***Animal* Journal**

**Expression of key myogenic, fibrogenic and adipogenic genes in *Longissimus thoracis* and *Masseter* muscles in cattle**

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**Supplementary Table S1. Oligonucleotide sequences and amplicon size of the target and reference genes used for the quantification of gene expression in cattle.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Gene ID** | **Accession number** | **Gene** | **Primers1** | **bp2** | **Source** |
| *Peroxisome proliferator activated receptor γ* | NM\_181024 | *PPARG* | F: GTGAAGTTCAACGCACTGGA | 113 | Soret *et al.*, 2016 |
| R: ATGTCCTCAATGGGCTTCAC |
| *CCAAT/enhancer-binding protein α* | NM\_176784 | *CEBPA* | F: TGGACAAGAACAGCAACGAG | 130 | Soret *et al.*, 2016 |
| R: TTGTCACTGGTCAGCTCCAG |
| *Fatty acid binding protein 4* | NM\_174314.2 | *FABP4* | F: CATCTTGCTGAAAGCTGCAC | 202 | Bonnet *et al.*, 2013 |
| R: ACCCCCATTCAAACTGATGA |
| *Wingless-type MMTV integration site family, member 10B* | XM\_005206363 | *WNT10B* | F: AATGCAAGTGCCATGGTACG | 139 | Soret *et al.*, 2016 |
| R: GAGTTGCGGTTGTGAGTATCAATG |
| *Zinc finger protein 423* | NM\_001101893.1 | *ZFP423* | F: GGATTCCTCCGTGACAGCA | 120 | Duarte *et al.* 2013 |
| R: TCGTCCTCATTCCTCTCCTCT |
| *Fibronectin* | NM\_001163778.1 | *FN1* | F: GCGTGTCACCTGGGCTCCAC | 149 | Duarte *et al.* 2013 |
| R: CTTGCTCCGGCAAGGTCGGGG |
| *Fibroblast growth factor receptor 1* | NM\_001110207.1 | *FGFR1* | F: AGGAGGATCGAGCCCACGGC | 166 | Duarte *et al.* 2013 |
| R: CTTGCTCCGGCAAGGTCGGGG |
| *Fibroblast growth factor 2* | NM\_174056.3 | *FGF2* | F: GGAGCATCACCACGCTGCCA | 165 | Duarte *et al.* 2013 |
| R: GTGGGTCGCTCTTCTCGCGG |
| *Transforming growth factor, β 1* | NM\_001166068.1 | *TGFB1* | F: AGCCAGGGGGATGTGCCA | 147 | Duarte *et al.* 2013 |
| R: TAGCACGCGGGTGACCTCCT |
| *Myogenic factor 5* | NM\_174116.1 | *MYF5* | F: AGACGCCTGAAGAAGGTCAA | 220 | This study |
| R: TGCCATCAGAGCAACTTGAG |
| *Myogenic differentiation 1* | NM\_001040478.2 | *MYOD* | F: TTCCGACGGCATGATGGACTAC | 72 | Duarte *et al.* 2013 |
| R: TAAGTGCGGTCGTAGCAGTTCC |
| *Myogenin* | NM\_001111325.1 | *MYOG* | F: TACAGACGCCCACAATCTGCAC | 67 | Duarte *et al.* 2013 |
| R: AGCGACATCCTCCACTGTGATG |
| *Leptin* | NM\_173928.2 | *LEP* | F: GGCTGTCCACAGGAGAAGAG | 233 | This study |
| R: AGTGAGAGGGAGCTGGAACA |
| *Adiponectin* | NM\_174742.2 | *ADIPOQ* | F: GTGGCTCTGATTCCACACCT | 208 | This study |
| R: TCTCCAGGAGTGCCATCTCT |
| *Myostatin* | AF320998.1 | *MSTN* | F: GTGTTGCAGAACTGGCTCAA | 238 | This study |
| R: AGGTGCCTTTGTCTGGCTTA |
| *β-actin* | BC\_142413 | *ACTB* | F: CGCCATGGATGATGATATTGC | 65 | Waters *et al.*, 2009 |
| R: AAGCGGCCTTGCACATGC |
| *Topoisomerase II-beta* | XM\_001254709 | *TOP2B* | F: CCGATGATGATGACGACAAT | 62 | Bonnet *et al.*, 2013 |
| R: TGCTATGGGAGATGCTTTGA |
| *Ceroid-lipofuscinosis neuronal 3* | NM\_001075174 | *CNL3* | F: TTCTGACTCCTTGGGACACA | 62 | Bonnet *et al.*, 2013 |
|  |  |  | R: CAACCTGCCCACCTATCAGT |  |  |
| *Peptidylprolyl isomerase A* | XM\_001252497 | *PPIA* | F: GATTTATGTGCCAGGGTGGT | 116 | This study |
|  |  |  | R: GATGCCAGGACCTGTATGCT |  |  |
| *Ribosomal protein large PO* | NM\_001012682 | *RFLPO* | F: CAACCCTGAAGTGCTTGACAT  R: AGGCAGATGGATCAGCCA | 227 | Bonnet *et al.*, 2013 |

