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著者	Kanaya T., Aso H., Miyazawa K., Minashima T., Kido T., Watanabe K., Ohwada S., Yamaguchi T.
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P-11. Estimation of genetic parameters and environment effects for fat melting point and fatty acid composition of Japanese Black Wagyu cattle

K. Inoue[a], N. Shoji[b], M. Kobayashi[c]
[a]National Livestock Breeding Center, Fukushima 961-8511, Japan
[b]Yamagata General Agricultural Research Center, Yamagata 996-0041, Japan
[c]Shonai Animal Hygiene Service Center, Yamagata 999-7781, Japan

Data of 2,713 Japanese Black cattle fattened in Yamagata prefecture during 1998-2004 were collected to estimate genetic parameters and environment effects for melting point of fat (MP) and fatty acid composition, which have relation to taste and flavor of beef. Fat and meat (*M. trapezius*) samples were taken from the carcasses of these fattened cattle for determination of MP and fatty acid composition of total lipid of intra-muscular adipose tissue. Genetic parameters were estimated using multiple traits animal model including fixed effects of sex, slaughter year, slaughter season, farm and regressions for slaughter age. In addition, the pedigree information containing 8,442 animals was used. Heritabilities for all traits were middle to high (0.37-0.67) except C18:2 (0.17). Genetic correlations between beef marbling score (BMS) and MP or each fatty acid or total unsaturated fatty acids per total saturated fatty acids (US/S) were low. Genetic correlations between MP and each saturated fatty acid were positive, while these between MP and US/S or each unsaturated fatty acid were negative. These results suggested that it was possible to improve simultaneously both amount and quality of beef fat. About the estimated environment effects, heifers had lower MP (higher US/S) than steers, and the cattle slaughtered in winter had lower one than in summer. As slaughter age increases, MP (US/S) became lower (higher).

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T. Kanaya, H. Aso, K. Miyazawa, T. Minashima, T. Kido, K. Watanabe, S. Ohwada, T. Yamaguchi
Graduate School of Agricultural Science, Tohoku University, Sendai, Japan

In murine small intestine, cells differentiate into one of five functional cell types, such as enterocytes, goblet cells, enteroendocrine cells, Paneth cells and M cells. All of these cells arose from intestinal epithelial stem cells located at the bottom of crypt. However, the differentiation processes of these cells have not been elucidated. To clarify the differentiation mechanisms of these intestinal epithelial cells, we attempted to establish clonal murine intestinal epithelial cell lines.

The small intestine was removed from a C57BL/6 mouse and cut finely, and then seeded into a collagen-coated flask. After limiting dilution, we have established three clonal cell lines. These established clones of murine intestinal epitheliocyte (MIE) are able to grow constantly and assume a monolayer, cobblestone and epithelial-like morphology. All of three clones were strongly positive for cytokeratin, a marker for epithelial cells. One clone was selected upon the growing rate. Scanning electron microscopy showed that MIE cells formed microvilli tightly after 15 days of culture. Cell-cell adherens junction protein (beta-catenin) and tight junction proteins (ZO-1 and claudin 1) were observed in the cell-cell contact region of adjacent cells. Musashi-1 antigen and hes 1 transcriptional factor are known to be candidate markers for stem cells and early progenitor cells of intestinal epitheliocyte. As MIE cells expressed Musashi-1 and hes 1, this cell line may have characteristics of immature intestinal epithelial cells. MIE cells can contribute to the elucidation of intestinal epithelial cell differentiation mechanisms.