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Home Institution: Section of Endocrinology, Animal Husbandry and Animal Welfare, Department of Veterinary Medicine, University of Sassari.

Host Institution: Farm Animal Health and Production Group, Hawkshead Campus, Royal Veterinary College, University of London.

I will work in the RVC for 6 months, from 25 January 2016, with my supervisor Professor Claire Wathes and her research group, in the Department of Production and Population Health, in the Royal Veterinary College, University of London.

My research in the Host Institution is under an ongoing EU project called GplusE (Genotype plus Environment). Genotype and Environment, contributes to the sustainability of dairy cow production systems through the optimal integration of genomic selection and novel management protocols based on the development and exploitation of genomic data and supporting novel phenotyping approaches. The end result of GplusE will be a comprehensive, integrated identification of genomic – phenotypic associations relevant to dairy production across Europe. The objectives are improvement in productivity, efficiency, animal health, welfare and fertility in an environmentally sustainable way. It will also increase biological understanding of the mechanisms by which genotype, environment and their interaction influence performance.

The research plan is taking part in a large GWAS study. A number of 1,000 dairy cows, from 4 herds being contributed from the UK, with the aim of a total of 10,000 to 15,000 across the consortium as a whole, will all be genotyped using the Irish IDB SNP chip and also extensive phenotype data are being collected. Additional blood samples have been taken at the Royal Veterinary College in the first week after calving from cows, which are part of this study.

The aim of the work is to measure IGF1 (insulin-like growth factor1) in blood samples of dairy cows by ELISA as the research group of Professor Claire Wathes and others have previously shown that circulating IGF1 at key time just after calving predicts future health and fertility in lactation.

The concentration of IGF1 is an indication of the cow's physiological state and it plays several important roles in controlling metabolism and reproduction. However, its concentration varies with age, breed and stage of lactation, and also as a result of the use of exogenous products such as bovine somatotropin and growth hormone releasing factor, products which are used in some countries.

This study will be an investigation of the changes in the concentration of IGF1 in high-yielding dairy cows around calving, in relation to when they conceived after calving, their levels of milk production and the concentration of IGF1 in their blood.

We will do the IGF1 ELISA assays and use this method to select a subset of cows with either high or low IGF1.

Blood samples will be collected into the Tempus Blood RNA Tube containing a stabilizing reagent to preserve RNA until RNA isolation procedure.

The next step will be to extract the RNA using a Commercial Kit. Extracted RNA will be preserved at -80°C until use after evaluation of RNA quality. Quantitative RT-PCR will be performed to measure expression of some key genes involved in immunity. The results will be related to the health and fertility data which are being collected anyway.

Briefly, the passes of the research:

- 1) Blood samples collected from dairy cows after calving;
- 2) Measurement of IGF1 concentration in the plasma by ELISA assay;
- 3) RNA extraction from blood samples collected into Tempus Blood RNA tube;
- 4) Quantitative RT-PCR to measure expression of genes involved in immunity;
- 5) Connect the IGF1 concentrations with expression of immunity genes, fertility and milk yield in the dairy cows.

This project could be useful to improve dairy animal husbandry.