Symposium highlights epigenetic effects of milk

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It seems the ads were right. A milk mustache is a good thing to have. Animal and dairy scientists have discovered that drinking milk at an early age can help mammals throughout their lives.

But understanding exactly how milk affects the body is a complicated story of hormones, antibodies and proteins, as well as other cells and compounds researchers have not yet identified.

Learning how milk affects offspring was the subject of the Lactation Biology Symposium, held as part of the 2012 Joint Annual Meeting in Phoenix, AZ. The presentations were summarized in a recent paper in the *Journal of Animal Science*.

The presentations focused on epigenetics, or how gene expression changes based on factors like environment or diet. Epigenetic changes modify when or how certain traits are expressed.

The first presenter, Dr. Frank Bartol from Auburn University, explained how certain hormones, called lactocrines, in pig's milk affect gene expression in piglets. Bartol said lactrocrines could modify gene expression in the reproductive systems; however, Bartol said the specific effects of lactocrines are still being studied.

In the next presentation, Dr. Harald Hammon, from the Leibniz Institute for Farm Animal Biology, explained how drinking milk affects future nutrition. According to Hammon, the milk produced in the first few days

after birth, called colostrum, contains growth factors that help young calves better digest and absorb lactose and glucose. Hammon called for more research into identifying these factors and better describing their effects.

Studying milk is important not just for studying future fertility and nutrition, but future milk production as well. Dr. Paul Kenyon, from Massey University in New Zealand, suggested that either underfeeding or overfeeding milk could reduce milk production in the offspring. Though the differences in milk yield were small, there could still be an economic difference for dairy farmers.

The research presented at the Lactation Biology Symposium could have implications for human health as well. Dr. Katie Hinde, from Harvard University, revealed how the components of mother's milk could alter infant behavior and cell development through epigenetic mechanisms. In Hinde's studies of rhesus monkeys, infants who had mothers producing milk higher in milk energy and cortisol were more active, playful, exploratory and bold.

"Milk is, therefore, not merely food that allows the body to grow but it contains constituents that help build the brain and provide the energy that allows infants to be behaviorally active," wrote K. M. Daniels et. al. in a review of the Lactation Biology Symposium.

Research into milk could help researchers better understand farm animals, the dairy industry and human health. Figuring out which compounds are found in milk and how they affect gene expression in offspring could advance knowledge in body development at all stages of life.

"At present there are far more questions than answers," Bartol said in an interview. "However, we are making progress."

More information: The full symposium summary is titled, "Lactation Biology Symposium: The long-term impact of epigenetics and maternal influence on the neonate through milk-borne factors and nutrient status." It can be read in full at www.journalofanimalscience.org

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