

Differential expression of mammary epithelial cells as possible biomarker of stage of lactation and mammary gland functionality in dairy cow

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The complicated and extensive modifications to which the mammary gland cyclically undergoes can be attributed to adult stem cells and/or precursors activation that have the potential replication to support significant waves of proliferation that determine extensive cycles of mammary remodeling during pregnancy. The close relation between the progenitor cells with the total mass of epithelial cells that compose the parenchymal portion of the mammary gland acquires a crucial importance when considering the issue of productivity in dairy cattle. Since the amount of milk that a cow is able to produce at any time is closely related to the number of epithelial cells secreting that are present in the tissue, the more the dairy cow will be able to maintain a high number of these cells, the higher will be its production. In this scenario, it is evident that variations also limited in the proliferative activity of stem cells and progenitors may have an important effect on the productivity of the dairy cow. It is clear that the dry or transition period represents a critical moment for the productivity of dairy cows and how homeostasis compartment of progenitor cells at this stage is crucial. Recently it was described the isolation of progenitor cells directly from human milk that show cell population of epithelial identity expressing markers typical of progenitor. This non-invasive system for the recovery of primitive cells from the mammary gland could be a interesting to monitor on the functional status of the bovine mammary gland. We are developing a research project to determine the meaning and the role of living epithelial cells in milk according to the phase of lactation, the dry period length and a possible influence with anti-oxidant compounds in the diet in dairy cow. The aim is to evaluate if the measuring of such epithelial cell populations in the milk may give a contribution to compare different strategies in managing the transition period and animal welfare with production. Preliminary results indicate a differential expression of epithelial cells subpopulations according to lactation and cell viability.

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