



DAIRY CATTLE REPRODUCTION COUNCIL

Q&A with Hasan Khatib

1. Briefly explain what you are researching in regards to dairy genetics and its link to reproduction.

Reproductive performance in high-producing dairy cattle is clearly a challenge for dairy producers today. There are many different reasons for this reduced reproductive efficiency, but it seems likely that there is a genetic basis for some of the infertility. During the last 50 years intense genetic selection has helped to increase milk production, but it may have also led to genotypes that are suboptimal for reproductive efficiency. Indeed, this decline in fertility is hard to ignore because of the economic consequences it now has on commercial dairies. Because of this, the long-term goal of my research is to identify genes that are contributing to milk production traits and to poor reproductive performance in dairy cattle.

2. How did you first gain interest on this topic?

The interest on this topic came along with my position in the Department of Dairy Science at the University of Wisconsin-Madison. I was concerned about the genetic selection for a few traits while neglecting other important traits, like fertility.

3. What results have you seen so far in this study?

Our research has already produced one novel finding that will be of great benefit for improving reproduction in dairy cattle. We have identified a gene associated with fertilization success, embryonic survival and milk composition in Holstein dairy cattle. The death of embryos appears to occur much earlier than any previously reported.

Also, our efforts led to the discovery of several genes associated with milk production and health traits. These results were published in an article entitled, "Effects of the Osteopontin Gene Variants on Milk Production Traits in Dairy Cattle" in the *Journal of Dairy Science* in 2005.

4. What are your next steps to continue your research?

Future work will be to identify other genes in pathways connecting milk production with reproduction in cattle.

5. What do your findings mean to dairy producers?

Our research indicates that an embryonic-lethal allele is present in about 40 percent of the Holstein population. It also is present in other breeds of dairy cattle. The early nature of this lethality may have slowed the identification of mutation and also made it easier for this mutation to remain prevalent.



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For example, a pregnancy loss at 40 – 50 days would be readily identified by producers and would be extremely costly, both economically and reproductively. In contrast, an early embryonic loss would be regarded as a lack of conception and the cow would be quickly rebred. Thus, if it was possible to screen the bulls and cows for this lethal mutation, we could consequently select against the embryonic-lethal allele to increase the chances of fertilization and pregnancy rate.

6. What are you hoping will come from your research?

The identification of a genetic factor that causes the death of embryos is the first step in eliminating this problem from the population and thereby improving reproductive efficiency. Lethal genes have been suggested as a cause of embryonic death, but no naturally occurring genetic mutations that cause embryonic lethality during the first week of pregnancy have been previously identified in mammals. Our research should provide substantial new information to not only help us understand the reproductive impact of this particular gene, but to also understand other potential embryonic-lethal mutations that may be present in the livestock population.

7. Is there anything else that is important to include about your research?

Funding is the key for future success of this research. The lethal gene identified in our lab is the first gene to cause early embryonic loss and low fertilization rate discovered in any mammalian species. I would like to thank my department and my college for the funding they have provided for me to complete this ground-breaking research.