

Target Gene	Forward Primer	Reverse Primer
<i>GFAP</i>	CTGGAGAGGAAGATTGAGTCGC	ACGTCAAGCTCCACATGGACCT
<i>S100-β</i>	GAAGAAATCCGAACTGAAGGAGC	TCCTGGAAGTCACATTCGCCGT
<i>AQP4</i>	GCCATCATTGGAGCAGGAATCC	ACTCAACCAGGAGACCATGACC
<i>ALDH1</i>	CGGGAAAAGCAATCTGAAGAGGG	GATGCGGCTATAACAACACTGGC
<i>Nestin</i>	TCAAGATGTCCCTCAGCCTGGA	AAGCTGAGGGGAAGTCTTGGAGC
<i>ELOVL1</i>	GTCTACAACCTTCTCACTGGTGGC	AAGTGCCTCAGGGCTGTTGGAA
<i>ELOVL3</i>	CTACCTGGTTCTCATCGCTGTG	GTAGCACAGTCCCCATAATGCC
<i>NDUFA6</i>	GACGGGATAAAGTCCGAGAAATG	CATGTGTCCGCTGCTTCCATAC
<i>SDHB</i>	GCAGTCCATAGAAGAGCGTGAG	TGTCTCCGTTCCACCAGTAGCT
<i>SDHC</i>	GGTTCAAACCGTCCTCTGTCTC	CGACATGCCAAAAAGAGAGACCC
<i>UQCRB</i>	TAAGAGGGCACTGGACCTGAAC	CATGATTACTTCTTTGCCATTCTT
<i>UQCRQ</i>	GCCTATCCGCACGTCTTCACTA	GGATCTCTCGAACTCTTCAGTCC
<i>COX4i-1</i>	TCGGTTTCACCGCGCTCGTTAT	TGTCCAGCATCCTCTTGGTCTG
<i>ATP5B</i>	TCATGCTGAGGCTCCAGAGTTC	ACAGTCTTGCCAACTCCAGCAC
<i>Citrate synthase</i>	CACAGGGTATCAGCCGAACCAA	CCAATACCGCTGCCTTCTCTGT
<i>NRF-1</i>	GGCAACAGTAGCCACATTGGCT	GTCGTCTGGATGGTCATCTCAC
<i>PGC1-α</i>	CCAAAGGATGCGCTCTCGTTCA	CGGTGTCTGTAGTGGCTTGACT
<i>GLUT-1</i>	TTGCAGGCTTCTCCAACCTGGAC	CAGAACCAGGAGCACAGTGAAG
<i>HK-I</i>	CTGCTGGTGAAAATCCGTAGTGG	GTCCAAGAAGTCAGAGATGCAGG
<i>HK-II</i>	GAGTTTGACCTGGATGTGGTTGC	CCTCCATGTAGCAGGCATTGCT
<i>GPI</i>	CTGGTAGACGGCAAGGATGTGA	TCCGTGATGGTCTTGCCCTGTGT
<i>ALDOC</i>	CATTCTGGCTGCGGATGAGTCT	CACACGGTCATCAGCACTGAAC
<i>GAPDH</i>	GTCTCCTCTGACTTCAACAGCG	ACCACCCTGTTGCTGTAGCCAA

