

Biomarkers for bovine pregnancy

Karl Klisch

Institute of Veterinary Anatomy, University of Zurich, Switzerland

karl.klisch@uzh.ch

Early and reliable pregnancy diagnosis is a prerequisite for economically successful dairy farming. An ideal test should determine pregnancy from the 3rd week onwards, should be cheap, reliable, and non invasive.

Pregnancy associated glycoproteins (PAGs) are produced by the binucleate trophoblast cells of the placenta and are secreted into the maternal organism. Serum based PAG pregnancy tests are available since many years, but were not very widely used. Recently a milk-based PAG test was developed, which can determine pregnancy from about day 30 onwards.

Interferon-tau (IFNT) is the molecule of maternal recognition of pregnancy in ruminants. IFNT induced genes are up-regulated in peripheral leucocytes, most pronounced in neutrophil granulocytes. Several of the genes were tested and maximal transcription values were found at day 14-21 of pregnancy.

Early pregnancy factor (EPF) is an immunosuppressive glycoprotein, chaperonine-10, which is produced in the female genital organs in response to a fertilised zygote. EPF can be detected by a 'rosette inhibition test' as early as 24 h after ovulation. Commercially available ELISAs were tested and were consistently identified as not reliable.

Another immunosuppressive molecule is PreImplantation Factor (PIF), which is a peptide produced by the trophoblast. An ELISA showed raised PIF-concentrations in maternal serum at days 10 and 20 post insemination, but further tests will be necessary to confirm these results and to characterise the PIF levels during later pregnancy.

Less characterised is the seed germination inhibition test. This test is based on old Egyptian reports, which were reproduced in the 1930th in Germany, that pregnant women's urine stimulated germination of wheat or barley seeds. Studies from India and Bangladesh show that in cows the opposite is true, and diluted urine from pregnant cow inhibits seed germination.

Acknowledgements

This article is based upon work from COST Action FA1308 DairyCare, supported by COST (European Cooperation in Science and Technology, www.cost.eu). COST is a funding agency for research and innovation networks. COST Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.