Concerning to genes previously associated with cattle meat tenderness, the μ-calpain (CAPN1 - ENSBTAG00000010230) and calpastatin (CAST - ENSBTAG0000000874) are key ones for cattle in general [1,2] and even particularly for the Nelore breed [3,4]. The remarkable influence in postmortem protein degradation, from CAPN1 and CAST, can partially explain the association with meat tenderness [5]. However, none of our Nelore CNVRs have overlap with CAPN1/CAST genes. Likewise none of miRNAs genes, predicted to bind on CAPN1/CAST product transcripts, were overlapped by our Nelore CNVRs or even known CNVRs. Conversely, 3 known CNVRs were overlapped with CAPN1 or CAST genes. One known CNVR overlapped with CAPN1 gene is described for Bos taurus coreanae (Hanwoo) [6]. Two previously described CNVRs encompassing CAST gene, one for Holstein-Friesian dairy cattle (Bos taurus taurus) [7] and another in a study with 27 different cattle breeds including Holstein [8].

Heat shock proteins (HSPs) are involved with key processes in meat tenderness [9]. HSPs and other proteins are associated with Nelore meat tenderness [10]. However, none of our Nelore CNVRs, or known CNVRs coordinates, have overlap with source genes of these associated proteins (HSP27, HSP70, MLC2, alpha tropomyosin, beta-LG and cytochrome b-c1 subunit 1) [10]. It can indicate a lack of copy number events in those genomic regions. Similarly, Ensembl Bos Taurus annotated miRNAs with predicted binding sites inside to these 6 protein genes do not overlap our Nelore CNVRs. The exception was bta-miR-499 (ENSBTAG00000029949) miRNA gene, which is predicted to bind at alpha tropomyosin TPM1-201 transcript (ENSBTAT0000044796) are inside a CNVR in a lost state in Hanwoo breed (Bos taurus coreanae) and gain state in Angus breed (Bos taurus taurus) [11]. The tenderness score is higher for Hanwoo when compared with Angus [12].

References