1F = Forward; R = Reverse.

2Amplicon size in base pairs (bp).

**References for Supplementary Table S1**

Bonnet M, Bernard L, Bes S, Leroux C 2013. Selection of reference genes for quantitative real-time PCR normalisation in adipose tissue, muscle, liver and mammary gland from ruminants. Animal: an international journal of animal bioscience 7,1344. doi: 10.1017/S1751731113000475.

Soret B, Mendizabal JA, Arana A, Alfonso L 2016. Expression of genes involved in adipogenesis and lipid metabolism in subcutaneous adipose tissue and longissimus muscle in low-marbled Pirenaica beef cattle. Animal 10, 2018. https://doi.org/10.1017/S175173111600118X.

Waters SM, Kenny DA, Killeen AP, Spellman SA, Fitzgerald A, Hennessy AA, Hynes AC 2009. Effect of level of eicosapentaenoic acid on the transcriptional regulation of Delta-9 desaturase using a novel in vitro bovine intramuscular adipocyte cell culture model. Animal: an international journal of animal bioscience 3, 718. doi: 10.1017/S1751731109004054.

**Supplementary Table S2. Slope, R2 and Efficiency values for the target and reference genes used for the quantification of gene expression in cattle.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gene** | **Slope1** | **(R2)2** | **Efficiency3** |
| *PPARG4* | -3.405 | 0.99 | 1.97 |
| *CEBPA* | -3.493 | 0.98 | 1.93 |
| *FABP4* | -3.546 | 0.98 | 1.91 |
| *WNT10B* | -3.684 | 0.98 | 1.87 |
| *ZFP423* | -3.371 | 0.99 | 1.98 |
| *FN1* | -3.074 | 0.99 | 2.00 |
| *FGFR1* | -3.350 | 0.99 | 1.99 |
| *FGF2* | -3.179 | 0.97 | 1.97 |
| *TGFB1* | -3.211 | 0.99 | 2.00 |
| *MYF5* | -3.323 | 0.99 | 2.00 |
| *MYOD* | -3.344 | 0.99 | 1.99 |
| *MYOG* | -3.285 | 0.99 | 2.00 |
| *LEP* | -3.309 | 0.99 | 2.00 |
| *ADIPOQ* | -3.160 | 0.99 | 2.00 |
| *MSTN* | -3.314 | 0.99 | 1.99 |
| *ACTB* | -3.450 | 0.96 | 1.95 |
| *TOP2B* | -3.020 | 0.99 | 2.00 |

1 Slope of the standard curve.

2 R2= coefficient of determination of the standard curve.

3 Calculated as 10-1/Slope.

4*PPARG = Peroxisome proliferator-activated receptor γ*; *CEBPA = CCAAT/enhancer-binding protein α; FABP4 = Fatty acid binding protein 4; WNT10B* = *Wingless-type MMTV integration site family, member 10B; ZFP423* = *Zinc finger protein 423; FN1* = *Fibronectin*; *FGFR1*= *Fibroblast growth factor receptor 1*; *FGF2* = *Fibroblast growth factor 2*; *TGFB1= Transforming growth factor β 1*; *MYF5 = Myogenic factor 5*; *MYOG* = *Myogenin*; *MYOD* = *Myogenic differentiation 1*; *LEP* = *Leptin*; *ADIPOQ* = *Adiponectin*; *MSTN* = *Myostatin¸ACTB* = *β-actin;* *TOP2B* = *Topoisomerase II-beta*.

