SUPPLEMENTARY INFORMATION

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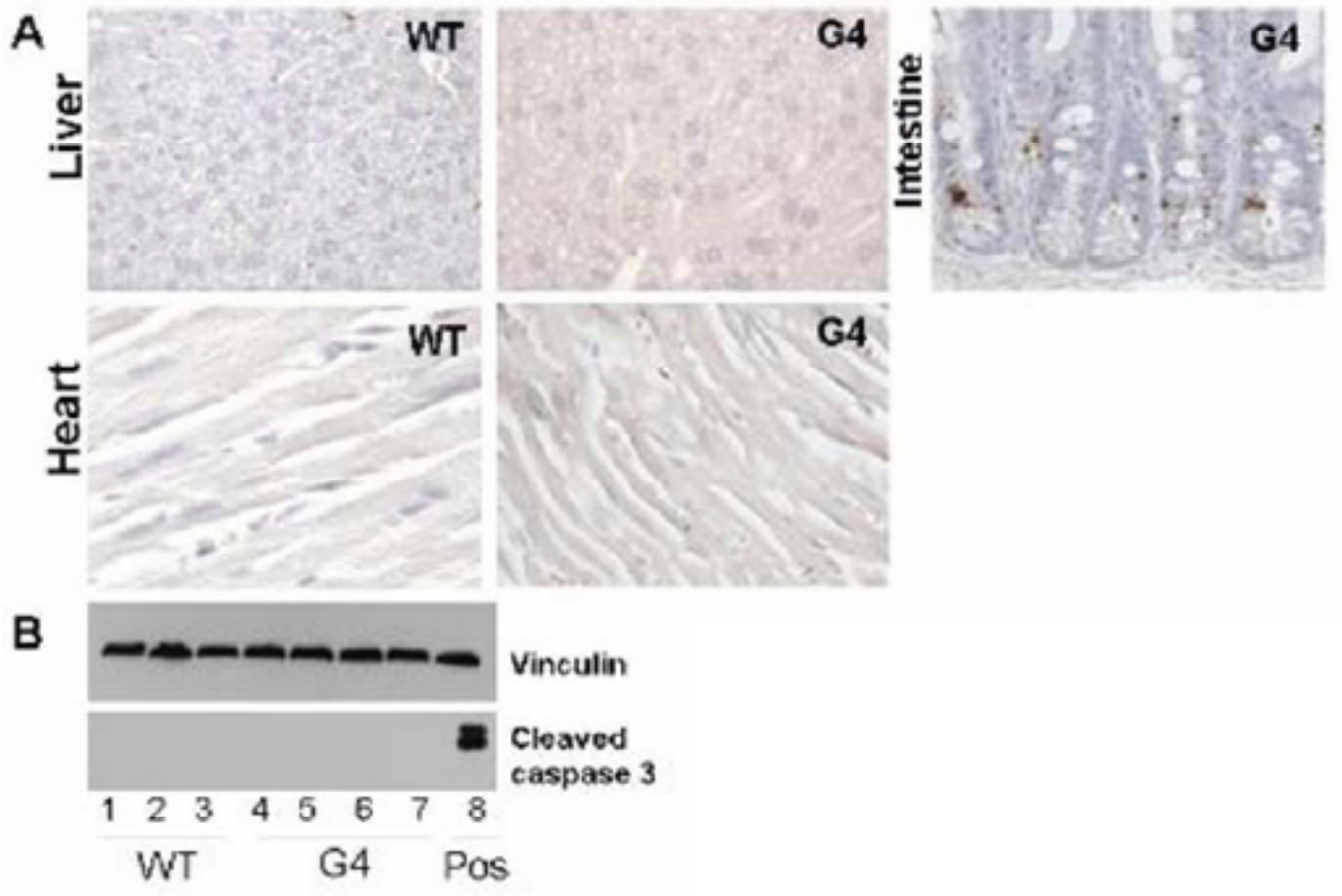
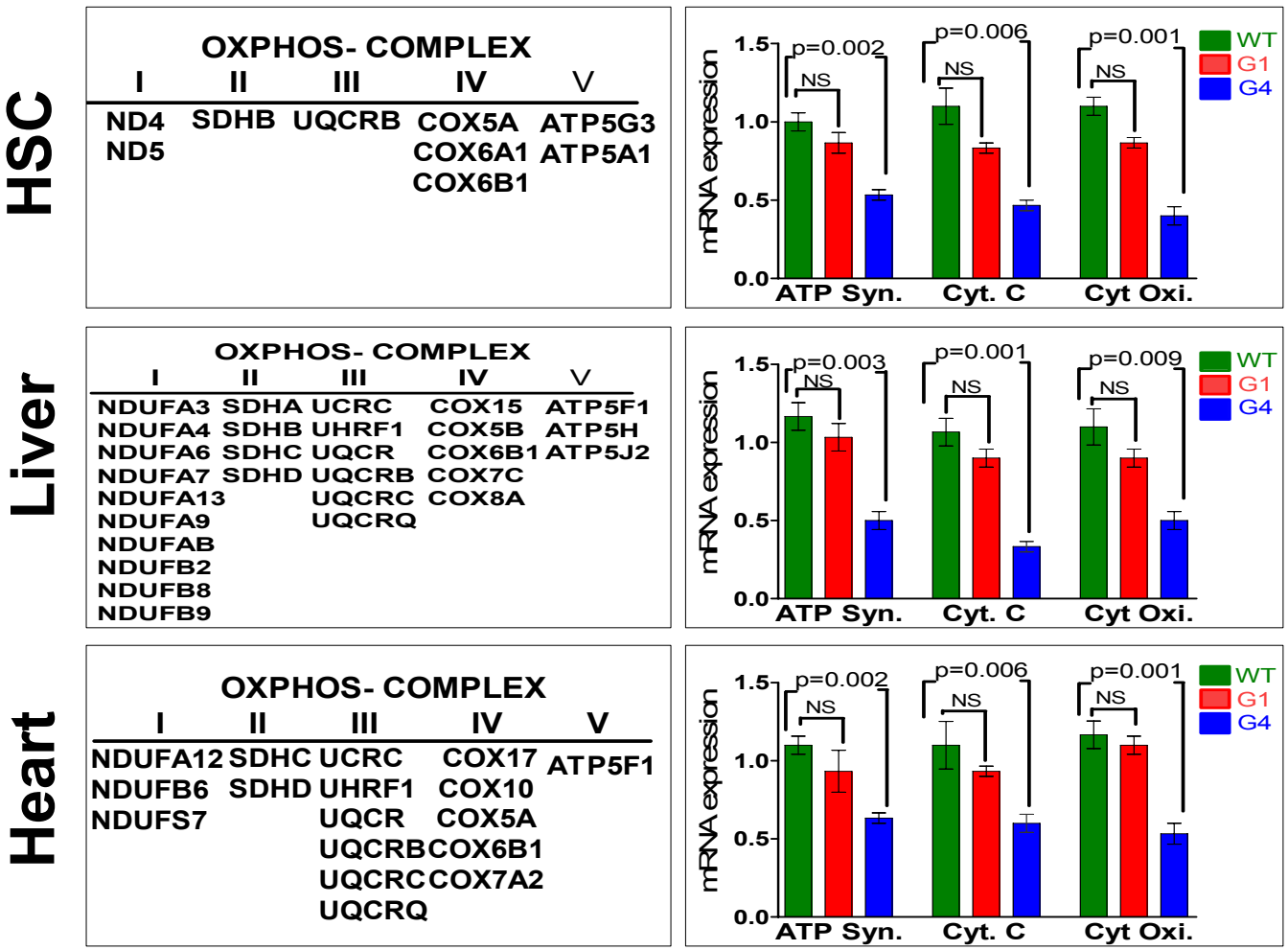
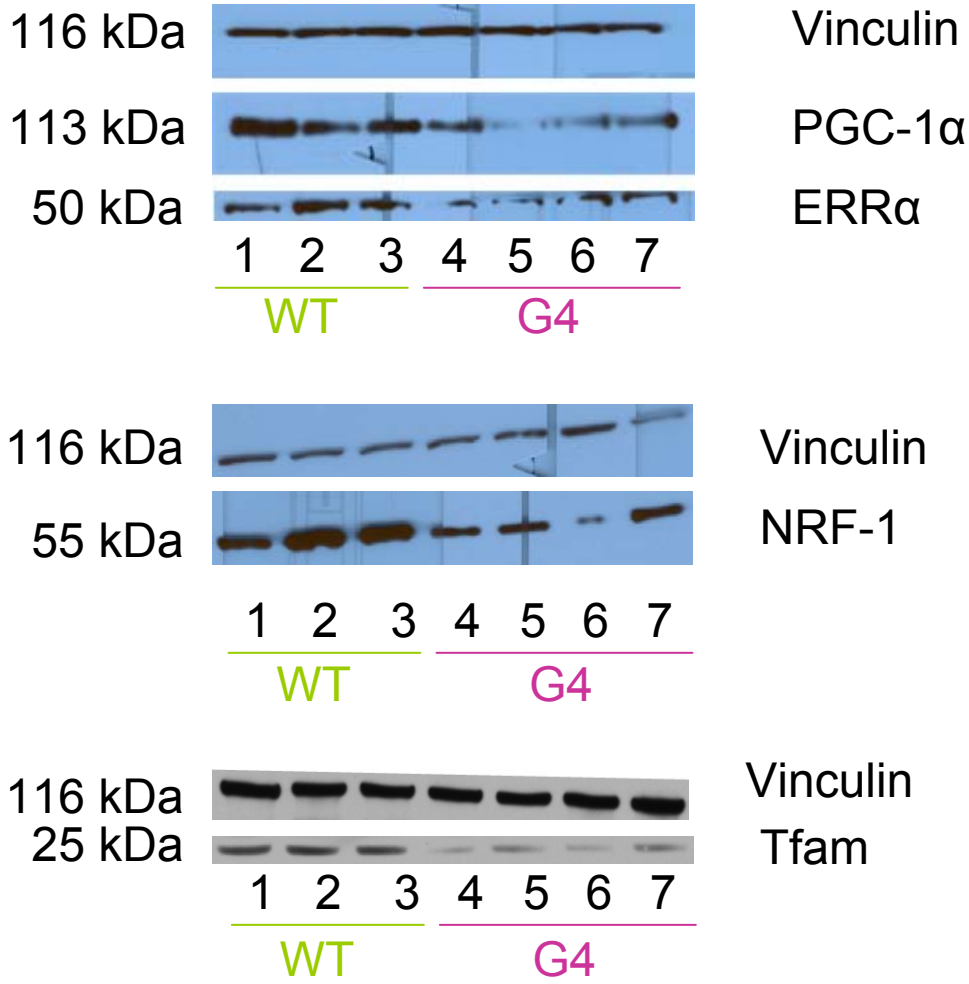


