



HAL
open science

The cellular mechanisms underlying mammary tissue plasticity during lactation

Marion Boutinaud, Lucile Herve, H el ene Quesnel, Vanessa Lollivier, Laurence Finot, Frederic Dessauge, Eric Chanat, Pierre Lacasse, Cl ementine Charton, Jocelyne Guinard-Flament

► To cite this version:

Marion Boutinaud, Lucile Herve, H el ene Quesnel, Vanessa Lollivier, Laurence Finot, et al.. The cellular mechanisms underlying mammary tissue plasticity during lactation. International Workshop on the Biology of Lactation in Farm Animals (Bolfa), Aug 2018, Dubrovnik, Croatia. hal-01948627

HAL Id: hal-01948627

<https://hal.science/hal-01948627v1>

Submitted on 2 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destin ee au d ep ot et  a la diffusion de documents scientifiques de niveau recherche, publi es ou non,  emanant des  tablissements d'enseignement et de recherche fran ais ou  trangers, des laboratoires publics ou priv es.

The cellular mechanisms underlying mammary tissue plasticity during lactation.

M. Boutinaud¹, L. Herve¹, H. Quesnel¹, V. Lollivier¹, L. Finot¹, F. Dessauge¹, E. Chanut¹, P. Lacasse², C. Charton¹, J. Guinard-Flament¹

¹INRA, UMR PEGASE, 16, le Clos, Saint Gilles, France

²AAFC, Dairy and Swine R&D centre, Sherbrooke, Canada

The mammary tissue is characterized by its capacity to adapt in response to a wide variety of changing conditions. This capacity of adaptation refers to the mammary tissue plasticity. In dairy ruminants, lactation is challenged by modifications that can either be induced on purpose such as modifications of management practices, or involuntary when adverse environmental constraints arise. These modifications can elicit both immediate changes in milk yield and composition and carryover effects that persist after the end of the challenge. This review focuses on the current knowledge concerning the cellular mechanisms underlying mammary tissue plasticity. One of the main cellular mechanisms contributing to mammary tissue plasticity is the changes in the activity and number of mammary epithelial cells in the tissue. The later results from changes in the rates of cell proliferation and death, as well as changes in mammary epithelial cell exfoliation. It also relies on the number of resident adult mammary stem cells and their progenitors, which can regenerate the pools of mammary cells. Epigenetic changes may stand for an additional mechanism. Several challenges including the milking frequency, the level of feed supply and hormonal manipulations have been shown to modulate milk yield together with changes in mammary cell activity, turnover and exfoliation. Changes in DNA methylation have been observed together with reductions in milk yield during once daily milking and during mastitis in dairy cows, and may affect cell activity sustainably. In contrast to what has been assumed for a long time, no carryover effect on milk yield were observed during challenges induced by the level of feed supply in dairy cows and milking frequency in dairy goats, even if the number of mammary cells was reduced. In addition, the mammary tissue plasticity have been shown to be influenced by the parity, the stage of lactation, the health status and genetic factors. In conclusion, the cellular mechanisms underlying mammary tissue plasticity are diverse and the mammary tissue can either shows elastic properties (with no permanent deformation) or not in response to environmental changes.