considering a range of outcomes in term born infants. Fortunately, many of these benefits are even greater in infants born preterm. Whilst there is continued uncertainty over the precise role of donor expressed breast milk, existing data are consistent and continue to show that maximising the duration and amount of mother's own breast milk that infants receive will result in better outcomes. Preterm infants who receive mother's own milk have lower rates of sepsis and necrotising enterocolitis, and better neuro-cognitive outcomes. Breast milk is a complex biological mixture that will never be replicated by cow's milk based artificial formula. In addition, the structures of key human milk proteins and lipids are different to those from bovine milk. However, many of the human milk constituents

also have 'functional' properties meaning they exert a beneficial effect over and above that provided by the micro- or macronutrient content alone. This presentation will consider some of the functional properties of breast milk including lactoferrin, live bacteria and human milk oligosaccharides (HMOs) and how they might interact with the immune system in the developing gastro-intestinal tract to promote 'gut health'. The talk will discuss potential roles of nutrients such as lactoferrin, the ingestion and metabolic function of HMOs and how they 'feed' beneficial bacteria such as Bifidobacteria. These elements will also be considered alongside the potential contribution of bacteria naturally present in breast milk, and how these may interact to 'shape' a healthy pattern of gut bacteria (the gut 'microbiota') for preterm infants.