<i>ENO-1</i>	AGTCAACCAGATTGGCTCCGTG	CACAACCAGGTCAGCGATGAAG
<i>PKM2</i>	ATGGCTGACACATTCTGGAGC	CCTTCAACGTCTCCACTGATCG
<i>LDHA</i>	GGATCTCCAACATGGCAGCCTT	AGACGGCTTTCTCCCTCTTGCT
<i>NOX1</i>	GGTTTTACCGCTCCCAGCAGAA	CTTCCATGCTGAAGCCACGCTT
<i>NOX2</i>	CTCTGAACTTGGAGACAGGCAAA	CACAGCGTGATGACAACTCCAG
<i>NOX3</i>	CCTGGAAACACGGATGAGTGAG	CCTCCCATAGAAGGTCTTCTGC
<i>NOX4</i>	GCCAGAGTATCACTACCTCCAC	CTCGGAGGTAAGCCAAGAGTGT
<i>IFN-γ</i>	GAGTGTGGAGACCATCAAGGAAG	TGCTTTGCGTTGGACATTCAAGTC
<i>IL-12α</i>	TGCCTTCACTCCCAAACC	CAATCTCTCAGAAGTGCAAGGG
<i>IL-12β</i>	GACATTCTGCGTTCAGGTCCAG	CATTTTTGCGGCAGATGACCGTG
<i>IL-1β</i>	CCACAGACCTTCCAGGAGAATG	GTGCAGTTCAGTGATCGTACAGG
<i>IL-6</i>	AGACAGCCACTCACCTCTTCAG	TTCTGCCAGTGCCTCTTTGCTG
<i>NOS-2</i>	GCTCTACACCTCCAATGTGACC	CTGCCGAGATTTGAGCCTCATG
<i>IL-23α</i>	GAGCCTTCTCTGCTCCCTGATA	GACTGAGGCTTGGAATCTGCTG
<i>IL-1R</i>	GTGCTTTGGTACAGGGATTCTTG	CACAGTCAGAGGTAGACCCTTC
<i>IL-1RA</i>	ATGGAGGGAAGATGTGCCTGTC	GTCCTGCTTTCTGTTCTCGCTC
<i>TNF-α</i>	CTCTTCTGCCTGCTGCACTTTG	ATGGGCTACAGGCTTGTCACTC
<i>IL-17A</i>	CGGACTGTGATGGTCAACCTGA	GCACTTTGCCTCCAGATCACA
<i>IL-22</i>	GTTCCAGCCTTATATGCAGGAGG	GCACATTCCTCTGGATATGCAGG
<i>ARG-1</i>	TCATCTGGGTGGATGCTCACAC	GAGAATCCTGGCACATCGGGAA
<i>FIZZ-1</i>	GCAAGAAGCTCTCGTGTGCTAG	AACATCCCACGAACCACAGCCA
<i>IL-4</i>	CCGTAACAGACATCTTTGCTGCC	GAGTGTCTTCTCATGGTGGCT
<i>IL-10</i>	TCTCCGAGATGCCTTCAGCAGA	TCAGACAAGGCTTGGCAACCCA
<i>MRC-1</i>	AGCCAACACCAGCTCCTCAAGA	CAAAACGCTCGCGCATTGTCCA
<i>BDNF</i>	CATCCGAGGACAAGGTGGCTTG	GCCGAACCTTCTGGTCCTCATC

<i>CNTF</i>	TCAGACCTGACTGCTCTTACGG	TTGGAGTCGCTCTGCCTCGGT
<i>GDNF</i>	CGCCGAAGACCGCTCCCTCG	ATCCATGACATCATCGAACTGATC
<i>NGF</i>	ACCCGCAACATTACTGTGGACC	GACCTCGAAGTCCAGATCCTGA
<i>NTF3</i>	CAAGCAGATGGTGGACGTTAAGG	TCGCAGCAGTTCGGTGTCCATT
<i>NTF4/5</i>	GCAAGGCTGATAACGCTGAGGA	CCTGGGCATCAGCGGTCAATG
<i>TLR-1</i>	CAGCGATGTGTTTCGGTTTTCCG	GATGGGCAAAGCATGTGGACCA
<i>TLR-2</i>	CTTCACTCAGGAGCAGCAAGCA	ACACCAGTGCTGTCCTGTGACA
<i>TLR-3</i>	GCGCTAAAAAGTGAAGAACTGGAT	GCTGGACATTGTTTCAGAAAGAGG
<i>TLR-4</i>	CCCTGAGGCATTTAGGCAGCTA	AGGTAGAGAGGTGGCTTAGGCT
<i>TLR-5</i>	CCTTACAGCGAACCTCATCCAC	TCCACTACAGGAGGAGAAGCGA
<i>TLR-6</i>	ACTGACCTTCCTGGATGTGGCA	TGACCTCATCTTCTGGCAGCTC
<i>TLR-7</i>	CTTTGGACCTCAGCCACAACCA	CGCAACTGGAAGGCATCTTGTAG
<i>TLR-8</i>	ACTCCAGCAGTTTCCTCGTCTC	AAAGCCAGAGGGTAGGTGGGAA
<i>TLR-9</i>	TGAGCCACAACCTGCATCTCGCA	CAGTCGTGGTAGCTCCGTGAAT
<i>TLR-10</i>	GGTTAAAAGACGTTTCATCTCCACG	CCTAGCATCCTGAGATAACCAGG
<i>mtDNA tRNA</i>	CACCCAAGAACAGGGTTTGT	TGGCCATGGGTATGTTGTTA
<i>Leu (UUR) gene</i>		
<i>nuclear gene β2-microglobulin</i>	TGCTGTCTCCATGTTTGATGTATCT	TCTCTGCTCCCCACCTCTAAGT

