

## Frequency of Leukochimerism in Holstein and Jersey Twinsets

Amanda Young and Brian W. Kirkpatrick

Department of Animal Sciences, University of Wisconsin-Madison, Madison, WI

This study was conducted to test breed difference in the frequency of leukochimerism in twins. Leukochimerism was considered evidence of placental vascular anastomosis formation and its frequency was compared between Holstein and Jersey breeds. SNP assay data was used to quantify leukochimerism. Hair and blood samples were collected from 85 Jersey twinsets and 80 Holstein twinsets ranging in age for one day to eight years. A subset of twinsets were re-sampled five to ten months after initial sampling to assess whether leukochimerism changed with age. DNA was extracted from white blood cells (potentially chimeric) and hair follicles (not chimeric) and genotyped for nineteen SNPs selected for high minor allele frequency in both breeds. The genotyping assays provided quantitative data that was used to assess chimerism in blood-derived DNA. Jersey and Holstein did not differ in proportion of non-chimeric twinsets at 20.1% and 15.7%, respectively ( $p > 0.05$ ), providing no evidence for genetic variation in anastomosis. Degree of chimerism for members of a twin set was also evaluated with regard to representation of self versus co-twin in the blood-derived DNA. For twinsets where the more chimeric twin was 45% or greater co-twin in its blood-derived DNA, there was a strong inverse relationship ( $P < 0.001$ ) between percent co-twin in the blood-derived DNA of members of a twinset. These results suggest that variation in chimerism in members of a twinset may be a function of degree of anastomosis and differences in timing of the migration of hematopoietic stem cells between members of the twinset.