Supp. Fig. 1 G4 liver and heart tissues do not have significant Apoptosis (A) Tunel staining in liver and heart tissue from 12 week old WT and G4 mice shows no significant apoptosis; right positive control (G4 intestine). (B) Western blot in liver samples from 3 WT and 3 G4 mice shows no cleaved caspase signal indicative of apoptosis (right positive control).



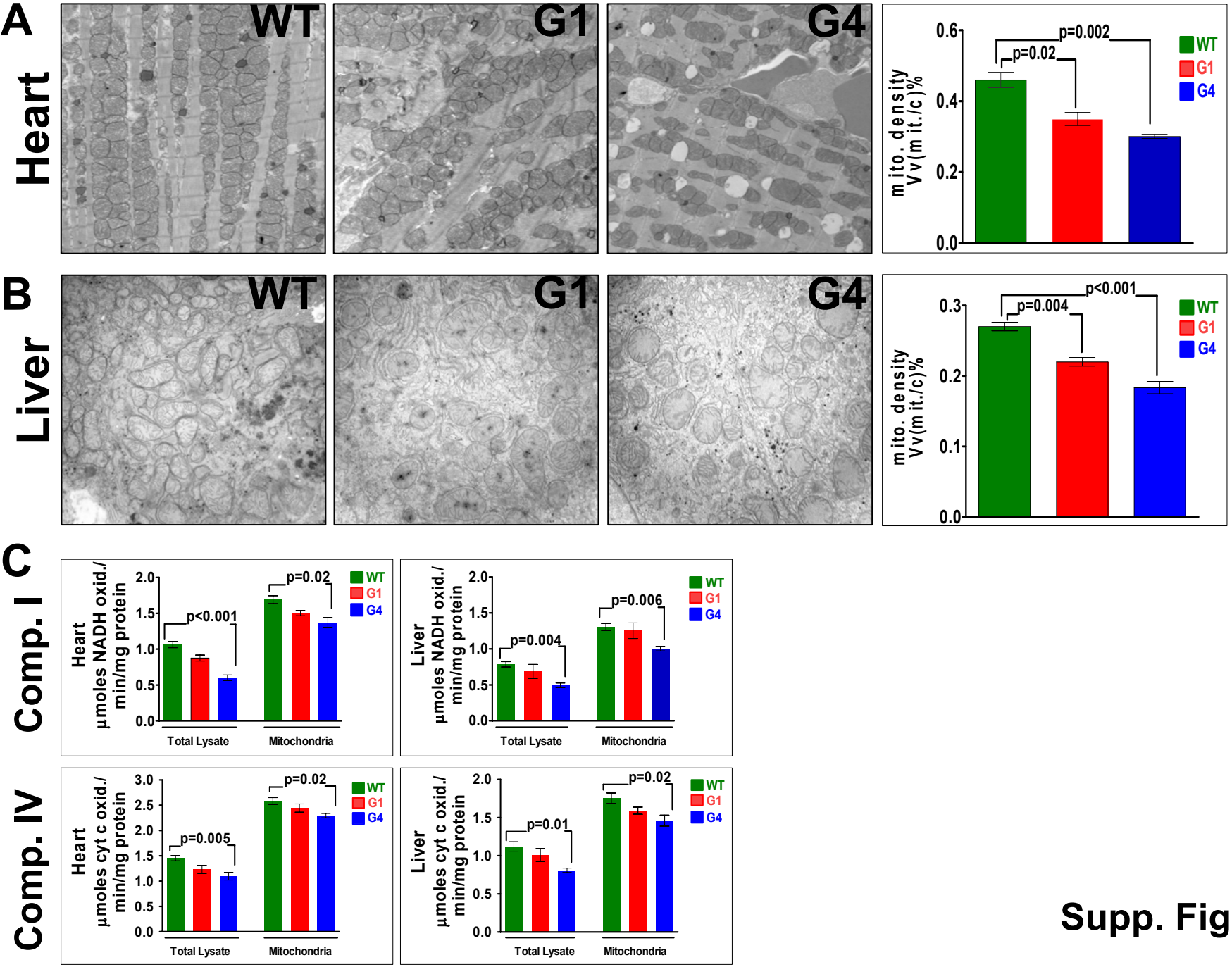
Supp. Fig. 2 G4 tissues show repression of OXPHOS genes

Microarray analysis based IPA list of repressed genes in the OXPHOS pathway include members of all 5 complexes (left), RT-qPCR (n=5-8 per group) validation of selected OXPHOS genes (ATP synthase, Cytochrome C and Cytochrome C oxidase) in WT, G1 and G4 HSC, liver and heart. T-test was used for statistical analysis and error bars represent s.e.m.



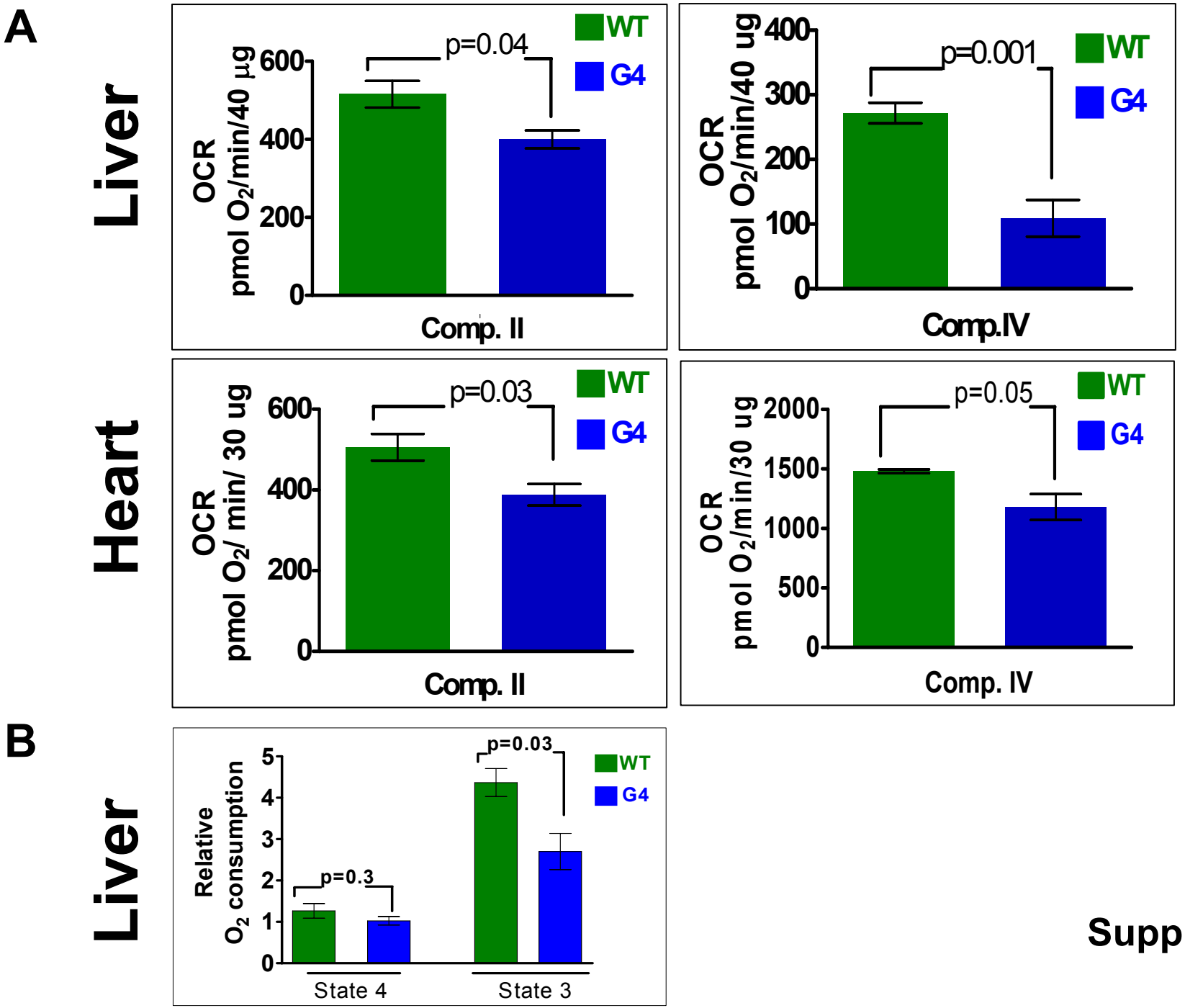
Supp. Fig. 3 PGC-1α and downstream targets are repressed at the protein level in G4 mice Western blot analysis of 3 WT (1-3) and 4 G4 (4-7) liver lysates for the indicated proteins.

