

# Somatotrophic axis genes' SNPs and milk production in Assaf ewes

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## Abstract

Growth hormone (GH) has long been known to indirectly support the synthesis and secretion of milk and milk components in lactating animals by increasing blood flow and nutrient availability to the mammary gland<sup>1</sup> or through stimulation of IGF secretion by the liver and by stromal cells within the mammary gland<sup>2</sup>. These physiological stimuli increase epithelial cell proliferation or secretory activity in the lactating mammary gland, indicating the involvement of signalling pathways regulating cell turnover and renewal<sup>3,4</sup>, RNA transcription at posttranscriptional level of miRNAs<sup>5</sup>, and protein synthesis<sup>6</sup>. Molecular markers in the genes from the principal pathways triggered by GH has been reported to control milk production and milk protein genes expression in sheep<sup>7,8</sup>. Animal selection based on such markers offers an enormous potential to improve sheep milk productivity. Thus, the objective of this study is to uncover polymorphism in ovine somatotrophic axis associated with high yielding Assaf dairy ewes. Eighteen SNPs in *GH*, *GHR*, *PRL*, *PRLR*, *IGF1*, *IGF1R* and *STAT5B* genes have been genotyped by SNaPShot analysis in 450 Assaf dairy ewes from Fertiland flock divided into two groups: high (H – total milk yield higher than 500 L/lactation) or medium yielding ewes (M – average total milk yield of 300±100 L/lactation). Data collected for ten years regarding milk yield adjusted to 150 lactation days, total milk yield and lactation duration was analysed for individual SNPs with MAF>0.05 using the PROC MIXED procedure, considering the effect of the genotypes, lactation number, type of lambing, and production group. The analysed SNPs showed to be highly polymorphic, and associations has been stabilised with milk yield traits. The results from this study provided new insights into allelic frequencies of the analysed SNPs, and theirs effects' on milk production traits in Assaf dairy ewes. It future use in selection programs could contribute to increase economic sustainability of sheep's milk farms.

## Recent Publications (minimum 5)

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4. Sciascia Q, Pacheco D, McCoard SA (2013). Increased milk protein synthesis in response to exogenous growth hormone is associated with changes in mechanistic (mammalian) target of rapamycin (mTOR)C1-dependent and independent cell signaling. *Journal of Dairy Science* 96, 2327–2338.
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6. Sakamoto K, Komatsu T, Kobayashi T, Rose MT, Aso H, Hagino A, Obara Y (2005). Growth hormone acts on the synthesis and secretion of  $\alpha$ -casein in bovine mammary epithelial cells. *Journal of Dairy Research* 72, 264–270.
7. Dettori ML, Pazzola M, Paschino P, Amills M, Vacca GM (2018). Association between the GHR, GHRHR, and IGF1 gene polymorphisms and milk yield and quality traits in Sarda sheep. *Journal of Dairy Science* 101, 9978–9986.
8. Marques MR, Santos IC, Carolino N, Belo CC, Renaville R, Cravador A (2006). Effects of genetic polymorphisms at the growth hormone gene on milk yield in Serra da Estrela sheep. *Journal of Dairy Research* 73, 394–405.

## Photograph



## Biography

Dr Marques has a PhD degree in Biology, specialty of Population Biology. She has her expertise in animal production and molecular biology techniques applied to genetic polymorphism detection in animals. Her current research interest are the detection of genetic polymorphism in the somatotrophic axis and milk protein genes in sheep, and to disclose its' possible correlations with milk traits in dairy sheep breeds.

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## Notes/Comments:

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