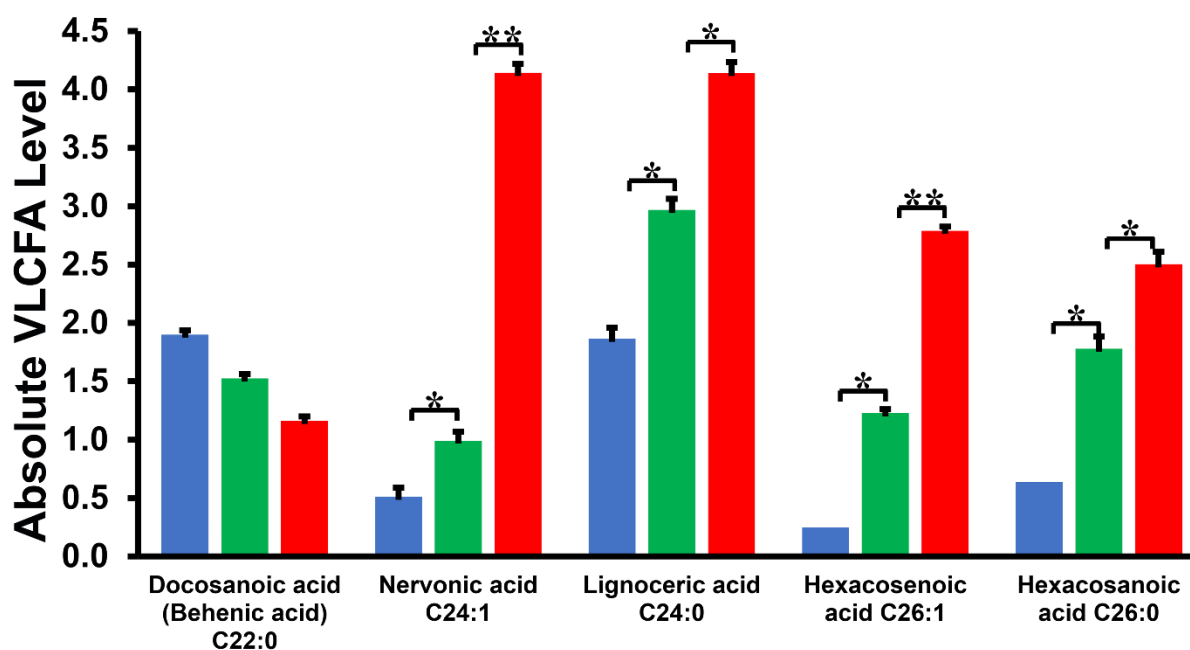
Table S1: List of primer sequences used for RT-qPCR

Antigen	Clone	Isotype	Supplier	Cat. No.	Dilution
ABCD1	EPR15929	Rabbit IgG	Abcam	ab197013	1:1000
ABCD2	Polyclonal	Rabbit IgG	Abcam	ab97383	1:1000
ABCD3	EPR5614	Rabbit IgG	Abcam	ab109448	1:1000
Oxphos	Ms mAb cocktail	Cocktail	Abcam	ab110413	6 ug/ml
GFAP	Polyclonal	Rabbit IgG	Abcam	ab7260	1:10000
p-Akt	D9E	Rabbit IgG	CST	4060S	1:1000
Total Akt	C67E7	Rabbit IgG	CST	4692S	1:1000
p-AMPK	40H9	Rabbit IgG	CST	2535L	1:1000
Total-AMPK	Polyclonal	Rabbit IgG	CST	2757S	1:1000
p-P44	D13.14.4E	Rabbit IgG	CST	4370S	1:1000
Total-p44	137F5	Rabbit IgG	CST	4695S	1:1000
p-SAP/JNK	81E11	Rabbit IgG	CST	4668S	1:1000
Total-SAP/JNK	Polyclonal	Rabbit IgG	CST	9252	1:1000
P-Stat sampler kit	Sampler kit	Rabbit IgG	CST	9914T	1:1000
Total-stat3	79D7	Rabbit IgG	CST	4904S	1:1000
S100-beta	E7C3A	Rabbit IgG	CST	90393S	1:1000
EAAT1	D20D5	Rabbit IgG	CST	5685S	1:1000
AQP4	D1F8E	Rabbit IgG	CST	59678S	1:1000
ALDH1L1	E7I2Q	Rabbit IgG	CST	85828S	1:1000
Glut-1	D3J3A	Rabbit IgG	CST	12939S	1:1000
Hexokinase-I	C35C4	Rabbit IgG	CST	2024S	1:1000
Hexokinase-II	C64G5	Rabbit IgG	CST	2867S	1:1000
DRP-1	C-5	Mouse IgG1	SantaCruz Biotechnology	Sc-271583	1:500

