

Animal and Bioscience Department

Title

Genetic and non-genetic congenital defects in the Irish national cattle population

Abstract

This research focuses on significant under-diagnosed animal health problems in the Irish national cattle population – genetic and non-genetic congenital defects. The project will benefit key stakeholders and animal welfare by 1) raising awareness of these conditions, 2) establish an Irish National Bovine Congenital Defects Register and a DNA Bank and 3) generate results on causation and risk factors for the most prevalent defects which can be used to alter current breeding and management practices.

Congenital defects (those present at birth) are grossly under-diagnosed and reported on commercial Irish dairy farms under current passive surveillance. There is no centralised national database to collate data on these conditions hence national statistics on the incidence of these problems are not currently available. However, a recent Moorepark research study of mortality in calves around birth found that congenital defects occurred on all farms studied in a whole-herd, active surveillance model. The most common defects affected the digestive system, specifically atresia of the bowel. This fatal condition was the most frequently recorded congenital defect, diagnosed in approximately 75% of commercial dairy herds and in approximately 10% of calves which died within 2 weeks of birth. The Irish Department of Agriculture reported that this condition was the most frequently recorded developmental abnormality in calves in Ireland. Hence, this project will focus on two aspects, a national congenital defects register and the most common, economically important congenital defects in the Irish national cattle population.

Congenital defects may have a genetic origin. In order to determine the genetic background and possible mode of inheritance of defects, pedigrees of affected calves will be examined for shared ancestry and compared to that of control calves. Affected animals will be genotyped with the bovine HD chip in order to calculate shared ancestry and to determine if any loci are associated with defects. If the defect appears to be inherited then a case-control genome wide association analysis will be carried out using the genotyped samples and available genotypes from healthy animals as controls.

This project will involve collaboration between two Teagasc centres (Moorepark and Grange), the Department of Agriculture, the Irish Cattle Breeding Federation (ICBF) and UCD.

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