**Supplementary Table S3. Variance components estimates for inter-animal variation, processing steps Sampling, Reverse Transcription (RT) and quantitative Polymerase Chain Reaction (qPCR) (residual), in *Longissimus thoracis* and *Masseter* muscles of Pirenaica and Holstein bulls.**

**(a) Adipogenic markers**1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Pirenaica** | | | | | | **Holstein** | | | | | |
| ***Longissimus*** | ***PPARG*** | ***CEBPA*** | ***FABP4*** | ***ZFP423*** | ***WNT10B*** | | | ***PPARG*** | ***CEBPA*** | ***FABP4*** | ***ZFP***  ***423*** | ***WNT10B*** |
| Animal | 0.16 | 0.10 | 0.00 | 0.53 | 0.08 | | | 0.23 | 0.14 | 0.23 | 0.08 | 0.19 |
| Sampling | 0.24 | 0.14 | 2.28 | 0.07 | 0.48 | | | 0.32 | 0.62 | 1.19 | 0.49 | 0.61 |
| RT | 0.28 | 0.25 | 0.92 | 0.23 | 2.69 | | | 0.16 | 0.25 | 0.11 | 0.30 | 0.06 |
| qPCR | 0.38 | 0.23 | 0.29 | 0.03 | 1.17 | | | 0.05 | 0.02 | 0.02 | 0.02 | 0.15 |
| ***Masseter*** |  |  | | | |  |  | | | | | |
| Animal | 0.00 | 0.00 | 0.18 | 0.00 | 0.00 | | | 0.00 | 0.00 | 0.00 | 0.22 | 0.00 |
| Sampling | 0.59 | 1.10 | 0.32 | 0.12 | 0.76 | | | 0.34 | 0.46 | 2.04 | 0.38 | 0.28 |
| RT | 0.29 | 0.40 | 0.22 | 0.16 | 0.29 | | | 0.10 | 0.15 | 0.14 | 0.14 | 0.12 |
| qPCR | 0.08 | 0.23 | 0.58 | 0.02 | 0.31 | | | 0.02 | 0.02 | 0.05 | 0.02 | 0.14 |

**(b) Myogenic markers**1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Pirenaica** | | | **Holstein** | | |
| ***Longissimus*** | ***MYF5*** | ***MYOD*** | ***MYOG*** | ***MYF5*** | ***MYOD*** | ***MYOG*** |
| Animal | 1.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 |
| Sampling | 1.21 | 0.00 | 0.00 | 1.30 | 0.55 | 0.49 |
| RT | 0.13 | 0.00 | 0.00 | 0.24 | 0.72 | 0.21 |
| qPCR | 0.08 | 0.00 | 0.00 | 0.25 | 0.06 | 0.01 |
| ***Masseter*** |  |  |  |  |  |  |
| Animal | 0.05 | 0.25 | 0.03 | 0.00 | 0.21 | 0.12 |
| Sampling | 0.09 | 0.06 | 0.08 | 0.55 | 0.17 | 0.37 |
| RT | 0.03 | 0.07 | 0.01 | 0.72 | 0.66 | 0.67 |
| qPCR | 0.04 | 0.02 | 0.01 | 0.06 | 0.03 | 0.01 |