Supp. Fig. 3


A
Heart
WT
G1
G4
mito. density
Vv(mit./c)%
p=0.002
p=0.02
WT
G1
G4
B
Liver
WT
G1
G4
mito. density
Vv(mit./c)%
p<0.001
p=0.004
WT
G1
G4
C
Comp. I
Heart
µmoles NADH oxid./
min/mg protein
p<0.001
p=0.02
Total Lysate
Mitochondria
WT
G1
G4
Liver
µmoles NADH oxid./
min/mg protein
p=0.004
p=0.006
Total Lysate
Mitochondria
WT
G1
G4
Comp. IV
Heart
µmoles cyt c oxid./
min/mg protein
p=0.005
p=0.02
Total Lysate
Mitochondria
WT
G1
G4
Liver
µmoles cyt c oxid./
min/mg protein
p=0.01
p=0.02
Total Lysate
Mitochondria
WT
G1
G4

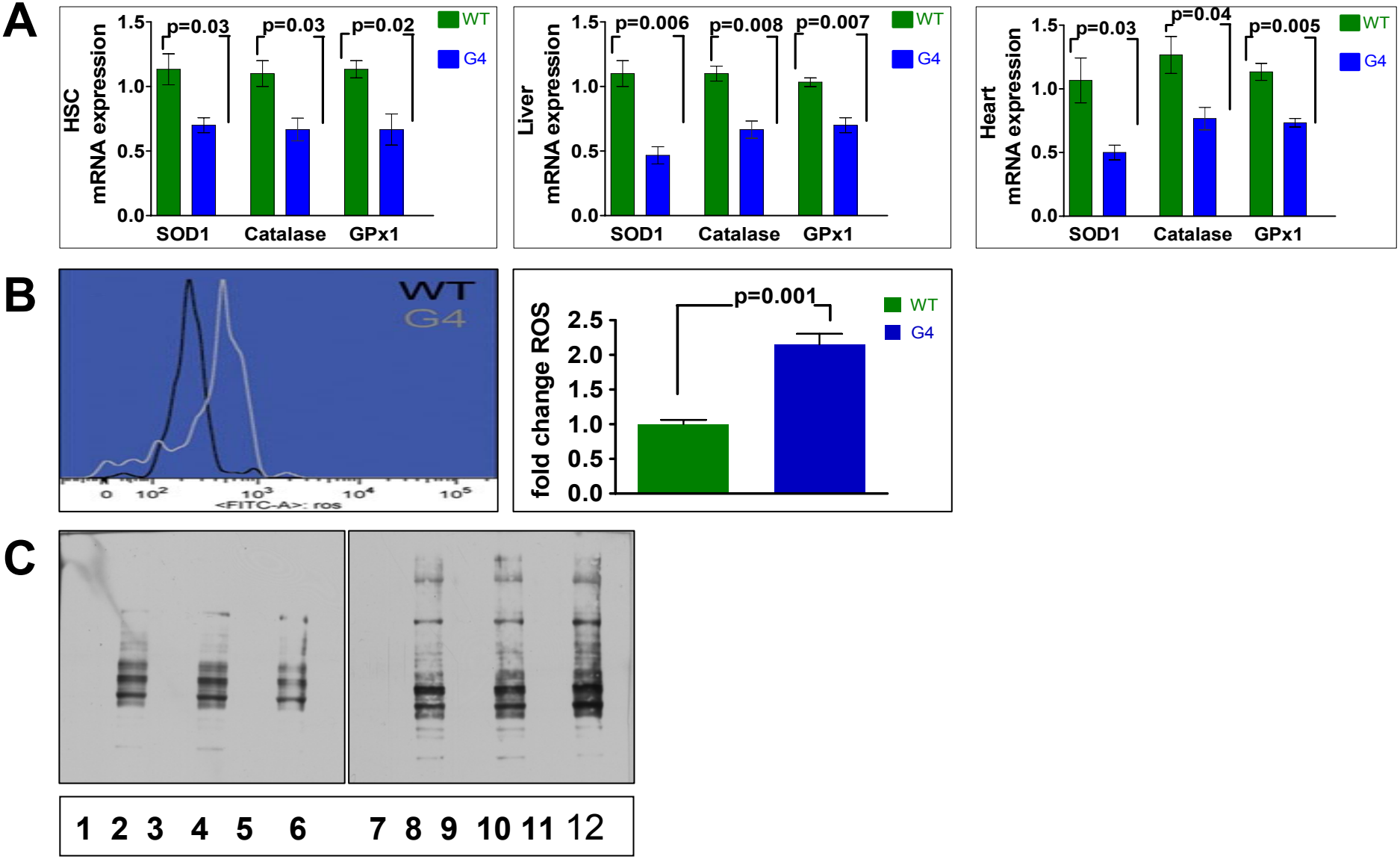
Supp. Fig. 4

Supp. Fig. 4 Telomere dysfunction is associated with reduced mitochondrial density and repressed complex activities in liver and heart tissue (4A) and (4B) Representative electron microscopy pictures used for stereotactical mitochondrial quantification of WT, G1, G4 heart (4A) and liver (4B) tissue (n=3). Mitochondrial volume density (Vv) was calculated by the point-method by two independent investigators from 10 different tissue sections (total of 30 tissue sections per genotype). (4C) Enzymatic activities of mitochondrial respiratory chain complexes I (top) and IV was determined spectrophotometrically in liver and heart lysates and isolated mitochondria from WT, G1 and G4 mice (n= 3- 5 per genotype, student's t-test, error bars represent s.e.m.).


A
Liver
OCR
pmol O2/min/40 µg
600
400
200
0
p=0.04
WT
G4
Comp. II
OCR
pmol O2/min/40 ug
400
300
200
100
0
p=0.001
WT
G4
Comp.IV
Heart
OCR
pmol O2/ min/ 30 ug
600
400
200
0
p=0.03
WT
G4
Comp. II
OCR
pmol O2/min/30 ug
2000
1500
1000
500
0
p=0.05
WT
G4
Comp. IV
B
Liver
Relative
O2 consumption
5
4
3
2
1
0
p=0.3
p=0.03
WT
G4
State 4
State 3

