

Supplementary Table 5

Pathway analysis of upregulated gene expression at ZT 16 in Bmal1^{0V} (HFD) vs. Control (HFD)

GO: Pathway Name	P-value	Genes
Innate immune response(4)	3.795E-06	APOBEC3,CLEC2D,CSF1,GBP7,GBP7,IFIT1,NFKBIA,NR1D1,OAS2,RIPK2,RSAD2,S100A8,S100A9,SERPING1,STAT2
immune effector process(3)	3.354E-04	ADORA2B,ALPK1,APOBEC3,CLEC2D,DDIT4,GADD45G,HIST1H3E,IFIT1,OAS2,RIPK2,RSAD2,SERPING1,STAT2,ZFP35
leukocyte cell cell adhesion(5)	3.354E-04	CCL28,FCGR4,GADD45G,HSPH1,PSMB10,RIPK2,RSAD2,S100A8,S100A9,SOX4,ZBTB16,ZFP35
negative regulation of catalytic activity(4)	3.354E-04	CDKN1A,CNN3,CRY2,ERRF1,GADD45B,GADD45G,PTPN1,SGS2,SERPINA10,SERPINA3F,SERPINA3N,SERPING1,TRIB1
homotypic cell cell adhesion(5)	4.587E-04	FCGR4,GADD45G,HSPH1,PLEK,PSMB10,RIPK2,RSAD2,S100A8,S100A9,SOX4,ZBTB16,ZFP35
response to cytokine(5)	4.587E-04	CSF1,GBP10,GBP7,IFIT1,IFNGR2,JUNB,NFKBIA,RIPK2,SERPINA3F,SERPINA3I,SERPINA3N,STAT2
defense response to other organism(4)	4.738E-04	ALPK1,APOBEC3,DDIT4,GBP10,GBP7,HIST1H3E,IFIT1,OAS2,REG3B,RIPK2,RSAD2,STAT2
negative regulation of phosphorus metabolic process(5)&negative regulation	4.738E-04	BIRC3,CDKN1A,CRY2,DDIT4,ERRF1,GADD45B,GADD45G,HSPH1,PLEK,PTPN1,SGS2,TRIB1
regulation of defense response(5)	4.974E-04	ADORA2B,ALPK1,CLEC2D,HIST1H3E,NFKBIA,NR1D1,RIPK2,RSAD2,S100A8,S100A9,SERPING1,STAT2
inflammatory response(5)	5.220E-04	ADORA2B,CSF1,ELF3,NFKBIZ,NUPR1,REG3A,REG3B,S100A8,S100A9,SERPINA3N,SERPING1,ZFP35
leukocyte aggregation(6)	5.220E-04	FCGR4,GADD45G,HSPH1,PSMB10,RIPK2,RSAD2,S100A8,S100A9,SOX4,ZBTB16,ZFP35
alpha beta T cell activation(6)	6.013E-04	FCGR4,GADD45G,HSPH1,RIPK2,RSAD2,ZBTB16,ZFP35
single organismal cell cell adhesion(4)	7.237E-04	CCL28,FCGR4,GADD45G,HSPH1,PLEK,PSMB10,RIPK2,RSAD2,S100A8,S100A9,SOX4,ZBTB16,ZFP35
leukocyte differentiation(6)	1.317E-03	CLEC2D,CSF1,GADD45G,JUNB,RIPK2,RSAD2,SNX10,SOX4,TRIB1,ZBTB16,ZFP35
negative regulation of phosphorylation(7)	1.429E-03	BIRC3,CDKN1A,DDIT4,ERRF1,GADD45B,GADD45G,HSPH1,PTPN1,SGS2,TRIB1
negative regulation of protein modification process(6)	3.220E-03	CDKN1A,CRY2,DDIT4,ERRF1,GADD45B,GADD45G,HSPH1,PTPN1,SGS2,SOX4,TRIB1
circadian regulation of gene expression(4)	3.482E-03	ARNTL,CRY2,NOCT,NPAS2,NR1D1
defense response to virus(4)	4.108E-03	ALPK1,APOBEC3,DDIT4,HIST1H3E,IFIT1,OAS2,RSAD2,STAT2
positive regulation of cell death(4)	4.195E-03	BTG1,CDKN1A,DDIT4,GADD45B,GADD45G,NUPR1,RIPK2,S100A8,S100A9,SOX4,ZBTB16
negative regulation of protein phosphorylation(7)	4.492E-03	CDKN1A,DDIT4,ERRF1,GADD45B,GADD45G,HSPH1,PTPN1,SGS2,TRIB1