**(c) Fibrogenic markers**1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Pirenaica** | | | **Holstein** | | |
| ***Longissimus*** | ***FN1*** | ***FGFR1*** | ***FGF2*** | ***FN1*** | ***FGFR1*** | ***FGF2*** |
| Animal | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 0.07 |
| Sampling | 1.25 | 0.90 | 0.00 | 1.88 | 1.08 | 0.92 |
| RT | 0.14 | 0.22 | 1.39 | 0.22 | 0.24 | 0.37 |
| qPCR | 0.06 | 0.04 | 0.14 | 0.03 | 0.02 | 0.16 |
| ***Masseter*** |  | | |  | | |
| Animal | 0.00 | 0.03 | 0.26 | 0.53 | 0.38 | 0.67 |
| Sampling | 0.01 | 0.02 | 0.00 | 0.44 | 0.34 | 0.66 |
| RT | 0.14 | 0.04 | 2.53 | 0.45 | 0.37 | 0.48 |
| qPCR | 0.03 | 0.06 | 0.18 | 0.03 | 0.01 | 0.06 |

**(d) Cytokines**1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Pirenaica** | | | | **Holstein** | | | |
| ***Longissimus*** | ***LEP*** | ***ADIPOQ*** | ***MSTN*** | ***TGFB1*** | ***LEP*** | ***ADIPOQ*** | ***MSTN*** | ***TGFB1*** |
| Animal | 0.00 | 0.00 | 0.00 | 0.00 | 0.62 | 0.00 | 0.85 | 0.00 |
| Sampling | 4.00 | 0.12 | 8.29 | 0.26 | 1.99 | 1.14 | 0.92 | 0.86 |
| RT | 0.40 | 0.16 | 0.32 | 0.16 | 0.22 | 2.19 | 0.10 | 0.17 |
| qPCR | 0.29 | 0.02 | 0.42 | 0.07 | 0.38 | 0.05 | 0.59 | 0.06 |
| ***Masseter*** |  | | | |  | | | |
| Animal | 0.77 | 1.42 | 1.59 | 0.00 | 2.72 | 1.80 | 0.62 | 0.20 |
| Sampling | 1.06 | 1.14 | 1.10 | 0.09 | 1.74 | 0.00 | 1.46 | 0.46 |
| RT | 0.32 | 0.06 | 0.10 | 0.09 | 0.06 | 7.67 | 0.00 | 0.24 |
| qPCR | 0.40 | 0.03 | 0.55 | 0.06 | 0.26 | 0.06 | 1.19 | 0.11 |

1*Gene abbreviations are defined in Table S2.*

**Supplementary Table S4. Differences in normalized expression values of adipogenic, myogenic and fibrogenic genes between *Longissimus thoracis* and *Masseter* in Pirenaica and Holstein bulls**.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Pirenaica** | | | | **Holstein** | | | |
| **Gene**1 | **Contrast** | **DIF2** | **SEM** | ***P-*value** | **Contrast** | **DIF** | **SEM** | ***P-*value** |
| *Adipogenic genes* | | | | |  |  |  |  |
| *PPARG* | *LT-MS3* | 0.53 | 0.42 | 0.215 | *LT-MS* | 0.19 | 0.31 | 0.534 |
| *CEBPA* | *LT-MS* | 0.42 | 0.46 | 0.361 | *LT-MS* | 0.25 | 0.36 | 0.495 |
| *FABP4* | *LT-MS* | 1.36 | 0.57 | 0.020 | *LT-MS* | 0.58 | 0.52 | 0.265 |
| *ZFP423* | *LT-MS* | 0.44 | 0.28 | 0.118 | *LT-MS* | 0.81 | 0.39 | 0.044 |
| *WNT10B* | *LT-MS* | -0.32 | 0.62 | 0.606 | *LT-MS* | -0.07 | 0.33 | 0.841 |
| *Myogenic genes* | | | | |  |  |  |  |
| *MYF5* | *LT-MS* | -0.40 | 0.62 | 0.516 | *LT-MS* | -0.18 | 0.47 | 0.711 |
| *MYOG* | *LT-MS* | 0.06 | 0.47 | 0.902 | *LT-MS* | 0.51 | 0.40 | 0.198 |
| *MYOD* | *LT-MS* | 2.45 | 0.51 | 0.000 | *LT-MS* | 1.98 | 0.41 | 0.000 |
| *Fibrogenic genes* | | | | |  |  |  |  |
| *FN1* | *LT-MS* | -0.25 | 0.35 | 0.481 | *LT-MS* | 0.33 | 0.47 | 0.492 |
| *FGFR1* | *LT-MS* | 0.12 | 0.33 | 0.725 | *LT-MS* | -0.12 | 0.44 | 0.778 |
| *FGF2* | *LT-MS* | 0.45 | 0.42 | 0.281 | *LT-MS* | 0.59 | 0.47 | 0.213 |
| *Cytokines* | | | | |  | | | |
| *LEP* | *LT-MS* | 0.63 | 0.80 | 0.438 | *LT-MS* | 0.26 | 0.76 | 0.734 |
| *ADIPOQ* | *LT-MS* | 0.03 | 0.50 | 0.952 | *LT-MS* | -1.18 | 0.57 | 0.042 |
| *MSTN* | *LT-MS* | 1.63 | 0.94 | 0.090 | *LT-MS* | 2.12 | 0.59 | 0.001 |
| *TGFB1* | LT-MS | -0.27 | 0.23 | 0.245 | LT-MS | -0.16 | 0.41 | 0.697 |