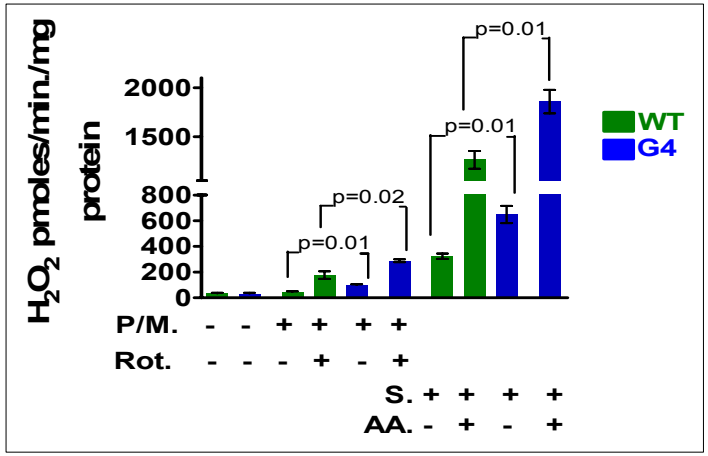
Supp. Fig. 5

Supp. Fig. 5 Complex II and complex IV driven respiration is impaired in G4 heart and liver mitochondria (A) Complex II driven respiration was measured in isolated mitochondria from liver (top left panel, 40 µg per well) or heart (bottom left, 30 µg per well) by inducing state III with 5 mM succinate, 2 µM rotenone (complex I inhibitor) and 250 µM ADP. Complex IV driven respiration was measured in isolated mitochondria from liver (top right panel, 40 µg) or in isolated mitochondria from heart (bottom right panel, 30 µg) by electron delivery to complex IV through addition of 10 mM Ascorbate, 100 µM TMPD (and after inhibition of complex III by incubating mitochondria with antimycin A 4 µM). Reported are oxygen consumption rates (OCR, pmols O2 per minute per 30 or 40 µg protein) of isolated mitochondria from 4-5 WT and 4-5 G4 mice with 3-4 replicates per mouse). The statistical significance was calculated by unpaired t-test (error bars represent s.e.m.). B) Relative O_2 consumption measured by Clark electrode in isolated liver mitochondria from W, G1 and G4 mice in state 3 and state 4 . State 3 respiration was measured with 5 mM glutamate and 5 mM malate in the presence of 2.5 mM ADP. State 4 respiration was measured following ADP consumption (n=3 per genotype). Respiration due to proton leak was determined using 0.5 µM oligomycin. This was subtracted from non-mitochondrial respiration using 20 µM myxothiazol. No difference in proton leak was detected.

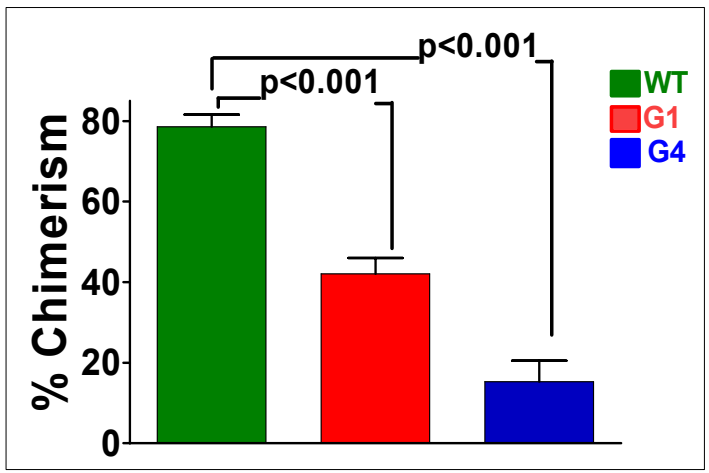

A
HSC mRNA expression
1.5
1.0
0.5
0.0
p=0.03
p=0.03
p=0.02
WT
G4
SOD1
Catalase
GPx1
Liver mRNA expression
p=0.006
p=0.008
p=0.007
Heart mRNA expression
p=0.03
p=0.04
p=0.005
B
WT
G4
0
10^2
10^3
10^4
10^5
<FITC-A>: ros
fold change ROS
2.5
2.0
1.5
1.0
0.5
0.0
p=0.001
C
1 2 3 4 5 6 7 8 9 10 11 12

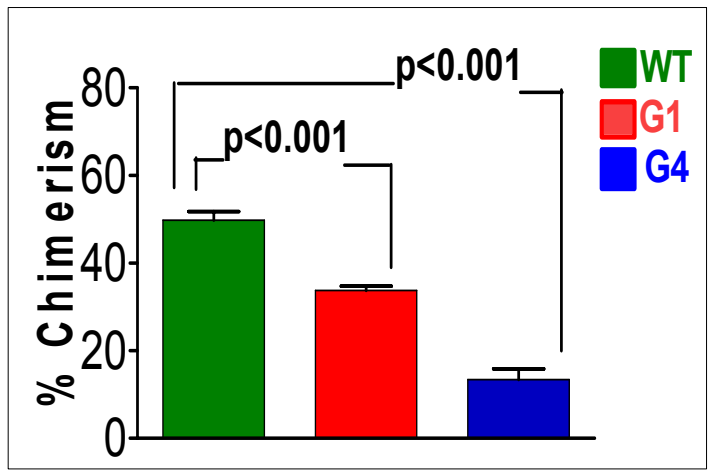
Supp. Fig. 6

D


H2O2 pmoles/min./mg protein
2000
1500
800
600
400
200
0
p=0.01
p=0.02
p=0.01
p=0.01
WT
G4
P/M. - - + + + +
Rot. - - - + - +
S. + + + +
AA. - + - +

E

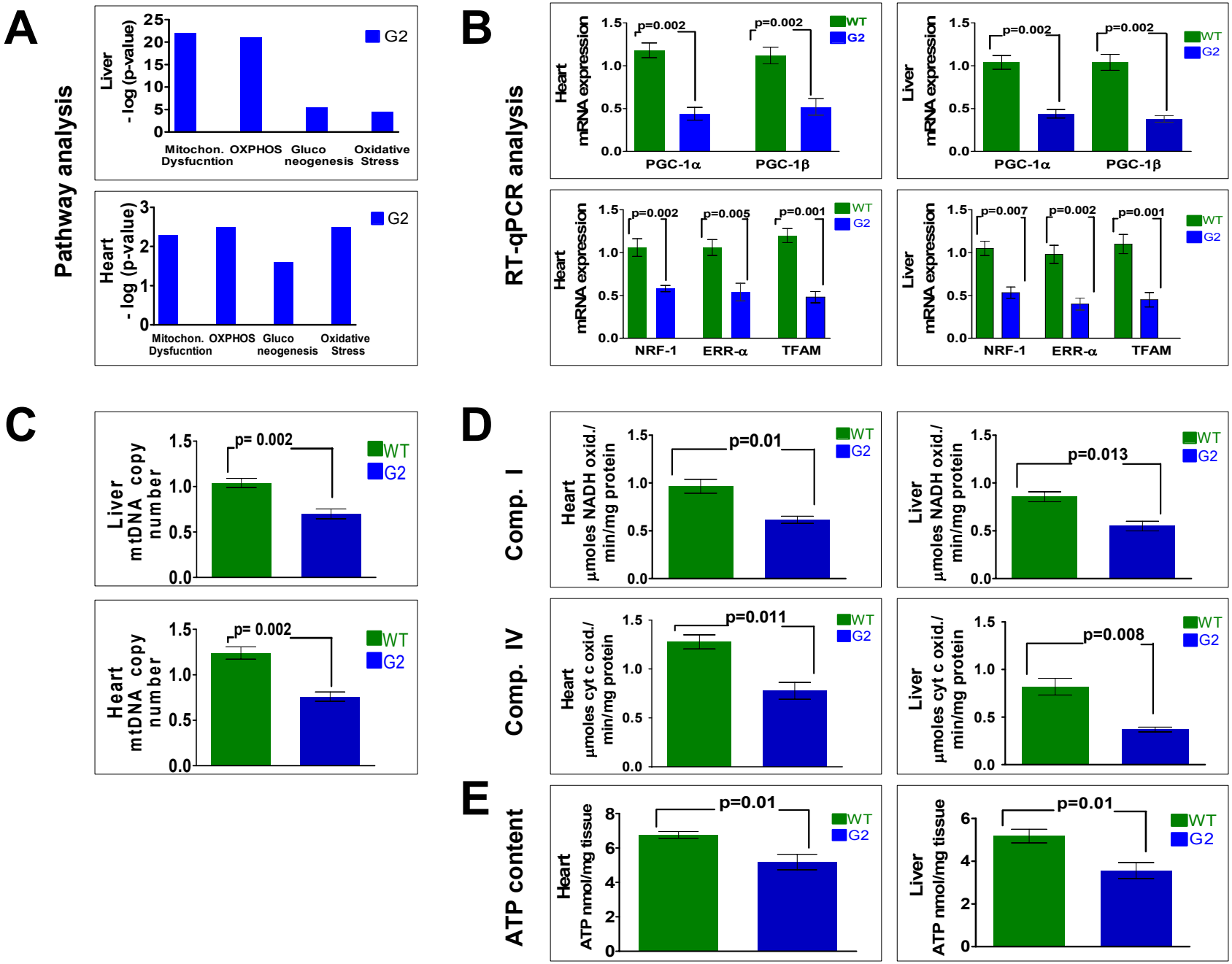

% Chimerism
80
60
40
20
0
p<0.001
p<0.001
WT
G1
G4


% Chimerism
80
60
40
20
0
p<0.001
p<0.001
WT
G1
G4

Supp. Fig. 6

Supp. Fig. 6 G4 mice have decreased ROS defense genes and increased mitochondrial ROS synthesis

