

PROGRESS IN BOVINE OOCYTE METABOLIC STUDIES. OOCYTE QUALITY INDICATORS FOR IT APPLICATION IN BIOTECHNOLOGIES.

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Embryo *in vitro* production has a great potential in livestock species. However, the rate of *in vitro* bovine embryo production is still deficient being around 40%. This result is still significant lower than the rate of *in vivo* embryo production. Being the factors involved to the low efficient the great heterogeneity of the oocyte population and the deficiency in competence acquisition that is obtained during maturation. Because of this factors, the ability to identify “high quality” oocytes become a real challenge. Metabolic studies during the maturation process allow to know what kind of requirements the COCs (cumulus-oocyte complexes), the fate of metabolites, the energetic metabolism and the way these parameters influence the oocyte maturation process and developmental competence. The COC is consider a morphological - functional complex with a characteristic metabolism, being the cumulus mainly anaerobic and the oocyte aerobic. Cumulus cells energetic metabolism is based on glucose oxidation through the glycolytic pathway being pyruvate and/or lactate the main products. These metabolites can be catabolized as energetic substrates by the oocyte. Another fate of the consumed glucose can be oxidized through the pentose phosphate pathway (PPP) by the cumulus cells and the oocyte. The glycolytic activity of the oocyte during maturation can be evaluated by glucose uptake and lactate production, while PPP activity can be estimated by the ability to reduce the Brilliant Cresyl Blue stain. Another way to evaluate oxidative activity is using the dual fluorescent stain of Redoxsensor red and Mitotracker green.

The obtained results of the cited tests and their relationship with the maturation process will be shown. Considering the requirements and metabolism of the oocyte, non-invasive metabolic studies can be used as markers of oocyte quality to improve blastocyst rates however it application is still in early stages.