1*PPARG* = *Peroxisome proliferator activated receptor γ*; *CEBPA = CCAAT/enhancer binding protein α;* *FABP4 =* *Fatty acid binding protein 4*; *ZFP423 = Zinc finger protein 423; WNT10B = wingless-type MMTV integration site family member 10B; MYF5 = Myogenic factor 5; MYOG = Myogenin; MYOD = Myogenic differentiation 1; FN1 = Fibronectin; FGFR1 = Fibroblast growth factor receptor 1; FGF2 = Fibroblast growth factor 2; LEP = Leptin; ADIPOQ = Adiponectin; MSTN = Myostatin; TGFB1 = Transforming growth factor β 1.*

2DIF contrasted differences between normalized log2 (E-cq). Values for *PPARG*, *CEBPA*, *FABP4* and *WNT10B* in Pirenaica breed were presented in a previous work [Martínez Del Pino L, Arana A, Alfonso L, Mendizábal JA, Soret B. Adiposity and adipogenic gene expression in four different muscles in beef cattle. PLoS ONE. 2017;12: 1–19. doi:10.1371/journal.pone.01796040].

*3LT= Longissimus thoracis; MS= Masseter.*

**Supplementary Table S5. Differences in normalised expression values of adipogenic, myogenic and fibrogenic genes between Pirenaica and Holstein bulls in *Longissimus thoracis* and *Masseter* muscles.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ***Longissimus thoracis*** | | | | ***Masseter*** | | | |
| **Gene**1 | **Contrast** | **DIF**2 | **SEM** | ***P-*value** | **Contrast** | **DIF** | **SEM** | ***P-*value** |
| *Adipogenic genes* | | | | |  |  |  |  |
| *PPARG* | PIR-HOL3 | 1.11 | 0.36 | 0.003 | PIR-HOL | 0.81 | 0.36 | 0.026 |
| *CEBPA* | PIR-HOL | -0.64 | 0.38 | 0.098 | PIR-HOL | -0.77 | 0.42 | 0.072 |
| *FABP4* | PIR-HOL | -1.98 | 0.57 | 0.001 | PIR-HOL | -2.74 | 0.51 | 0.000 |
| *ZFP423* | PIR-HOL | -0.25 | 0.46 | 0.588 | PIR-HOL | 0.09 | 0.32 | 0.772 |
| *WNT10B* | PIR-HOL | -0.77 | 0.57 | 0.180 | PIR-HOL | -0.45 | 0.38 | 0.241 |
| *Myogenic genes* | | | | |  | | | |
| *MYF5* | PIR-HOL | -0.92 | 0.72 | 0.205 | PIR-HOL | -0.69 | 0.33 | 0.043 |
| *MYOG* | PIR-HOL | -0.58 | 0.55 | 0.27 | PIR-HOL | -0.13 | 0.31 | 0.688 |
| *MYOD* | PIR-HOL | 0.05 | 0.54 | 0.925 | PIR-HOL | -0.42 | 0.32 | 0.191 |
| *Fibrogenic genes* | | | | |  |  |  |  |
| *FN1* | PIR-HOL3 | -0.51 | 0.56 | 0.358 | PIR-HOL | 0.09 | 0.34 | 0.801 |
| *FGFR1* | PIR-HOL | -0.39 | 0.52 | 0.454 | PIR-HOL | -0.61 | 0.32 | 0.066 |
| *FGF2* | PIR-HOL | 0.21 | 0.48 | 0.670 | PIR-HOL | 0.36 | 0.50 | 0.479 |
| *Cytokines* | | | | |  | | | |
| *LEP* | PIR-HOL | -0.12 | 0.89 | 0.896 | PIR-HOL | -0.46 | 0.74 | 0.534 |
| *ADIPOQ* | PIR-HOL | 0.80 | 0.65 | 0.222 | PIR-HOL | -0.44 | 0.48 | 0.368 |
| *MSTN* | PIR-HOL | 2.37 | 0.92 | 0.013 | PIR-HOL | 2.86 | 0.66 | 0.000 |
| *TGFB1* | PIR-HOL | -0.19 | 0.44 | 0.667 | PIR-HOL | -0.08 | 0.32 | 0.813 |