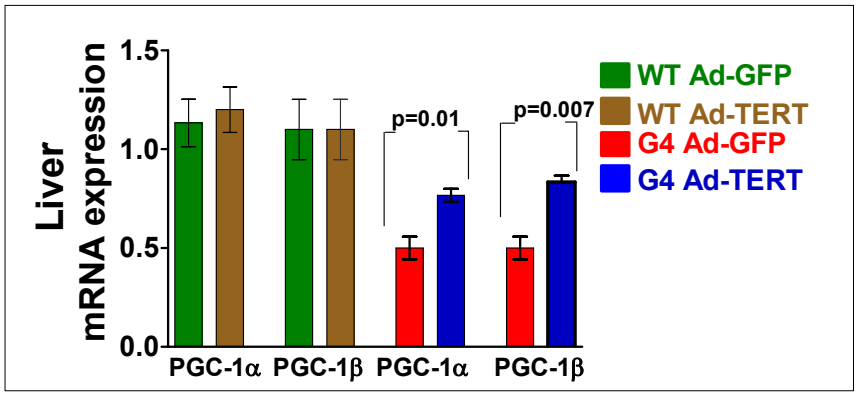
(A) Expression of anti-oxidants in WT and G4 HSC, liver and heart by RT-qPCR (n=3); (B) ROS levels in WT and G4 HSC determined by CM-H_2DFCDA staining and FACS analysis, ROS Histogram (left) and fold change (right), (n=5);(C) Levels of carbonylated proteins in liver lysates from WT (1-6;1,3 and 5 are negative controls) and G4 mice (7-12;7,9,11 are negative controls for each sample (n=3); (D) H_2O_2 synthesis rate in isolated heart mitochondria (30µg per well) in the presence of complex I substrates pyruvate/malate (5mM each) and succinate (5mM). The rates of H_2O_2 increases significantly in the presence of complex I (rotenone, 0.5µM) or complex III (antimycin A, 0.5µM) inhibitors. Note the increased rates of H_2O_2 production in G4 heart mitochondria (n=3 per group and duplicates per samples were analyzed) .The synthesis rate is reported as H_2O_2 pmol/min./mg protein;(E) Newborn WT, G1 and G4 mice were treated with NAC for 8 weeks prior to transplantation. Whole bone marrow (BM) (right panel) or isolated HSC (left panel) were used for competitive transplantation experiments. Note that there is no rescue of HSC failure in G1 or G4 mice with NAC.

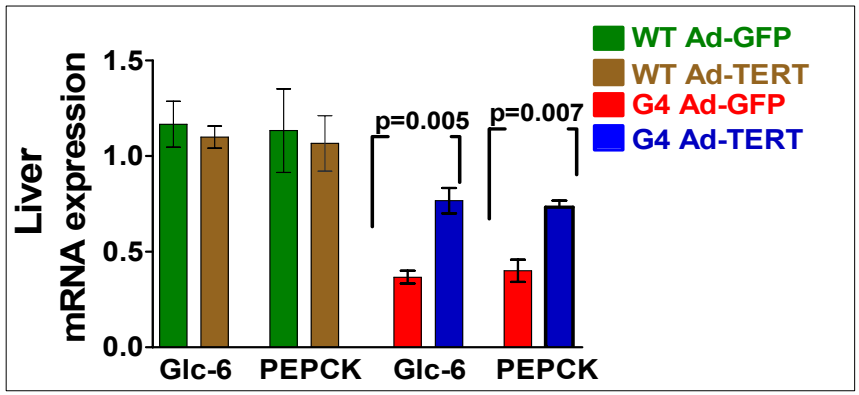

A
Pathway analysis
Liver
- log (p-value)
G2
Mitochon. Dysfucntion
OXPHOS
Gluco neogenesis
Oxidative Stress
Heart
- log (p-value)
G2
Mitochon. Dysfucntion
OXPHOS
Gluco neogenesis
Oxidative Stress
B
RT-qPCR analysis
Heart mRNA expression
p=0.002
p=0.002
WT
G2
PGC-1α
PGC-1β
Liver mRNA expression
p=0.002
p=0.002
WT
G2
PGC-1α
PGC-1β
Heart mRNA expression
p=0.002
p=0.005
p=0.001
WT
G2
NRF-1
ERR-α
TFAM
Liver mRNA expression
p=0.007
p=0.002
p=0.001
WT
G2
NRF-1
ERR-α
TFAM
C
Liver mtDNA copy number
p= 0.002
WT
G2
Heart mtDNA copy number
p= 0.002
WT
G2
D
Comp. I
Heart µmoles NADH oxid./ min/mg protein
p=0.01
WT
G2
Liver µmoles NADH oxid./ min/mg protein
p=0.013
WT
G2
Comp. IV
Heart µmoles cyt c oxid./ min/mg protein
p=0.011
WT
G2
Liver µmoles cyt c oxid./ min/mg protein
p=0.008
WT
G2
E
ATP content
Heart ATP nmol/mg tissue
p=0.01
WT
G2
Liver ATP nmol/mg tissue
p=0.01
WT
G2

Supp. Fig. 7

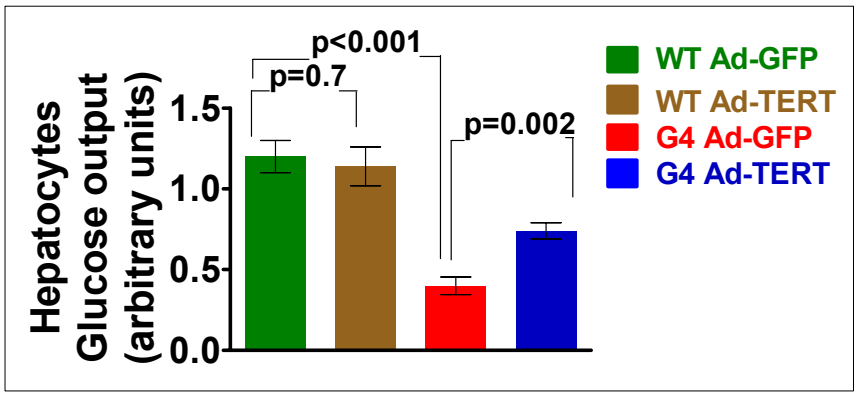
Supp. Fig. 7 Terc knock-out mice have similar mitochondrial related alterations as Tert knock-out mice. (A) IPA analysis : RNA derived from age and sex matched WT or G2 mTerc knock out mice with dysfunctional telomeres was analyzed by SAM in liver followed by IPA analysis. Shown are the canonical pathways significantly repressed in G2 liver and heart tissues as compared to their wild type controls. Statistical analysis was performed with IPA and expressed as – (p-log), 5 livers and 5 hearts per genotype were analyzed.(B) RT-qPCR analysis of PGC-1α, PGC-1β and transcriptional targets NRF-1, ERRα, Tfam in WT and G2 mTerc-/- livers and hearts (n=5). ΔΔCT method was used to analyze RT-qPCR data. (C) Relative mitochondrial DNA copy number in heart and liver of WT and G2 mTerc knock-out mice was determined by qPCR using primers specific for mitochondrial DNA (COX I) and normalized to genomic DNA content (β-Globin). For heart and liver tissues 5 age and sex matched mice per group were analyzed in triplicates. ΔΔCT method was used to analyze qPCR data. (D) Enzymatic activities of mitochondrial respiratory chain complexes I and IV was determined spectrophotometrically in liver and heart lysates from WT and G2 mice (n= 5 per genotype). (E) ATP content in freshly isolated liver and heart tissues of WT and G2 mice was determined by HPLC (n=5). Statistical significance for all experiments was determined by unpaired t-test from triplicate readings. Results are presented as mean ± s.e.m.