negative regulation of immune system process(3)	5.230E-03	CCL28,CLEC2D,HIST1H4H,NFKBIA,NR1D1,SERPING1,TRIB1,ZBTB16,ZFP35
negative regulation of protein kinase activity(7)	5.230E-03	CDKN1A,ERRF1,GADD45B,GADD45G,PTPN1,SGS2,TRIB1
fat cell differentiation(6)	6.089E-03	ARNTL,CEBPD,NOCT,NR1D1,PEX11A,SGS2,ZBTB16
regulation of immune effector process(4)	0.00608868	ADORA2B,ALPK1,CLEC2D,HIST1H3E,RIPK2,RSAD2,SERPING1,STAT2,ZFP35
response to lipopolysaccharide(5)	0.00633785	FCGR4,GBP10,JUNB,NFKBIA,NOCT,NR1D1,RIPK2,TRIB1
negative regulation of hemopoiesis(4)	0.00700902	CLEC2D,HIST1H4H,NFKBIA,TRIB1,ZBTB16,ZFP35
response to virus(4)	0.00700902	ALPK1,APOBEC3,DDIT4,HIST1H3E,IFIT1,OAS2,RSAD2,STAT2
negative regulation of kinase activity(6)	0.00706436	CDKN1A,ERRF1,GADD45B,GADD45G,PTPN1,SGS2,TRIB1
response to molecule of bacterial origin(5)	0.00854625	FCGR4,GBP10,JUNB,NFKBIA,NOCT,NR1D1,RIPK2,TRIB1
response to bacterium(4)	0.00855879	FCGR4,GBP10,GBP7,JUNB,NFKBIA,NOCT,NR1D1,REG3B,RIPK2,TRIB1
positive regulation of programmed cell death(5)	0.0101104	BTG1,CDKN1A,GADD45B,GADD45G,NUPR1,RIPK2,S100A8,S100A9,SOX4,ZBTB16
T cell aggregation(4)&T cell activation(5)	0.0104083	FCGR4,GADD45G,HSPH1,PSMB10,RIPK2,RSAD2,SOX4,ZBTB16,ZFP35
lymphocyte aggregation(7)	0.0104083	FCGR4,GADD45G,HSPH1,PSMB10,RIPK2,RSAD2,SOX4,ZBTB16,ZFP35
negative regulation of myeloid cell differentiation(5)	0.0104083	CLEC2D,HIST1H4H,NFKBIA,TRIB1,ZBTB16
alpha beta T cell differentiation(7)	0.0119615	GADD45G,RIPK2,RSAD2,ZBTB16,ZFP35
stress activated protein kinase signaling cascade(5)	0.0132328	ERRF1,GADD45B,GADD45G,HSPH1,PTPN1,RIPK2,TRIB1
regulation of hemopoiesis(4)	0.0138499	CLEC2D,CSF1,HIST1H4H,NFKBIA,RIPK2,TRIB1,ZBTB16,ZFP35
myeloid cell differentiation(6)	0.0153192	CLEC2D,CSF1,HIST1H4H,JUNB,NFKBIA,SNX10,TRIB1,ZBTB16
positive regulation of defense response(4)	0.0163565	ADORA2B,NFKBIA,NR1D1,RIPK2,RSAD2,S100A8,S100A9
negative regulation of transferase activity(5)	0.0185893	CDKN1A,ERRF1,GADD45B,GADD45G,PTPN1,SGS2,TRIB1
intrinsic apoptotic signaling pathway(6)	0.022112	CDKN1A,DDIT4,HSPH1,NUPR1,PTPN1,S100A8,S100A9
positive regulation of protein ubiquitination(8)	0.0227908	BIRC2,BIRC3,RIPK2,TRIB1,TSPYL5
regulation of circadian rhythm(3)	0.0227908	ARNTL,CRY2,NOCT,NPAS2,NR1D1
negative regulation of hydrolase activity(5)	0.0241423	CNN3,CRY2,SGS2,SERPINA10,SERPINA3F,SERPINA3I,SERPINA3N,SERPING1
lymphocyte activation(4)	0.0262513	CDKN1A,FCGR4,GADD45G,HSPH1,PSMB10,RIPK2,RSAD2,SOX4,ZBTB16,ZFP35
regulation of myeloid cell differentiation(5)	0.0262513	CLEC2D,CSF1,HIST1H4H,NFKBIA,TRIB1,ZBTB16
bile acid biosynthetic process(6)	0.0273436	AMACR,CYP39A1,NR1D1
