_____ ABSTRACT _____

Microarray analysis of Longissimus thoracis muscle gene expressions in vitamin A-restricted Japanese Black steers in middle fattening stage

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Vitamin A (VA) restriction in beef cattle improves meat marbling; however, the underlying molecular mechanisms remain incompletely understood. We performed microarray analysis to clarify the effect of VA restriction on Longissimus thoracis gene expressions in Japanese Black steers. Six Japanese Black steers 13-14 months of age were divided into two groups: S group (n = 3), which received VA supplementation, and R group (n = 3), in which dietary VA intake was restricted. Steers were fattened for 7 months, following which tissue samples were obtained. Extracted RNA samples were analyzed by Affymetrix Genechip Bovine Genome Array. Lists of genes highly expressed in the R and S groups were obtained. The lists were functionally interpreted using functional annotation software, DAVID. In the R and S groups, 48 and 40 genes were significantly highly expressed, respectively. The gene list of the R group included CD36, LPL, GPAM, DGAT2, and SCD and additional genes annotated 'PPAR signaling pathway,' 'lipid biosynthesis' and 'mitochondrion,' whereas that of the S group included COL1A2, FN1 and DCN and additional genes annotated 'extracellular matrix.' Changes in the expression of these genes are possibly involved in marbling improvement in beef cattle by VA restriction.