A

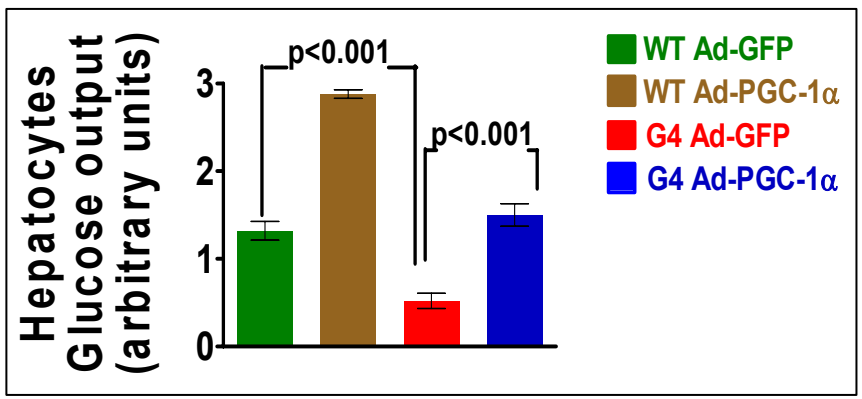




B

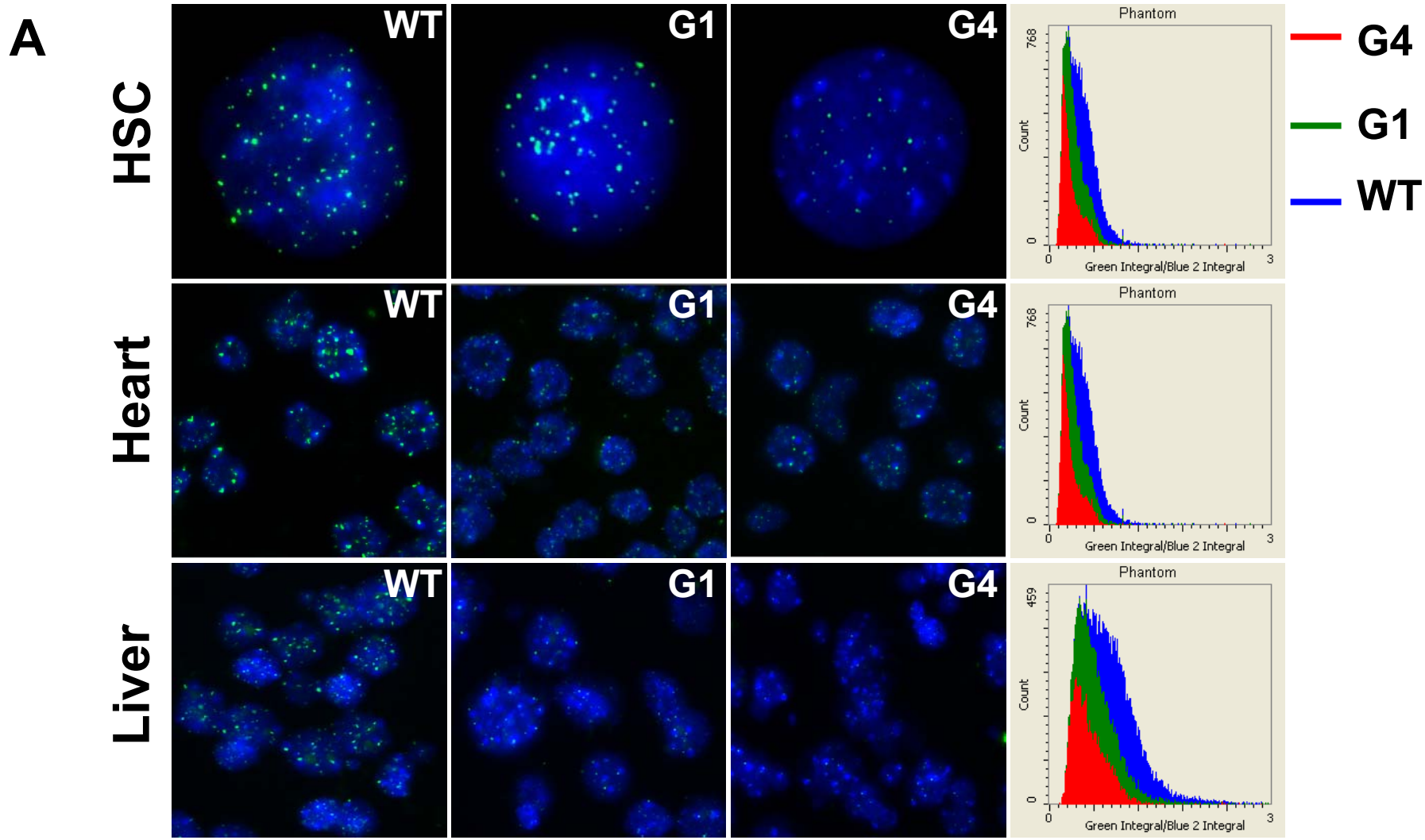


C

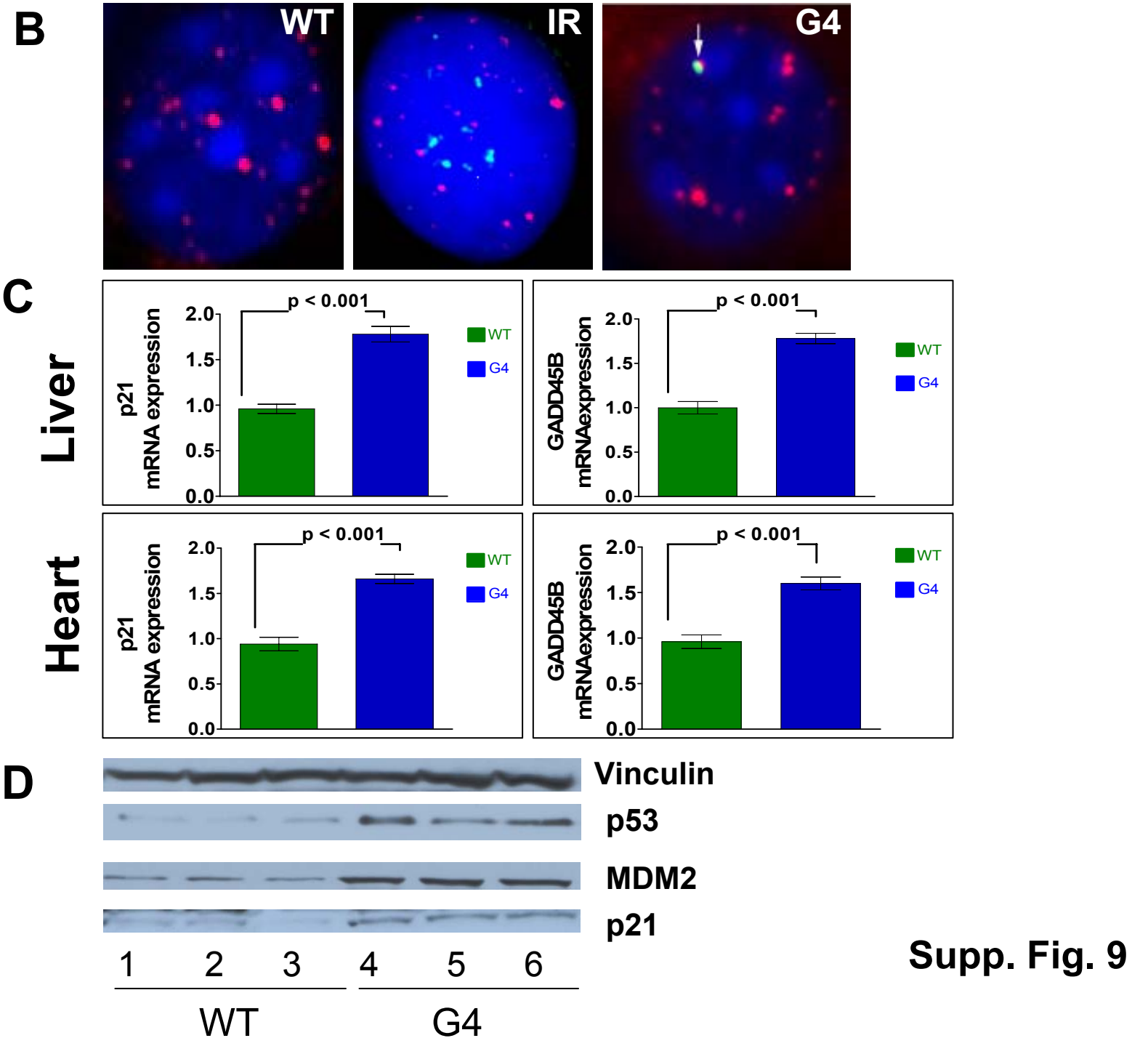


Supp. Fig. 8

Supp. Fig. 8 Telomerase or PGC-1α overexpression leads to increased expression of gluconeogenic genes and rescues the gluconeogenesis defect in G4 cultured hepatocytes (A) Expression levels of PGC-1α and PGC-1β, NRF-1, PPARα, Glucose-6 phosphatase (Glc-6) and Phosphoenolpyruvate carboxykinase (Pepck) in liver of WT and G4 mice after Ad-GFP or Ad-TERT infection (n=5 per group). (B) Cultured hepatocytes were infected with Ad-GFP and Ad-TERT and glucose levels were determined 48 hrs later after normalization to protein content in the supernatant (n=5) (C) Cultured hepatocytes were infected with Ad-GFP and Ad-PGC-1α (MOI 30) and glucose levels were determined 48 hrs later after normalization to protein content in the supernatant. Student t-test was used to calculate the statistical differences in all assays described and error bars represent s.e.m.


