Precision livestock farming and molecular based technologies for early detection and diagnosis of disease in calves (RMIS 6311 - EU PLF funded project)

Pneumonia is the major cause of respiratory distress in calves during the first few months of their life. It is a multifactorial disease determined by the environment, management, the immune status of the calves and the involvement of primary (viruses), and secondary infections (bacteria), and mycoplasma. Vaccination of animals against infections which result in pathogenesis of bovine respiratory disease (BRD) is currently employed as an approach to manage this disease but has not significantly reduced its overall prevalence or severity. Prophylactic and targeted therapeutic approaches/early diagnosis and intervention is critical. Information and Computer Technology (ICT) offers a high potential for real time monitoring of animal health in livestock production systems. To apply the high potential of these ICT technologies in livestock production is the core concept of precision livestock farming (PLF). Continuous automated monitoring of livestock results in "early warning systems" that improve the management of individual animal needs at any time. To apply PLF successfully we will define key animal health and welfare Indicators (KI's) during calf rearing. Using a set of KIs will allow the capture of quantitative information directly from the artificially reared calf and/or its environment. The lack of progress in identifying pathogens involved in BRD and in controlling respiratory disease demonstrates that there continues to be a significant need for controlling this multifactorial disease, and that producers need assistance in applying evolving technologies to improve animal health. Precision livestock farming (PLF) in combination with accurate and timely identification of the pathogens through sensitive RNAseq technology will be used to aid disease management, and provide fast and reliable diagnosis of the causative agent(s). The major goal of this project is to develop an early detection and decision process for appropriate intervention measures against calf pneumonia including the development of an electronic sensor-based early warning system.

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