1*PPARG* = *Peroxisome proliferator activated receptor γ*; *CEBPA = CCAAT/enhancer binding protein α;* *FABP4 =* *Fatty acid binding protein 4*; *ZFP423 = Zinc finger protein 423; WNT10B = wingless-type MMTV integration site family member 10B; MYF5 = Myogenic factor 5; MYOG = Myogenin; MYOD = Myogenic differentiation 1; FN1 = Fibronectin; FGFR1 = Fibroblast growth factor receptor 1; FGF2 = Fibroblast growth factor 2; LEP = Leptin; ADIPOQ = Adiponectin; MSTN = Myostatin; TGFB1 = Transforming growth factor β 1.*

2DIF contrasted differences between normalized log2 (E-cq).

3PIR = Pirenaica; HOL = Holstein.

**Supplementary Table S6 - Pearson's correlation coefficients (p-values) among gene expression and chemical traits and adipocyte size parameters in cattle.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Chemical traits (n=16)** | | | | |  | **Adipocyte size parameters (n=12)** | | | | | |
| **Gene**1 | **Fat, %** | **Protein, %** | **Total Collagen, mg/g** | **Soluble Collagen, %** | **Moisture,%** |  | **Minimum, μm** | **Maximum, μm** | **Median, μm** | **Mean, μm** | **Mode, μm** | **Number 106/g tissue** |
| *CEBPA* | 0.106 | 0.150 | 0.138 | 0.112 | -0.306 |  | 0.634 | 0.418 | 0.209 | 0.388 | 0.061 | -0.559 |
| *p-value* | *0.697* | *0.581* | *0.610* | *0.680* | *0.249* |  | *0.027* | *0.177* | *0.514* | *0.212* | *0.851* | *0.059* |
| *FABP4* | 0.225 | 0.003 | 0.424 | 0.084 | -0.410 |  | 0.831 | 0.578 | 0.350 | 0.468 | 0.144 | -0.358 |
| *p-value* | *0.403* | *0.992* | *0.101* | *0.758* | *0.115* |  | *0.001* | *0.049* | *0.265* | *0.125* | *0.656* | *0.254* |
| *FGF2* | -0.541 | 0.517 | -0.023 | -0.082 | 0.417 |  | -0.447 | -0.174 | -0.510 | -0.469 | -0.513 | -0.334 |
| *p-value* | *0.031* | *0.040* | *0.934* | *0.762* | *0.108* |  | *0.145* | *0.590* | *0.090* | *0.124* | *0.088* | *0.289* |
| *FGFR1* | 0.387 | -0.036 | 0.418 | -0.020 | -0.451 |  | 0.790 | 0.919 | 0.334 | 0.492 | 0.223 | -0.292 |
| *p-value* | *0.139* | *0.895* | *0.107* | *0.942* | *0.080* |  | *0.002* | *<.0001* | *0.289* | *0.105* | *0.487* | *0.357* |
| *FN1* | -0.096 | 0.109 | -0.200 | -0.343 | -0.004 |  | 0.596 | 0.639 | 0.230 | 0.314 | 0.113 | -0.509 |
| *p-value* | *0.725* | *0.688* | *0.458* | *0.194* | *0.987* |  | *0.041* | *0.026* | *0.473* | *0.321* | *0.726* | *0.091* |