A
HSC
Heart
Liver
WT
G1
G4
Phantom
Count
Green Integral/Blue 2 Integral
768
459
0
3
G4
G1
WT

Supp. Fig. 9

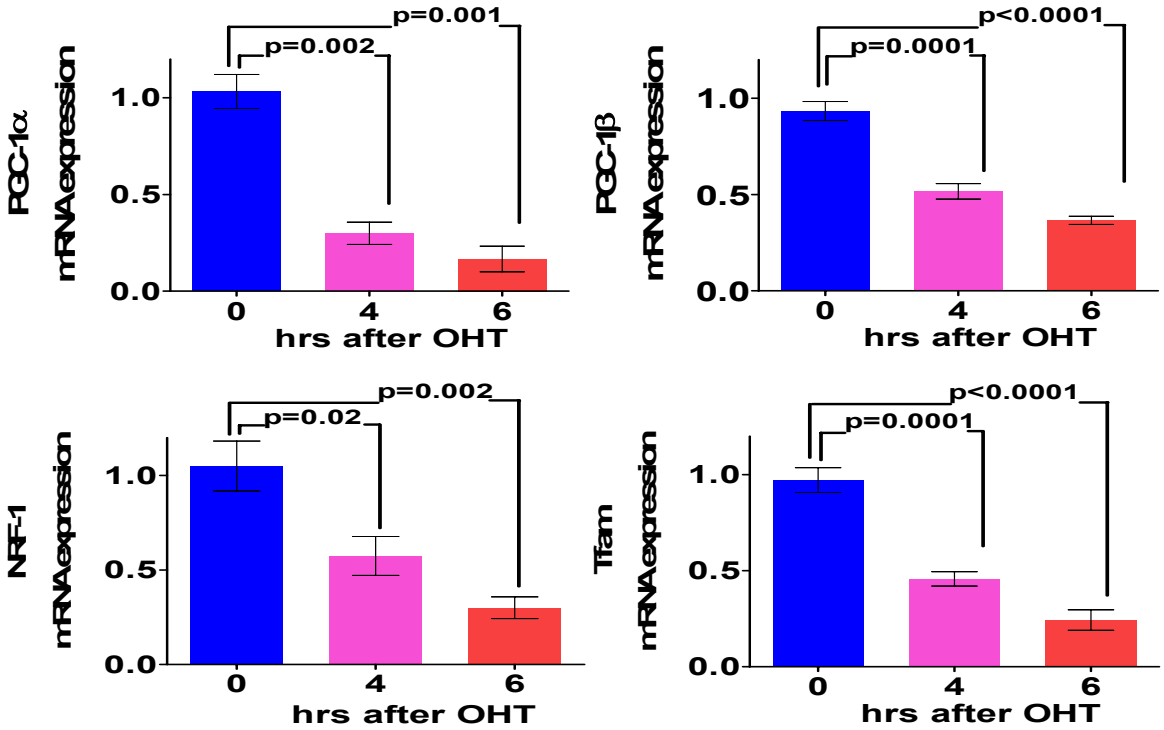

B
WT
IR
G4
C
Liver
Heart
p21 mRNA expression
GADD45B mRNAexpression
p < 0.001
2.0
1.5
1.0
0.5
0.0
WT
G4
D
Vinculin
p53
MDM2
p21
1 2 3 4 5 6
WT
G4

Supp. Fig. 9

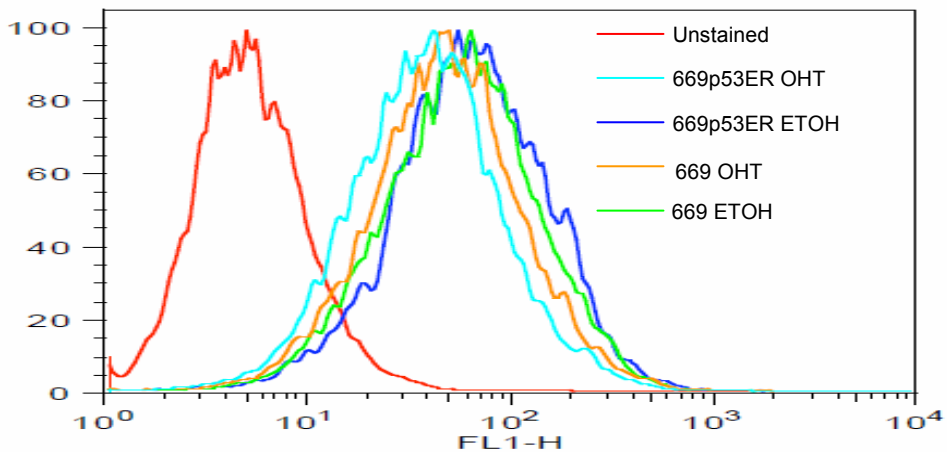
Supp. Fig. 9 Telomere shortening in tissues is associated with DNA damage response and activation of p53 pathway

(A) Analysis of telomere-FISH in FFPE tissue by laser scanning cytometry. DAPI normalized background corrected cell-centric telomere fluorescence frequency distribution plots for WT (blue), G1 (green), G4 (red) HSCs, heart and liver. Approximately 1500 cells were analyzed per sample. Note the decline in telomere length in G1 and much more pronounced in G4. In all cases, the difference between WT and G4 is significant ($p<0.001$). (B) Representative colocalization of 53BP-1 (arrow, green) with telomeres (red) in G4 liver (right) and absence thereof in WT (left) and irradiated mouse liver (IR,middle). (C) RT-qPCR analysis of p53 targets (p21, GADD45B) in hearts and livers from 5 WT and G4 mice ;
(D) Western blot analysis of p53, p21 and MDM2 in liver lysates from 3 WT(1-3) and G4 (4-6) mice.

