

NEUROD1 gene is not associated with feed efficiency in Nellore cattle

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Abstract:

Introduction: Feed efficiency is an important trait to be considered in meat production, since the feeding is the main cost of production. Some candidate genes have been reported as related to feed efficiency in cattle, among them is the NEUROD1 (neurogenic differentiation 1), which has function related to carbohydrate metabolism and feed intake (Malecki et al., 1999). **Objective:** This study aimed to investigate the association between SNPs prospecting by sequencing the NEUROD1 gene and residual feed intake (RFI) in Nellore cattle. **Methods:** DNA samples from 14 Nellore steers extremes for RFI were sequenced. The determination of the extreme individuals was based on the BLUP estimated value. From the SNPs prospecting by sequencing, one SNP showed association with RFI in the Fisher Exact Test. This SNP was further genotyped in 585 Nellore steers by the Tetra-primer ARMS-PCR. The association analysis of SNP (1062G> C) and BLUP estimated values was performed using the PROC MIXED of SAS. The Bonferroni correction was applied to avoid false associations. **Results:** Seven novel SNPs, non-described in public databases, were prospecting at NEUROD1 gene. The analysis by Fisher's exact test suggested association ($p < 0.10$) of the SNP (1062G> C) with RFI, which led us to choose this SNP for validation. However, this association was not confirmed in the whole population. Although a polymorphism in this gene was reported to be associated with RFI (Barendse et al., 2007), we could not observe this association in our population. This may be due to the fact that the SNP genotyped in the present study is not a causative mutation and it is not in linkage disequilibrium with other causative mutations. **Conclusions:** The studies of genomic regions and candidate genes associated with economic production traits paves the way to understanding the possible physiological processes related to these traits. The prospecting of SNPs in candidate genes with subsequent investigation in different populations is important even when associations are not detected, since all associations should be validated in the breeding population one expects to apply this information. Despite Nellore being the breed of greatest economic importance in Brazil, few studies aiming to identify the genetic variance related to feed efficiency have been performed, since this trait is costly to evaluate and measured lately in lifetime. Thus, further studies to identify and validate molecular markers related to RFI for this breed are needed in order to implement them in animal breeding programs in Brazil.

Acknowledgments: We thank the collaboration of Embrapa, São Carlos Federal University, SP, CNPq for providing financing, and CAPES for providing a scholarship to Priscila Silva Neubern de Oliveira.