00-08 Putative genes involved in muscle functioning are differentially expressed in Nelore steers divergent for sodium and potassium concentration

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Sodium and potassium play a major role in muscle functioning acting together in the Sodium-Potassium pump. Finding genes that are involved in sodium and potassium homeostasis can lead to a better understanding regarding the unknown shared roles of these minerals in the muscle physiology. In this study, we detected differentially expressed genes (DEGs) among extreme genomic estimated breeding values for sodium and potassium concentration in muscle (n=6 per group) of Nelore steers. Gene expression was measured with RNA-Seq in *Longissimus dorsi* muscle and the Tuxedo suite modified pipeline was adopted to identify the DEGs. We identified 73 DEGs for sodium and 79 DEGs for potassium, being 35 of them shared between the minerals (four upregulated and 31 downregulated in the positive group for both minerals). Among the downregulated we found seven genes (*CD44*, *COL11A1*, *TNC*, *THBS4*, *COMP*, *COL11A2,* and *ITGA10*) that are part of the Extracellular matrix (ECM) receptor interaction and the Focal Adhesion pathways. The ECM-receptor pathway is responsible for signaling molecules that act as receptors for interaction between cells and the extracellular matrix. The Focal adhesion pathway is liable for cell adhesions and, in conjunction with the ECM-receptor pathway, act on migration, differentiation, proliferation, apoptosis and other cellular activities. Products of both pathways together can link membrane receptors to the actin cytoskeleton using focal adhesion components, controlling thus the shape of the cell and acting as a sensor of an ECM-receptor condition affecting the cell behavior, being part of muscle growth. Our shared DEGs were previously associated with muscle and tendons healing process, but their expression were not related to sodium and potassium concentration. The other 24 downregulated shared DEGs have also functions related to signaling and extracellular matrix interaction. Our results provide inferences that the pathways discussed and other shared DEGs probably affect or are being affected by the maintenance of the ideal sodium and potassium concentration in muscle cells that are involved in functions such as muscle growth. We theorize that sodium and potassium concentration can act as messengers for the receptors in the extracellular matrix affecting muscle growth and healing.

Keywords: Cattle, gene regulation, RNA-Seq, minerals.

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