The world's leading researchers agree: 130 million babies need breast milk now

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"Breast milk is food, medicine and signal; it is the first food a baby has evolved to eat and we do not know enough about it to replicate it." With this statement, symposium speaker Associate Professor Katie Hinde articulated the foremost reason for bringing together nine leading scientists and 450 global delegates to Medela's 12th International Breastfeeding and Lactation Symposium in Florence, Italy.

Professor Bo Lönnerdal's (University of California, Davis, USA) seminal studies on human milk proteins alerted the world to the 'bioactivity' in human milk. The combined bioactivities of breast milk proteins improve long-term intellectual outcomes and reduce obesity, diabetes and cardiovascular disease, granting lifelong benefits to breastfed infants. Recent studies reveal even more bioactive powers:

- lactoferrin kills streptococcus and reduces infant diarrhoea
- the protein α-lactalbumin stimulates the immune system, builds a healthy gut microbiome and helps infants to absorb vital micronutrients
- milk fat globule membrane (MFGM) proteins function as anti-infection agents and improve cognitive development scores
- osteopontin boosts the immune system and protects brain development.

Professor Catharina Svanborg (Lund University, Sweden) has isolated the protein-lipid complex HAMLET (human α-lactalbumin made lethal to tumour cells) in breast milk and is now on the verge of developing a next-generation cancer therapy. Proven to kill over 40 cancers *in vitro* with no detrimental side effects, it represents new hope for cancer patients. The next stage will include large-scale clinical studies, mass production, toxicology proofs and regulatory approval.

Associate Professor Katie Hinde (Centre for Evolution and Medicine at Arizona State University, and the California National Primate Research Centre, USA)

Associate Professor Katie Hinde.

discussed the evolution of mammals and humans, and breast milk and breastfeeding advocacy. Hormones and bioactives in a mother's milk signal the infant's brain to set developmental priorities. Humans need the most complex milk of all to fuel complex brains; through a comparison of lactation across species, Professor Hinde demonstrated the exclusive suitability of human milk for human babies.

Dr Riccardo Davanzo (Division of Neonatology, Trieste, and Chair of the Task Force on Breastfeeding of the Italian Ministry of Health) highlighted the rare deaths of preterm and otherwise healthy infants from SIDS (sudden infant death syndrome) and sudden infant collapse. Dr Davanzo has devised a hospital protocol and homecare guidelines to help doctors, nurses and parents remain alert to a baby's condition during skin-to-skin contact and breastfeeding, and be vigilant about observing safe sleeping and breastfeeding practices.

Mother's own milk is the best medicine a premature infant can receive, but if a baby's own mother cannot provide milk, that baby should not be deprived of human milk and donor milk is the next best thing. **Professor Guido Moro** (Macedonio Melloni Maternity Hospital in Milan, first president of the European Milk Bank Association and President of the Italian Association of Donated Human Milk Banks) is developing high-temperature, short-time pasteurisation equipment that will preserve essential proteins, oligosaccharides, hormones and other bioactive properties of human milk

Professor Catharina Svanborg.

to better nurture those infants who rely on donor milk.

Professor Diane Spatz (University of Pennsylvania, Children's Hospital of Philadelphia) pleaded to the audience for a new approach to communicating the value of human milk to mothers. Research shows that if women and their families understand how essential breastfeeding is, it helps them to work through the challenges. From bedside fathers and peer counsellors, to nurse training, group sessions, in-house visits and regional assemblies, the Spatz 10-step model for transforming hospitals, homes and cultures into havens for breastfeeding mothers and infants provides concrete steps to help even mothers of babies in intensive care breastfeed.

The scientist who revealed the true internal anatomy of the lactating breast, **Associate Professor Donna Geddes** (University of Western Australia), described how breast milk feeding heightens cognitive development, lean muscle mass, and healthy cardiovascular development to establish a healthier lifelong trajectory. The act of breastfeeding reinforces the craniofacial bone structure at key pressure points to help it grow properly. Her recent studies have centred on preterm infants, whose craniofacial structures are especially soft and susceptible to malformation without breastfeeding. Dr Geddes is now developing vital interventions using nipple shields to help premature infants latch on more easily, enabling them to feed at the breast earlier.

Associate Professor Luigi Corvaglia (University of Bologna; Sant'Orsola-Malpighi Hospital, Bologna; Bologna Human Milk Bank, Italy) explained growth metrics in the neonatal ward and how formula-fed preterm infants show a sharp rise in growth (largely plumpness) while those fed breast milk grow more slowly. At ages two and five years, however, preterm infants fed breast milk have more advanced growth health and cognitive scores than their formula-fed counterparts. Dr Corvaglia presented new growth metrics and feeding regimens to ensure the provision of donor milk to infants whose mothers cannot provide their own milk.

Focusing on family outcomes rather than infant outcomes, **Associate Professor Karel O'Brien** (Sinai Health System, Toronto, Canada) has helped to develop the family integrated care (FIC) model with Professor Shoo Lee. Early preterm infants require lengthy hospital stays, yet parents who barely see or hold their preterm infants feel less bonded to them, more stressed, and less prepared to care for their infants at home. The FIC model brings the mother and father into the neonatal intensive care unit as full-time caregivers. In addition to the mother breastfeeding, the mother and father are both trained by nurses in how to use essential medical devices and tools. They receive peer support, participate in group counselling sessions, write in the medical charts, participate in daily care decisions, and provide all routine care for their babies. FIC has demonstrated improved infant outcomes, increased breastfeeding rates and reduced parental stress and anxiety from the hospital stay to beyond discharge.

In summing-up, the experts agreed: breast milk is indispensable in providing the nutrients, hormones, stem cells and bioactive elements which fuel and form the brains, organs, and immune systems that 130 million children born each year globally will rely on for the rest of their lives.

Professor Diane Spatz.

Dr Riccardo Davanzo and Professor Guido Moro.

Professor Bo Lönnerdal, Professor Catharina Svanborg and Associate Professor Katie Hinde.

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