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Latest insights from the biennial conference for research in human milk and lactation

The meeting of the International Society for Research in Human Milk and Lactation (ISRHML) only occurs every two years. This society remains one of the only groups dedicated to research the components of human milk and the physiology of the lactating breast. This year, the conference was in Japan and offered an interesting mix of both local and international research findings. Here is a little taste of what was on the menu:

- First, to Malaysia, where a research group has conducted a remarkable study demonstrating benefits to breastfeeding mothers using relaxation therapy. Mothers were asked to listen daily to a relaxation tape for at least two weeks. The results included reduced maternal stress, reduced milk cortisol levels, increased infant sleep duration and more optimal infant weight gain. A fascinating example of biological signalling between mother and baby.¹
- Next, let us consider the differences breastfeeding a baby boy or a baby girl. By sifting through the literature, researchers attempted to identify whether mothers make different milk for boys or girls. The result: studies should definitely consider boys and girls separately when analysing study results. The presenting researchers analysed data from a Canadian cohort (CHILD study) and showed that boys are less likely to be exclusively breastfeeding and more likely to receive formula by 4 months of age than girls, and so girls are more likely to get their mother's milk for longer.² Interestingly, research from Australia had previously shown that for mothers that do establish and achieve exclusive breastfeeding for the first 6 months of life, boys drink more milk daily than girls do³ (831ml for boys vs 755ml for girls). Is this extra daily volume demand more likely to result in early supplementation? The questions remain open as to why, but the implication is certainly interesting, do mothers that deliver boys require more lactation support?
- We know breastfeeding is not only beneficial for the baby, but also for the mother; and new research helps us understand these benefits even further. In 2016 the Lancet journal reported that if mothers worldwide breastfed for at least 6 months, 20 000 deaths from breast cancer would be avoided each year.⁴ This year, researchers presented that we can now consider an additional reduction of 31 000 cases of endometrial cancer, and 9 700

¹ Husna, N. et al. THE INFLUENCE OF RELAXATION THERAPY ON BREAST MILK HORMONES AND MACRONUTRIENT CONTENT: A RANDOMIZED CONTROLLED TRIAL. Abstract from the 19th ISRHML Conference. Breastfeed Med. 2018;13(7).

² Azad, M. et al. MORE MILK FOR DAUGHTERS? SEXDIFFERENTIATED BREASTFEEDING IN TWO BIRTH COHORTS. Abstract from the 19th ISRHML Conference. Breastfeed Med. 2018;13(7).

³ Kent, J.C. et al. 2006

⁴ Victora, 2016

cases of ovarian cancer, each year, worldwide.⁵ That is a 10% reduction in the risk of endometrial cancer if mothers 'ever' breastfed, with greater reductions for longer breastfeeding durations.

- A series of presentations focused on the bacteria in mother's milk. While mother's milk was considered 'sterile' for many years, it is now clear that it contains its own special combinations of microbes termed the 'human milk microbiome'. This is different to the 'infant gut microbiome'. Compelling results were presented: one study found that lower bacterial diversity in mother's milk at 12 weeks was associated with high maternal psychosocial distress.⁶ In addition, a large multi-centre study called the INSPIRE study aims to characterise the microbiome of human milk and has found some interesting interactions between the bacteria in milk and the environment, including the food mothers eat. For example, the types of bacteria found in milk were influenced by whether the women had themselves consumed milk, meat or carbohydrate-rich foods.⁷ The scientists could not speculate yet on whether this has any consequences, but these milk bacteria may be priming infants for the worlds which they are destined to grow up in.

- Another point of interest was how the microbiota of the infant is developed. It is clear some of the bacteria come from the mother's milk. It is also known that whether the infant is delivered vaginally or via c-section can impact the types of bacteria that colonise the infant. However, there is an open question regarding the infant's oral bacteria. The bacteria in the infant's mouth have been thought to 'contaminate' the breast so that as a result we see oral bacteria in that mother's milk. An elegant study⁸ decided to investigate if this was really true. The research team analysed the composition of bacteria in pre-colostrum (colostrum that is produced before birth), which has never been in contact with the baby's oral cavity. Interestingly, the researchers could demonstrate that this pre-colostrum already contained what had been considered 'oral-bacteria', showing that, at least some of the bacteria found in the infants' oral cavity, actually come from mother's milk itself. This adds further importance to the act of direct breastfeeding and to the administration of oral care (the swabbing of colostrum into the infants mouth) when direct breastfeeding is not possible.

- And finally, an exciting new frontier for research is unfolding as a research team in Munich attempts to define and understand how the mammary gland matures and produces milk at the single-cell level.⁹ It is still baffling that there is an enormous gap in knowledge regarding how the cells in the breast undergo the major changes seen during pregnancy, lactation and

⁵ Jordan, S. et al. BREASTFEEDING AND GYNAECOLOGICAL CANCER. Abstract from the 19th ISRHML Conference. Breastfeed Med. 2018;13(7).

⁶ Fernandez, L. et al. INFLUENCE OF MATERNAL POSTNATAL PSYCHOSOCIAL DISTRESS IN HUMAN MILK MICROBIOTA. Abstract from the 19th ISRHML Conference. Breastfeed Med. 2018;13(7).

⁷ Boothman, S. et al. MATERNAL DIET AND THE HUMAN MILK MICROBIOME Abstract from the 19th ISRHML Conference. Breastfeed Med. 2018;13(7).

⁸ Rodriguez, JM. et al. HUMAN PRE-COLOSTRUM: POTENTIAL ROLE AS A SOURCE OF BACTERIA TO THE INFANT MOUTH. Abstract from the 19th ISRHML Conference. Breastfeed Med. 2018;13(7).

⁹ Twigger, A. et al. UNDERSTANDING HUMAN MAMMARY GLAND MATURATION AND MILK PRODUCTION ON A SINGLE CELL LEVEL. Abstract from the 19th ISRHML Conference. Breastfeed Med. 2018;13(7).

weaning. The genes and signalling pathways that are involved in this process are yet to be completely characterised, which means we do not have a complete grasp on how this unique organ functions. The researchers are breaking new ground, taking cells directly from breast milk and using them to characterise the status of the mammary gland and comparing them to cells from the resting breast. The team are able to grow these cells in floating collagen gels, in which the cells grow and form 'organoids' that resemble ductal-like structures. Using these approaches, the researchers aim to determine more information on the types of cells and their signalling pathways that lead to breast maturation and ultimately milk production. Deepening our understanding of the normal development of the mammary gland may lead to brand new approaches to supporting breastfeeding mothers. Perhaps certain genes or signals can be utilised for predictive screening of mothers at risk for lactation difficulties to develop their milk supply.

Overall, there was an excited energy in the conference hall each day as the human milk and lactation scientists discussed new perspectives and fostered new collaborations. It was clear that there is still so much we do not know about the topic, but that there are very dedicated and enthusiastic researchers that are taking on the challenge. Every two years, the list of human milk components expands, the complexity of the mother-infant-milk system becomes even more apparent and we are left in awe of this remarkable biological system.