

Editorial

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During my career I have been fortunate enough to meet and collaborate with many extremely talented lactation biologists, and this Editorial is prompted by the death, last year, of one of them. Peter Hartmann was a gifted nutritional biochemist who, through exposure to other eminent mammary scientists, became passionately involved in lactation research. Searching for his name combined with the keyword ‘dairy’ in PubMed yields the grand total of 4 papers, although I know for sure that he published several hundred. The reason is simple: notwithstanding a number of diversions into porcine lactation, Peter’s research focused very largely on our own species, so if you remove the keyword they all appear, including quite a number published in the *Journal of Dairy Research*. He was one of a relatively small but extremely enthusiastic and successful band of late-twentieth-century human lactation scientists, whose work perfectly complemented, extended and, frequently, improved that being done by so many more working in laboratory or dairy species. Not surprisingly, ‘human lactation’ elicits tens of thousands of PubMed hits for the last decade, although it is comfortably eclipsed by ‘breastfeeding’, whereas the reverse would have been true when my research started in the 1980s. The move away from more basic scientific aspects of the functioning of the human breast to applied practical advice for breastfeeding mothers is understandable and reflects a need created by modern social structures (grandmother is frequently less experienced, less available or less involved than would have been the case historically). However, it does leave knowledge gaps. I well remember Peter commenting that the breast is the only major organ in the human body that does not have a medical specialism associated with its functioning, a lamentable fact that probably dates from the era of male dominance of the medical sciences, but should have been redressed long ago. As an example of where our level of knowledge (or its application) almost certainly fails us, I offer this quote from UNICEF (2018): *Breastfeeding, initiated within the first hour of birth, provided exclusively for six months, and continued up to two years or beyond with the provision of safe and appropriate complementary foods, is one of the most powerful practices for promoting child survival and wellbeing*. In my opinion, this well intentioned statement risks putting mothers off breastfeeding rather than encouraging it, on two counts. The thought of breastfeeding for two years or more will not appeal to the majority of mothers in the developed world and, more importantly, to truly establish breastfeeding within an hour of birth is more or less a biological impossibility. For most species, the timing of lactogenesis stage II (copious secretion enabled by progesterone withdrawal) is closely co-ordinated with parturition, but this is not the case in the human, where progesterone remains high *postpartum* such that, as Peter showed, lactose secretion characteristic of milk synthesis is delayed for 24 h or more (Arthur *et al.*, 1989). From an evolutionary perspective, the human placenta has acquired the capability to transfer passive immunity to the developing fetus, development that includes the laying down of very considerable adipose depots which, at birth, are more extensive than probably any other species. On the other hand, on a comparative scale the stressfulness and energetic demands of human childbirth will probably rank as high as any other species, and certainly much higher than most. It would seem logical, therefore, to assume that mother and baby are biologically meant to enjoy a good few hours of rest and recovery immediately *postpartum*, with mother’s milk taking over as the baby’s energy source only after around 24 h (Knight, 2010). This raises a problem. In many developed countries, maternity units now aim for early discharge (within 24 or even 12 h), a practice that all too often results in infant nutritional problems and increased readmissions (Nilsson *et al.*, 2017). Ingrid Nilsson’s research employed a counselling approach focused on the first 24 h and such aspects as skin-to-skin contact in an effort to improve the postnatal establishment of successful breastfeeding. My involvement was to provide advice on mammary biology, as just described. The counselling intervention achieved some positive effects, but I wish that it had also included the simple reassuring message that breastfeeding takes time to get going, time which is, from a biological perspective, available. A poor understanding of human lactogenesis concerns me, and from a research perspective (and need) this applies in particular to the high rate of lactation failure experienced by obese mothers (Knight, 2020). It is not my only concern where human lactation research is concerned, there are others, and I wish to briefly address one of them. It is now 15 years since I participated in a study of human mastitis in Glaswegian breastfeeding mothers (Scott *et al.*, 2008). We showed an incidence of almost 20%, not dissimilar from other

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studies of human mastitis nor from typical incidence rates in well managed dairy herds. What worries me is the almost complete absence of meaningful basic research into human mastitis, to the point where there is no consensus regarding the cause (pathological infection vs. 'plugged ducts') or treatment (antibiotic usage varies enormously from country to country). It has been suggested that *Staphylococcus aureus* is the most common human mastitis pathogen, in which case my concern increases significantly. In dairy species *S. aureus* is frequently associated with sub-clinical mastitis and chronic inflammation. Chronic inflammation is a well recognized risk factor for many cancers. Human mastitis is usually unilateral, as is breast cancer. During the noughties, researching the possibility that mastitis is a risk factor for breast cancer is something that I tried frequently but unsuccessfully to get funding for, and talking at breastfeeding conferences it became obvious that the idea was not welcome; breastfeeding is not to be sullied by such a thought! So, I am delighted that others have come to the same conclusion and proposed, hypothetically, such a link (Nolan *et al.*, 2020). This is the penultimate statement in that article: *There was no funding for this work.* This contrasts starkly with mastitis research in dairy animals, which receives enormous amounts of funding. Last year this Journal published nine mastitis-related articles in a single issue, for example. From my perspective, it is high time that we reassessed this allocation of resources and skills. Where research

is concerned, the breast need not necessarily be best, but it should certainly not be least.

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