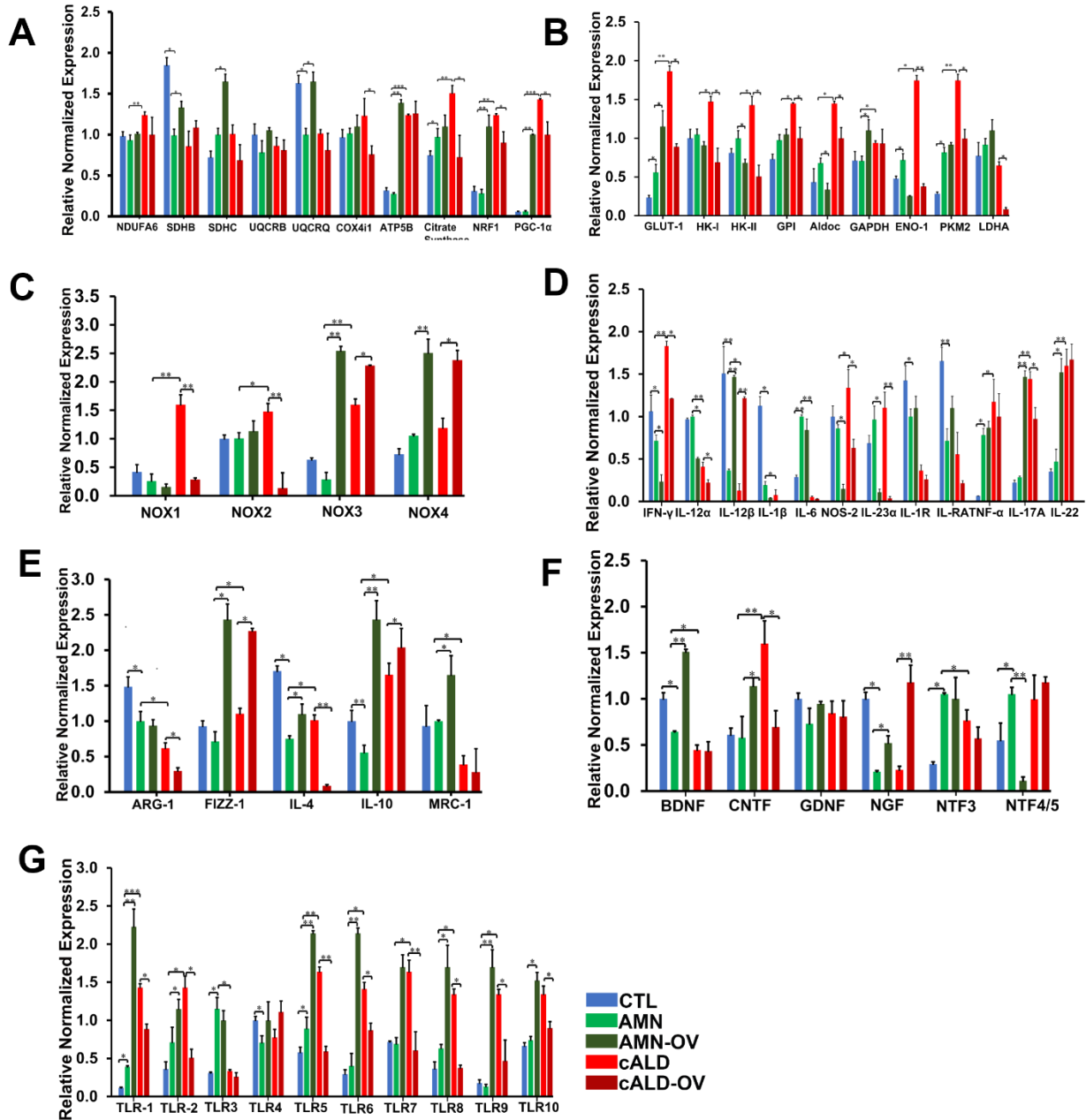
Mitofusin-1	D6E2S	Rabbit IgG	CST	14739	1:1000
PKM2	D78A4	Rabbit IgG	CST	4053S	1:1000
PGC1 α	3G6	Rabbit IgG	CST	2178S	1:1000
iNOS	E3W6B	Rabbit IgG	CST	20609S	1:1000
Beta-actin	D6A8	Rabbit IgG	CST	8457S	1:2000
HRP-anti-rabbit		Goat anti-rabbit IgG	CST	7074S	1:2000
HRP-anti-mouse		Horse anti-mouse IgG	CST	7076S	1:2000

