Lameness, fertility and nutrition. Human and animal biomarkers.

Gianfranco Gabai and Marcela Speranda
University of Padova, I; Faculty of Agriculture, Osijek, HR gianfranco.gabai@unipd.it

Here we will address some activities executed and planned within WG1 "Biomarker-based Welfare Technologies", and introduce the WG1 session dealing with interactions between lameness, nutrition and fertility. WG1 aims to understand the role of biomarkers in health/welfare research, where "biomarker" means "A characteristic that is objectively measured and evaluated as an indicator of normal biological processes, pathogenic processes, or pharmacologic response to a therapeutic intervention" (NIH Biomarkers Definition WG). In the First DairyCare conference emphasis was given to the use of proteomic and metabolomic techniques to identify novel biomarkers, especially in milk and in relation to mastitis and negative energy balance. The relevance of some circulating adipokines as potential biomarkers of metabolic health was discussed, and the potential development of robotic systems for collecting biological samples (sweat, saliva, hair) non-invasively explored. The main theme of the second DairyCare conference is more specific, targeting the interaction between lameness and fertility. Most information on how lameness decreases reproductive performance is epidemiological. It is clear that clinical lameness affects oestrous detection rates and consequently pregnancy rates. However, there is a scarcity of studies considering health status, stress and inflammation, and the mechanisms that lead to decreased conception rates in clinical or sub-clinical lame cows are still unclear. How does lameness affect the endometrium and conceptus? Is there a cause-effect relationship of lameness on embryonic loss in dairy cows? Can we identify potential 'burden of disease' biomarkers to assess the severity of the disease leading to lameness, and 'prognostic' biomarkers to predict whether a lame cow is at risk of embryonic loss? These studies require a suitable 'non-invasive' biomarker to assess embryo/early foetal viability; could the measurement of PAG (Pregnancy Associated Glycoproteins) in milk be the answer? What is the role of nutrition? How will WG1 develop after Cordoba? In the near future, attention might be given to the Hypothalamus-Pituitary-Adrenal axis and the meaning of cortisol measurement in the different biological matrixes, and subsequently we would probably like to explore the immune function in dairy animals. Should we interact more with colleagues from the human medical field? Your views and input are needed!

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