

Can Establishment of Human Microbiome be Customized After Birth with Local Traditions of First Feed and Intimate Kissing?

The human microbiome and its association with health and diseases are currently a topic of discussion and our understanding is enhancing on a daily basis. In India, there is a tradition since time immemorial that immediately after birth, the newborn is not allowed to suck the mother's breast or any other hospital beverage, but the family will choose a most respected and legendary woman to put honey on her index finger and put in the mouth of the newborn, so that the baby can suck the sweetened finger. Only after this tradition, baby can take any other fluid or mother's milk. It is believed that the baby will develop the same personality and health parameters as of this woman. It is also believed that this tradition was used as blessing to the baby. No validation studies have been done, but in the present era of the microbiome, with advances in gene sequencing and associated bioinformatics, a lot of data are being generated. It would be interesting to study, if this Indian tradition has some relation with the customized microbiome establishment and if the profile of microbiome determines the health and personality of the growing child. We know that fingers are the host of various personal and environmental microbiota, which can be divided into residual and transient types.^[1] The count of culturable bacteria can be several thousand on the fingertips, and especially in ancient times, when sanitary toilets were not available, the hands were used to clean the anus after defecation, the fingers carried a plethora of gut microbes.

The gut microbiome is an area of science which is least studied. The adult human body comprises 10 times more microbial cells than human cells, largely this microbiota is found in the human intestinal tract. Using a rough estimate approximately 10^{11} – 10^{12} microorganisms/mL of the gut contents are harbored by an adult. The estimate may vary with the dietary and hygienic habits of the person. The mouth cavity and intestinal tract of the fetus are sterile, but colonization of environmental bacteria, fungi, and viruses starts immediately at the first cry after birth, ending with the extremely dense colonization with a mixture of

microbes. However, the mechanisms and sequences of colonization may differ from infant to infant and with regional customs and dietary contents in the babies' food. This microbiota performs numerous important functions in the life of the human host, such as protection against pathogenic microorganisms, the processing of nutrients, stimulation of angiogenesis, and other metabolic cycles.^[2] However, if it plays any role in the personality development and future health of the host has no documentation in the literature.

Personalized signatures of this microbiome in the gut are reported to vary with the mode of delivery of the child whether it was vaginal or cesarean surgery.^[3] It is also mentioned that environment of the household, pets in the house where the newborn spends first few months or years of life, the microbiome profile will develop accordingly.^[4] Hence, it is not surprising that this Indian tradition has some strong association with the early selection and establishment of personalized microbiome, and second that probably Indian ancestors were aware that microbiome can influence the personality development and health of the child. It has been recognized for nearly a century that human beings are inhabited by a remarkably dense and diverse microbial ecosystem, yet we are only just beginning to understand and appreciate the many roles that these microbes play in human health and development. Palmer *et al.*^[2] reported that the composition and patterns of the microbiota varied from infant to infant. However, by the completion of the 1st birthday the babies retained their uniqueness, but had converged toward a characteristic profile of the adult. Most strikingly, the composition and temporal patterns of development of the intestinal microbiota in a pair of fraternal twins were strikingly similar, suggesting that genetic, and environmental factors shape our gut microbiota in a reproducible way. There are several areas yet to be investigated which have anecdotal mention in the Indian literature, especially pertaining to who breastfed the child and how the personality of this child developed in adulthood. However, it needs to be studied if it is the role of protein and immune cells in the milk or it is the microbiota which is transferred from the chest and clothes of the breastfeeding woman (mother or otherwise) to the baby during the act of breastfeeding, in the development of innate immunity and questionably the health and personality of the baby in adulthood.

There is another Indian tradition that after marriage husband and wife both should eat and drink from the

same utensil, to have a cordial marital life. No research has been done, whether this tradition has some scientific basis or it is merely a tactic of those who are involved in the business of performing the marriages. In western world analogous tradition to this Indian custom is intimate kissing. In both traditions, the aim could probably be the same – the exchange of oral microbiota.^[5]

Mouth-to-mouth contact has been observed in a wide variety of animals, including fish, birds, and primates and serves a range of functions, including the assessment of physical abilities to mate, and carry forward the genetic material to future generations, unknowingly through an act of eugenics. However, intimate kissing involving tongue contact and saliva exchange appears to be a unique behavior to mankind seen across the cultures, but in different ways. It is estimated that a 10 s intimate kissing can transfer as many as 8 million bacteria and an unknown number of viruses from one mouth to another. It has been estimated that the oral cavity of western adults harbors approximately 700 different, mostly anaerobic, species of bacteria.^[5]

However, there is no study in the literature which shows that using the same spoon or glass, how many bacteria or viruses can transmit from one partner to another in one act, and how much time it will take to equalize the microbiota in the mouth cavity of both husband and wife, if at all, it equalizes. Furthermore, it remains to be studied; that equalization of microbiota in the mouth cavity has any association with the longevity of marriages. One can argue if this was the case, why in the Western world, who have more chances of equalization through intimate kissing, couples have a higher rate of divorces? The science of microbiome is evolving and it may approve and disprove several anecdotal theories like mentioned above including the first feed of honey by a legendary woman in the family. If this theory was true, one might be able to answer the question, why all

children who undergo strict traditional customs, do not meet the expectations of their parents. Nevertheless, all these questions need to be addressed in a scientific manner and with the availability of modern molecular and sequencing tools; this area of science will provide several new findings.

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Quick Response Code: 	Website: www.jlponline.org
	DOI: 10.4103/0974-2727.163140