CST, Cell Signaling Technology; Ig, immunoglobulin.

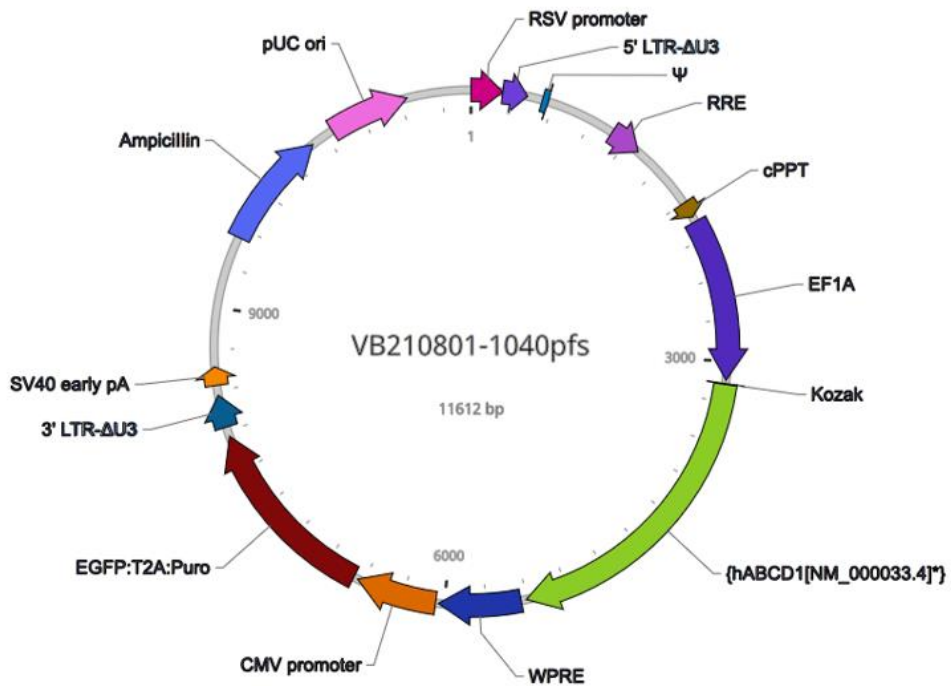
Table S2: List of antibodies used for Western Blotting.



Supplemental Figure S1: Quantification of absolute VLCFA levels C22:0, C24:1, C24:0, C26:1, and C26:0 in CTL, AMN, and cALD astrocytes.



Supplemental Figure S2: RT-qPCR quantification of (A) mitochondrial, (B) glycolytic genes and (C) NADPH Oxidases for CTL, AMN, AMN-OV, cALD, and cALD-OV astrocytes. RT-qPCR quantification of (D) proinflammatory, (E) anti-inflammatory and (F) neurotrophic factor genes in CTL, AMN, AMN-OV, cALD, and cALD-OV astrocytes. (G) RT-qPCR quantification of gene expression for TLR1-10) in CTL, AMN, AMN-OV, cALD, and cALD-OV astrocytes. The gene expression of the individual sample was assessed with fold change using the comparative $\Delta\Delta C_t$ method and normalized to *L-27*.



Vector Components

Supplemental Figure S3: Residue: 1-11612 (length: 11612)
 Vector Name: pLV[Exp]-EGFP:T2A:Puro-EF1A>hABCDI[NM_000033.4]
 Vector Type: Mammalian Gene Expression Lentiviral Vector
 Vector Size: 11612 bp
 Viral Genome Size: 8137 bp
 Promoter: EF1A
 ORF: hABCDI[NM_000033.4]
 Marker: EGFP:T2A:Puro