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C. Andrieux[1], M. Morisson[2], V. Coustham[1], S. Panserat[1], M. Houssier[1]

[1]UPPA, INRAE UMR1419 NuMéA, 173 Route de Saint-Jean-de-Luz, 64310 Saint Pée sur Nivelle, France, [2]ENVT, INRAE, GenPhySE, 24 Chemin de Borde Rouge, 31320 Castanet-Tolosane, France; charlotte.andrieux9@gmail.com

Increasing egg incubation temperature has been shown to have a significant impact on energy metabolism in poultry, and more precisely on hepatic metabolism in mule duck. We therefore investigated the effects of thermal manipulation (TM) on the hepatic metabolism and *foie gras* production performance. The impacts of the TM were measured throughout the life of the mule duck and during two different metabolic challenges, from embryogenesis to slaughter day. One hour after the rise in temperature, the relative expression of around 10% of the genes studied in the liver (8/78 genes), involved in lipid and carbohydrate metabolisms, was significantly modulated showing a direct effect of temperature on metabolism (Anova tests, 8 ducks). Thereafter, hatchability sometimes decreased depending on the time and intensity of the TM (Chi tests, 265 to 279 ducks), while under most conditions, hatching body weight and body temperature were lower (Student tests, 100 ducks). Several months after the thermal stimulus, refeeding after a 23h-fast induced a change in energy metabolism in TM duck livers compared to control ducks, with an increase in hepatic cell size (+1µm on average), a change in liver lipid composition (+4% of saturated fatty acids 4h after the meal) and changes in the relative expressions of metabolic genes (14 genes, Anova tests, 8 ducks). On the other hand, overfeeding (OF) induced an 8% increase in *foie gras* weight in the TM group compared to the control group without any negative impact on the quality of the *foie gras* (Student tests, 36 to 58 ducks), but again, differences in lipid composition were noticed (student test, 8 livers) associated with modulations in the expression of hepatic genes involved in energy metabolism. Our results confirm that embryonic TM can program liver metabolism of mule duck, and that this programming can be revealed by different feeding challenges. TM could be a lever to reduce the number of OF meals, thereby improving animal welfare and reducing production costs. Finally, this new technique could be combined with optimized breeding methods to produced fattened livers without force-feeding.