Methods for genetic improvement of disease resistance in Canadian pigs

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Disease resistance is a difficult trait to measure on live animals but one that could provide invaluable information to swine breeders and producers as they work to improve the health of their animals. The possibility to select for stronger disease resistance could have a significant economic impact on the swine industry as animal disease causes large production losses; and is in line with the research priorities that were identified by Canadian swine industry stakeholders. The general objective of this project was to develop methods to identify breeds, lines or families with greater general disease resistance. The project allowed studying the relationship between immune capacity (using hematological, biochemical, immunological and molecular markers), performance traits and mortality information recorded in Canadian breeding farms. Over a specific timeframe, sire families were targeted within three major Canadian breeds (Duroc, Landrace and Yorkshire) to sample progeny for blood tests. Hematological and immunological tests were performed at Metadis Laboratories in Ottawa. There were 19 hematological parameters measured on 887 sampled pigs from 13 breeding herds across Canada. Five lymphocyte proliferation tests were performed which were an in-vitro measure of the innate immune response of each animal. DNA was extracted from blood for SNP testing in genes associated with the immune system to evaluate allelic frequencies and investigate associations with indicators of immune response. In addition, mortality reasons for 5,560 deaths out of 65,186 purebred pigs born on participating farms were tracked from birth to market weight, for use in survival evaluation and association with other traits.