APPLICATION OF FLOW CYTOMETRY IN SEMEN ANALYSIS: SEMEN ANALYSIS BY FLOW CYTOMETRY APPROACH TO PREDICT AND TO IMPROVE THE FERTILITY

Na Li, Agnès Camus and Guy Delhomme

Semen analysis is widely used to evaluate semen quality. The assessment by classical microscopic observation remains subjective, cannot suit the need of semen processing centers and final customers with higher requirements of semen quality control. Technologies developed from the medical-food processing have been applied to semen evaluation. Routine tests can be evaluated in short time by CASA (Computer Assisted Semen Analysis) system: concentration, morphology, motility, kinematics etc. Flow cytometry, a more advanced technology, has also been applied to study semen functional parameters in a timely manner. The review will focus on the flow cytometry approach, and aims to establish the relationship between semen analysis *in vitro* and field fertility *in vivo*. In this study, the semen functional parameters measured by flow cytometer are primarily assessed, i.e., sperm membrane integrity, mitochondrial activity, potential oxidation, acrosome status and DNA compaction. The fertility prediction model is also discussed. In equine, the correlation values between the predicted and the real fertility values was up to 0.942. Reliable results obtained with CASA (IVOS II®, Hamilton Thorne, USA) and flow cytometry (EasyCyte®, Millipore, USA). These results allow the opportunity to standardize semen analysis. Combination of IVOS2 and EasyCyte® give a full characterization of the semen quality. Semen analysis becomes a new perspective to predict the male fertility potential, to improve semen process and field fertility of domestic animals.