regulation of innate immune response(5)	0.0275335	CLEC2D,NFKBIA,NR1D1,RIPK2,RSAD2,SERPING1
response to peptide(5)	0.029527	CRY2,NFKBIA,PTPN1,RIPK2,SERPINA3F,SERPINA3I,SERPINA3N
negative regulation of cell differentiation(4)	0.0297854	AREG,ARNTL,CLEC2D,HIST1H4H,NFKBIA,NOCT,REG3A,TRIB1,ZBTB16,ZFP35
cellular response to lipopolysaccharide(6)	0.0300161	FCGR4,GBP10,NFKBIA,NR1D1,RIPK2,TRIB1
regulation of multi organism process(3)	0.0312371	ALPK1,APOBEC3,HIST1H3E,P2RY1,RIPK2,RSAD2,STAT2,TRIB1
cellular response to cytokine stimulus(6)	0.032268	CSF1,GBP10,GBP7,IFIT1,IFNGR2,NFKBIA,RIPK2,STAT2
positive regulation of protein modification by small protein conjugation or re	0.032268	BIRC2,BIRC3,RIPK2,TRIB1,TSPYL5
regulation of protein ubiquitination(8)	0.032268	BIRC2,BIRC3,RIPK2,SOX4,TRIB1,TSPYL5
acute inflammatory response(6)	0.033803	NUPR1,REG3A,REG3B,SERPINA3N,SERPING1
positive regulation of apoptotic process(6)	0.033803	BTG1,GADD45B,GADD45G,NUPR1,RIPK2,S100A8,S100A9,SOX4,ZBTB16
cellular response to molecule of bacterial origin(5)	0.0340341	FCGR4,GBP10,NFKBIA,NR1D1,RIPK2,TRIB1
CD4 positive alpha beta T cell differentiation(8)	0.0340958	GADD45G,RIPK2,RSAD2,ZFP35
regulation of ossification(4)	0.0347529	AREG,CEBPD,CSF1,NOCT,RSAD2,ZBTB16
regulation of endopeptidase activity(7)	0.0350303	S100A8,S100A9,SERPINA10,SERPINA3F,SERPINA3I,SERPINA3N,SERPING1
stress activated MAPK cascade(6)	0.0374615	GADD45B,GADD45G,HSPH1,PTPN1,RIPK2,TRIB1
wound healing(5)	0.0400002	P2RY1,PLEK,REG3A,S100A9,SCNN1G,SERPINA10,SERPING1
regulation of p38MAPK cascade(7)	0.0414725	GADD45B,GADD45G,HSPH1
autophagy(3)	0.0417361	ALPK1,GABARAPL1,HIST1H3E,PI3K,RIPK2,S100A8,S100A9,STAT2
regulation of protein modification by small protein conjugation or removal(7)	0.0444898	BIRC2,BIRC3,RIPK2,SOX4,TRIB1,TSPYL5
cellular response to biotic stimulus(4)	0.0472753	FCGR4,GBP10,NFKBIA,NR1D1,RIPK2,TRIB1
CD4 positive alpha beta T cell activation(7)	0.0477036	GADD45G,RIPK2,RSAD2,ZFP35
T cell differentiation(6)	0.048755	GADD45G,RIPK2,RSAD2,SOX4,ZBTB16,ZFP35
p38MAPK cascade(7)	0.048755	GADD45B,GADD45G,HSPH1

KEGG: Pathway Name	P-value	Genes
Circadian rhythm	0.0024	ARNTL,CRY2,NPAS2,NR1D1
Osteoclast differentiation	0.0024	CSF1,FCGR4,IFNGR2,JUNB,NFKBIA,STAT2
Transcriptional misregulation in cancer	0.0024	BIRC3,CDKN1A,HIST1H3E,HIST1H3F,NFKBIZ,NUPR1,ZBTB16
TNF signaling pathway	0.0112	BIRC2,BIRC3,CSF1,JUNB,NFKBIA
Herpes simplex infection	0.0122	ARNTL,IFIT1,IFNGR2,NFKBIA,OAS2,STAT2
NOD-like receptor signaling pathway	0.0122	BIRC2,BIRC3,NFKBIA,RIPK2
Hepatitis C	0.0179	CDKN1A,IFIT1,NFKBIA,OAS2,STAT2
Influenza A	0.0392	IFNGR2,NFKBIA,OAS2,RSAD2,STAT2