| *ADIPOQ* | 0.312 | 0.047 | 0.255 | 0.699 | -0.233 |  | -0.146 | -0.083 | -0.064 | 0.003 | -0.015 | 0.287 |
| *p-value* | *0.240* | *0.863* | *0.340* | *0.003* | *0.386* |  | *0.650* | *0.798* | *0.844* | *0.993* | *0.963* | *0.365* |
| *LEP* | -0.196 | 0.436 | -0.028 | 0.019 | 0.117 |  | 0.235 | 0.356 | 0.015 | 0.239 | 0.023 | -0.701 |
| *p-value* | *0.468* | *0.091* | *0.918* | *0.945* | *0.667* |  | *0.462* | *0.256* | *0.963* | *0.454* | *0.945* | *0.011* |
| *MSTN* | -0.577 | 0.492 | -0.293 | 0.178 | 0.453 |  | -0.829 | -0.358 | -0.703 | -0.743 | -0.623 | 0.021 |
| *p-value* | *0.019* | *0.053* | *0.271* | *0.509* | *0.078* |  | *0.001* | *0.254* | *0.011* | *0.006* | *0.031* | *0.948* |
| *MYF5* | 0.323 | -0.061 | 0.594 | 0.424 | -0.110 |  | 0.519 | 0.270 | 0.163 | 0.171 | 0.065 | 0.141 |
| *p-value* | *0.222* | *0.822* | *0.015* | *0.102* | *0.685* |  | *0.084* | *0.397* | *0.612* | *0.595* | *0.842* | *0.661* |
| *MYOD* | -0.344 | 0.365 | 0.043 | 0.066 | 0.042 |  | -0.550 | -0.262 | -0.730 | -0.762 | -0.738 | 0.136 |
| *p-value* | *0.192* | *0.165* | *0.874* | *0.808* | *0.877* |  | *0.064* | *0.410* | *0.007* | *0.004* | *0.006* | *0.674* |
| *MYOG* | -0.003 | 0.248 | 0.324 | 0.287 | 0.024 |  | 0.180 | 0.109 | -0.211 | -0.245 | -0.356 | 0.115 |
| *p-value* | *0.990* | *0.354* | *0.221* | *0.282* | *0.929* |  | *0.576* | *0.736* | *0.510* | *0.443* | *0.257* | *0.722* |
| *PPARG* | -0.602 | 0.542 | -0.517 | 0.130 | 0.457 |  | -0.806 | -0.556 | -0.454 | -0.460 | -0.339 | -0.170 |
| *p-value* | *0.014* | *0.030* | *0.040* | *0.632* | *0.075* |  | *0.002* | *0.060* | *0.138* | *0.133* | *0.282* | *0.598* |
| *TGFB1* | 0.051 | 0.088 | 0.338 | 0.304 | -0.097 |  | 0.729 | 0.673 | 0.195 | 0.340 | 0.081 | -0.355 |
| *p-value* | *0.851* | *0.747* | *0.201* | *0.253* | *0.721* |  | *0.007* | *0.017* | *0.543* | *0.280* | *0.803* | *0.257* |
| *WNT10B* | 0.121 | -0.105 | 0.241 | -0.058 | 0.074 |  | 0.469 | 0.170 | 0.444 | 0.447 | 0.432 | -0.079 |
| *p-value* | *0.656* | *0.700* | *0.369* | *0.831* | *0.785* |  | *0.124* | *0.598* | *0.149* | *0.145* | *0.160* | *0.807* |
| *ZFP423* | -0.330 | 0.291 | -0.041 | -0.135 | 0.050 |  | -0.265 | -0.157 | -0.586 | -0.648 | -0.674 | 0.090 |
| *p-value* | *0.213* | *0.274* | *0.880* | *0.619* | *0.855* |  | *0.406* | *0.627* | *0.045* | *0.023* | *0.016* | *0.780* |

1*Gene abbreviations are defined in Table S2.*