



HAL
open science

Epigenetics, developmental programming and nutrition in herbivores

Pascale Chavatte-Palmer, M.A. Velasquez, H el ene Jammes, V eronique
Duranthon

► **To cite this version:**

Pascale Chavatte-Palmer, M.A. Velasquez, H el ene Jammes, V eronique Duranthon. Epigenetics, developmental programming and nutrition in herbivores. 10th International Symposium on the Nutrition of Herbivores, Sep 2018, Clermont-Ferrand, France. pp.500, 10.1017/S2040470018000146 . hal-02735571

HAL Id: hal-02735571

<https://hal.inrae.fr/hal-02735571>

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.

Review: Epigenetics, developmental programming and nutrition in herbivores

P. Chavatte-Palmer¹, M. A. Velazquez², H. Jammes¹ and V. Duranthon¹

¹UMR BDR, INRA, ENVA, Université Paris Saclay, 78350, Jouy en Josas, France

²School of Natural and Environmental Sciences, Newcastle University, NE1 7RU, United Kingdom

E-mail: pascale.chavatte-palmer@inra.fr

Abstract

Epidemiological studies in humans and animal models (including ruminants and horses) have highlighted the critical role of nutrition on developmental programming. Indeed, it has been demonstrated that the nutritional environment during the periconceptual period and fetal development can alter the postnatal performance of the resultant offspring. This nutritional programming can be exerted by maternal and paternal lineages and can affect offspring beyond the F1 generation. Alterations in epigenetic mechanisms have been proposed as the causative link behind the programming trajectories observed in the offspring. Although a clear cause-effect relationship between epigenetic modifications during early development and later offspring phenotype has not been demonstrated in livestock species, strong associations have been reported for some epigenetic marks (e.g. miRNA) that are worth exploring as possible predictors of future offspring phenotype. In this review we shortly describe the main epigenetic mechanisms studied so far in mammals (i.e. mainly in the mouse) thought to be associated with developmental programming, and discuss the few studies available in mammalian herbivores (e.g. cattle) showing the effect of nutrition on epigenetic marks and the associated phenotype. Clearly, there is a need to develop research on nutritional strategies capable of modulating the epigenetic machinery with positive influence on the phenotype of livestock herbivores. This type of research is needed to alleviate the challenges currently faced by the livestock industry (e.g. impaired fertility of high-yielding dairy cows). This in turn will have a positive influence on animal welfare and productivity of livestock enterprises.