Improving Fertility of Dairy Cattle Using Translational Genomics

T.E. Spencer[1], H.L. Neibergs[2], P.J. Hansen[3], J.B. Cole[4], J.C. Dalton[5], D.A. Moore[6], M. Chahine[5], A. De Vries[3]

[1]Division of Animal Sciences, University of Missouri, Columbia, MO; [2]Department of Animal Science and Center for Reproductive Biology, Washington State University, Pullman; [3]Department of Animal Sciences, Gainesville, FL; [4]Animal Genomics and Improvement Laboratory, USDA ARS, Beltsville, MD; [5]Department of Animal and Veterinary Sciences, University of Idaho, Caldwell; [6]Department of Veterinary Clinical Sciences, Washington State University, Pullman, WA

Selection for higher milk production in United States dairy cattle has been very successful during the past 50 years, however today's lactating dairy cows exhibit a high incidence of subfertility and infertility with a national pregnancy rate of only 15%. An integrated approach to improve fertility of dairy cattle will be conducted with goals of improving reproductive performance of dairy cattle and their profitability by taking advantage of recent advances in animal genomics and our understanding of their reproduction. Our idea is that lactating cow fertility can be increased through genetic selection for maternal fertility in heifers and cows and use of sires with high daughter pregnancy rate (DPR), resulting in a significant, sustainable, and profitable increase in overall herd fertility. Objectives are to: (1) Identify genomic loci associated with fertility in dairy heifers and cows; (2) Identify functional single nucleotide polymorphisms (SNPs) associated with daughter pregnancy rate (DPR) and early embryo development; (3) Evaluate the efficiency and profitability of increasing fertility in dairy cattle using genetic selection tools; and (4) Engage in technology transfer regarding novel approaches for improving fertility using genetic selection tools to dairy farmers, dairy farm personnel and their advisors in English and Spanish using DAIReXNET and extension road shows. Each objective will involve an integrated team of scientists working in animal reproduction, genomics, breeding, and extension toward a common goal. The expected outcome and impact of meeting our goal is increased sustainability and profitability and increased international competitiveness of the US dairy industry. This project was supported by Agriculture and Food Research Initiative Competitive Grant no. 2013-68004-20365 from the USDA National Institute of Food and Agriculture.