Changes in the liver transcriptome and physiological parameters of Japanese Black steers during the fattening period

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Supplementary Table legends;

Supplementary Table S1. Concentrations of blood amino acid during the early (T1; 13 months of age), middle (T2; 20 months of age), and late fattening phases (T3; 28 months of age) in Japanese black cattle. Values indicate mean ± standard error and means in the same row with different superscripts differ significantly (*P*<0.05).

**Supplementary Table S2.** **Composition of rumen fluid during the early (T1; 13 months of age), middle (T2; 20 months of age), and late fattening phases (T3; 28 months of age) in Japanese black cattle.** Values indicate mean ± standard error and means in the same row with different superscripts differ significantly (*P*<0.05).

**Supplementary Table S3.** **Statistics and mapping results of RNA-seq data for early (T1; 13 months of age), middle (T2; 20 months of age), and late fattening phases (T3; 28 months of age).** GC: guanine and cytosine, AT: adenine and thymine, Q20: ratio of bases that have phred quality score > 20, Q30: ratio of bases that have phred quality score > 30.

**Supplementary Table S4.** **Statistics and mapping results of RNA-seq data for each Japanese Black cattle.**  T1: early fattening phases (13 months of age), T2: middle fattening phases (20 months of age), T3: late fattening phases (28 months of age). GC: guanine and cytosine, AT: adenine and thymine, DQ20: ratio of bases that have phred quality score > 20, Q30: ratio of bases that have phred quality score > 30.

**Supplementary Table S5. List of differentially expressed genes in carcass weight groups (High vs Low) in each fattening period.** T1: early fattening phases (13 months of age), T2: middle fattening phases (20 months of age), T3: late fattening phases (28 months of age).

**Supplementary Table S6**. **List of differentially expressed genes in beef marbling score groups (High vs Low) in each fattening period.** T1: early fattening phases (13 months of age), T2: middle fattening phases (20 months of age), T3: late fattening phases (28 months of age).

**Supplementary Table S7.** **List of differentially expressed genes in T1 (13 months of age) vs T3 (28 months of age) groups.**

**Supplementary Table S8. Gene ontology of differentially expressed genes in T1 (13 months of age) vs T3 (28 months of age) groups.**

**Supplementary Table S9. KEGG pathways of differentially expressed genes in T1 (13 months of age) vs T3 (28 months of age) groups.**

**Supplementary Table S10. Carcass traits of Japanese Black cattle used in present study (n=21).**

**Supplementary Table S11. Heat map illustrating the correlations between physiological parameters and carcass traits in the middle fattening period (20 months of age).** BUN: blood urea nitrogen, NEFA: non-esterified fatty acid, ALP: alkaline phosphatase, AST: aspartate aminotransferase, ALT: alanine aminotransferase, γ-GTP: gamma(γ)-glutamyl transferase, LD: lactate dehydrogenase, CK: creatine kinase, BHB: β-hydroxybutyric acid, IGF-I: insulin-like growth factor 1. \*\* and \* indicate *P*<0.01 and *P*<0.05, respectively.

**Supplementary Table S12. Concentrations of blood metabolites and hormones in carcass weight groups (High vs Low).** Carcass weights: High (782.50±6.9, n=4) and Low (698.00±18.02, n=4). BUN: blood urea nitrogen, NEFA: non-esterified fatty acid, ALP: alkaline phosphatase, AST: aspartate aminotransferase, ALT: alanine aminotransferase, γ-GTP: gamma(γ)-glutamyl transferase, LD: lactate dehydrogenase, CK: creatine kinase, BHB: β-hydroxybutyric acid, IGF-I: insulin-like growth factor 1. Values indicate mean ± standard error.

**Supplementary Table S13. Concentrations of blood amino acids in carcass weight groups (High vs Low).** Carcass weights: High (782.50±6.9, n=4) and Low (698.00±18.02, n=4). Values indicate mean ± standard error.

**Supplementary Table S14.** **Composition of rumen fluids in carcass weight groups (High vs Low).** Carcass weights: High (782.50±6.9, n=4) and Low (698.00±18.02, n=4). Values indicate mean ± standard error.

**Supplementary Table S15. Concentrations of blood metabolites and hormones in beef marbling score (BMS) groups (High vs Low).** BMS groups: High (10.00±0.41, n=4) and Low (6.50, n=4). BUN: blood urea nitrogen, NEFA: non-esterified fatty acid, ALP: alkaline phosphatase, AST: aspartate aminotransferase, ALT: alanine aminotransferase, γ-GTP: gamma(γ)-glutamyl transferase, LD: lactate dehydrogenase, CK: creatine kinase, BHB: β-hydroxybutyric acid, IGF-I: insulin-like growth factor 1. Values indicate mean ± standard error.

**Supplementary Table S16. Concentrations of blood amino acids in beef marbling score (BMS) groups (High vs Low).** BMS groups: High (10.00±0.41, n=4) and Low (6.50, n=4). Values indicate mean ± standard error.

**Supplementary Table S17.** **Composition of rumen fluid in beef marbling score (BMS) groups (High vs Low).** BMS groups: High (10.00±0.41, n=4) and Low (6.50, n=4). Values indicate mean ± standard error.

**Supplementary Figure legends;**

**Supplementary Figure S1. RNA-Seq analyses of differentially expressed genes of Japanese black cattle in the early (T1; 13 months of age), middle (T2; 20 months of age), and late fattening phases (T3; 28 months of age).**



**Supplementary Figure S2. Volcano plots of differentially expressed genes in early (T1; 13** **months of age) vs middle (T2; 20 months of age) vs late fattening phases (T3; 28 months of age).** *P*-value < 0.05, log2FC > ±1.5, and base mean > 30.