A

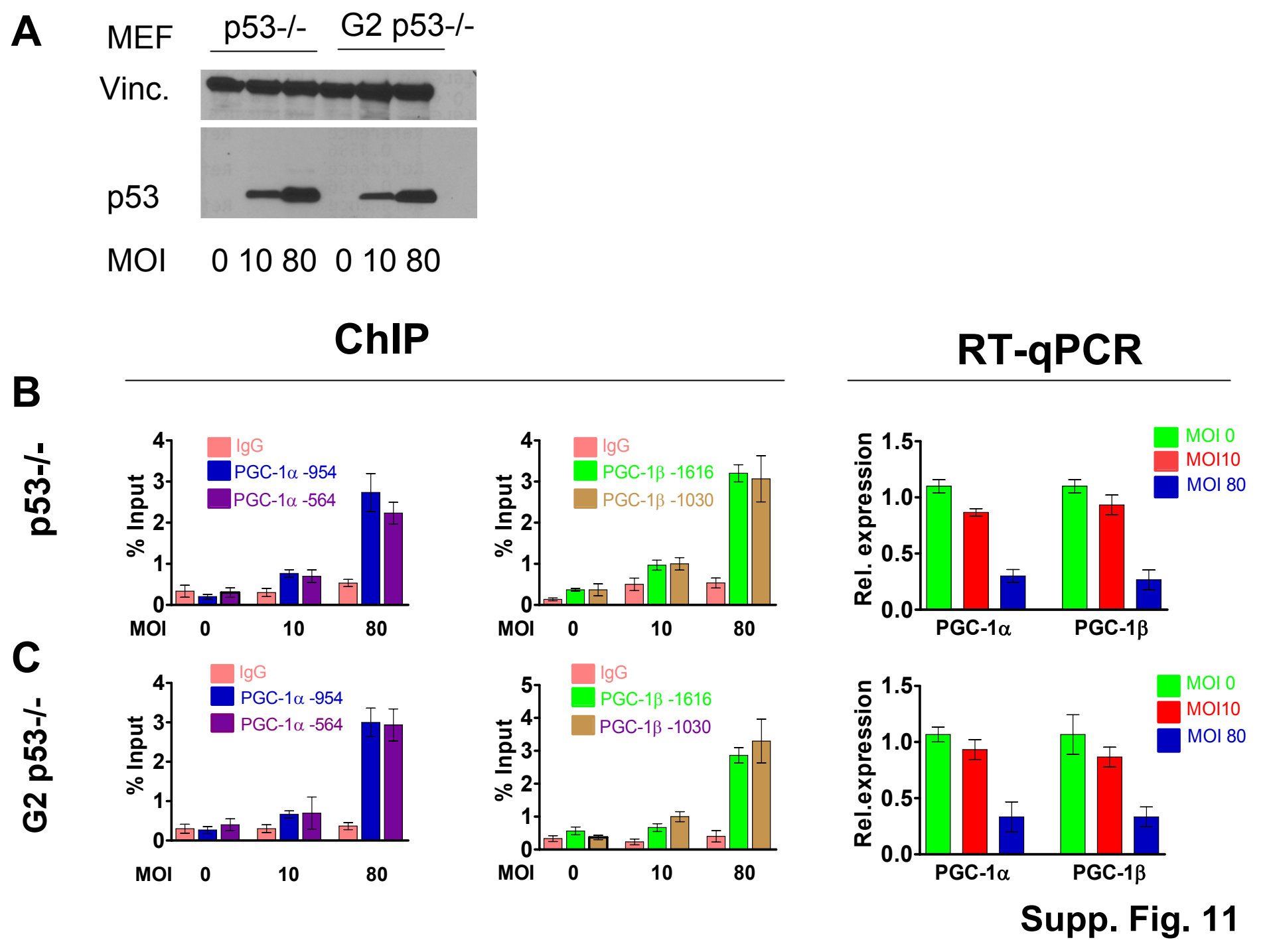


B



Supp. Fig. 10

Supp. Fig. 10 Activated p53 in G2 mTerc -/-, p53 -/- mouse embryonic fibroblasts represses PGC-1α, PGC-1β, NRF-1 and Tfam expression and leads to decreased mitochondrial biogenesis (A) RT-qPCR analysis of G2 mTerc -/-, p53 -/- mouse embryonic fibroblasts transfected with a p53-ER vector construct shows decreased PGC-1α and PGC-1β expression and concurrent Nrf-1 and Tfam repression at 4 and 6 hours post induction with 4-Hydroxytamoxifen (OHT); (B) Decreased mitochondrial mass 48 hours after p53 activation. G2 mTerc -/-, p53 -/- mouse embryonic fibroblasts ("669") transfected with p53-ER vector construct ("669p53ER") show decreased mitochondrial mass 48 hrs after activation of p53 by 4-Hydroxytamoxifen (669p53ER OHT) compared to either ethanol control (669p53ER ETOH) or non-transfected 669 cells treated with OHT or ethanol (669 OHT; 669 ETOH) .


A
MEF
p53-/-
G2 p53-/-
Vinc.
p53
MOI 0 10 80 0 10 80
ChIP
RT-qPCR
B
p53-/-
C
G2 p53-/-
IgG
PGC-1α -954
PGC-1α -564
PGC-1β -1616
PGC-1β -1030
% Input
MOI 0 10 80
Rel. expression
Rel.expression
MOI 0
MOI10
MOI 80
PGC-1α
PGC-1β

Supp. Fig. 11

Supp. Fig. 11 Increasing dosage of p53 leads to PGC promoter occupancy and repression of PGCs independent of telomere length

(A) Western blot analysis of p53 -/- (left) and G2 p53 -/- MEFs transduced with Ad-p53 (MOI 0,10 and 80)

(B) ChIP showing the binding of exogenous p53 on the promoters of PGC-1α and PGC-1β at two different sites respectively with increasing p53 levels in p53-/- MEFs . Results are expressed as % Input after qPCR analysis. Increased promoter occupancy is associated with PGC repression as determined by qPCR analysis (right).

(C) ChIP showing the binding of exogenous p53 on the promoters of PGC-1α and PGC-1β at two different sites after transduction with Ad-p53 at different MOI. Fixed and shared DNA from G2 mTerc p53 -/- MEFs was immunoprecipitated with antibodies against p53 and control IgG. Note similar occupancy of promoters as in p53-/- MEFs after qPCR analysis and similar repression of transcription.

Material and Methods

Mice: mTert deficient mice were generated as previously reported[46]. All mice used were backcrossed for 10 generations onto a C57/BL6 background (CD45.2). Tert deficient mice with decreasing telomere length were generated by continuous interbreeding of successive generations of Tert deficient (G1-G4) mice. Mice deficient for *mTerc* and *mTerc/p53* have been described and extensively characterized[47,48]. For all studies involving *mTert* and *mTerc/p53,* age and sex matched mice were used. Mice were maintained on standard rodent chow with 12-hlight-dark cycles. For transplant experiments, recipients were CD45.1 congenic mice, purchased from either Taconic or Jackson laboratories. All animal experiments were performed according to procedures approved by the Institutional Animal Care and Use Committee at the Dana-Farber Cancer Institute.

Flow cytometry and gene expression profile analysis:

BD FACS Aria Cell flow cytometers were used for sorting and analysis. Conjugated antibodies and matched isotype controls were obtained from PharMingen or eBioscience. For transcriptome analysis, enriched HSCs from bone marrow cells of nine age (12-16 weeks, duplicate samples per group, total of 18 mice per group) and sex matched WT, G1 or G4 mice were pooled and hematopoietic stem cells (HSC, defined as ckit+, Sca1+, Lin- [KSL], CD34low/- bone marrow cells were isolated by FACS analysis as described[49]. DAPI negative KSL CD34low/negative cells were sorted into Eppendorf tubes and total RNA was isolated using the Pico Pure Isolation Kit (Arcuturus) according to the manufacturer's instructions.

Total RNA was reverse-transcribed and amplified with the WT-Ovation™ Pico RNA Amplification System at the Harvard Medical School and Partners HealthCare System Center for Genetics and Genomics (HPCGG).

Prior to hybridization the quality of amplified RNA was checked. In accordance with manufacturer protocols, 15µg of fragmented cRNA was hybridized on GeneChip Mouse Genome 430 2.0 Arrays (Affymetrix). The oligonucleotide arrays were scanned using the Affymetrix GeneChip Scanner 3000 7G and images acquired using Microarray Suite (MAS) 5.0 software. Affymetrix raw data (CEL files) were pre-processed using a robust multi-array analysis (RMA) from the Affymetrix package of Bioconductor[50,51]. The background corrected and normalized intensity data was then analyzed using dChip to identify differentially expressed genes using an arbitrary fold-change threshold of 1.5. The significant gene lists from G1 and G4 data sets were fed into Ingenuity pathway analysis (Ingenuity Systems) to determine overrepresentation of canonical pathways and significance. P-values were calculated by Ingenuity and presented as –log (p-value). A –log (p-value) of 2 or 3 equals a p value of 0.01 and 0.001 respectively. For transcriptome analysis of liver and heart tissues total RNA from 5 WT, G1 and G4 Tert or 5 WT and 5 G2 Terc age and sex matched mice was isolated using Trizol (Invitrogen) followed

by DNase treatment and purification using the RNeasy Mini kit (Qiagen). RNA integrity was verified by means of an Agilent Technologies 2100 Bioanalyzer. In contrast to the HSC group the higher sample number for liver and heart (n=5) allowed identification of differentially expressed genes using significant analysis of microarrays (SAM) software[52]. The cut-off for significance was determined by tuning the Δ parameter on the false discovery rate (median FDR=5% for liver and 8% for heart) and controlling the q-value for the gene list. Compiled data were analyzed using the Ingenuity Pathways Analysis software. D-chip based analysis of liver and heart microarray data followed by IPA yielded similar results as SAM analysis.

Real-time PCR: RNA was isolated from live sorted HSCs (5 pooled mice per group, repeated three times, 15 mice total) using the PicoPure RNA Isolation kit. For heart and liver RT-qPCR analysis, RNA was isolated from individual age and sex matched mice (at least 5 mice per group) using Trizol in combination with the RNeasy Mini kit (Qiagen) followed by DNase treatment. cDNA synthesis was performed with the Superscript III system (Invitrogen) using oligo (dT) 20, oligo (dT) 12-18 and random primers. Real-time PCR was performed in triplicates by using QuantiFast SYBR Green (Qiagen) in combination with the Stratagene 3000 Real-Time PCR Detection System. Primer sequences are listed in Supp. Table 6. For heart and liver, two different primer pairs for each gene were used. Relative mRNA expression was normalized to TATA box binding protein (TBP) and β-Actin mRNA expression using the ΔΔCT method.

Electron microscopy and qPCR based determination of mtDNA copy number:

For electron microscopy analysis, fresh liver and heart tissues from 3 WT, G1 and G4 mice were fixed (2% formaldehyde /2.5% glutarataldehyde in 0.1M Sodium cacodylate buffer, pH 7.4) at 4°C overnight. Tissues were then processed at the Harvard Medical School EM Facility and visualized on a JEOL 1200EX electron microscope. 10 randomly taken longitudinal sections of heart and liver at 4800x magnification were used for quantification of mitochondrial density. Mitochondrial volume density was calculated from 10 sections per mouse using the point counting method by two independent investigators, one of them blinded according to Weibel *et al*[55]. For each section, average volume density was calculated independently by two investigators and the mean of both values was used to estimate the volume density for each individual tissue and mouse. Mitochondrial DNA (mtDNA) copy number was quantified by qPCR from isolated total DNA derived from HSCs, liver and heart tissues using previously described primer pairs for genomic and mitochondrial loci[53]. In short, for HSCs, 40000 FACS sorted HSC cells from 5 pooled WT, G1 and G4 mice were lysed in cell lysis buffer (Cells-to-cDNA II, Ambion) at 95º C for 10 minutes in a 40 µl total volume and 4 µl was used for qPCR analysis. Results were confirmed using isolated DNA (Qiagen DNAeasy) from HSC cells[54]. For heart and liver, 50 ng of total heart and liver DNA was used in each qPCR reaction. All samples were

measured in triplicates and qPCR results obtained were confirmed by three independent experiments. Two different primer pairs were used to quantify and confirm relative mtDNA copy number: COXI and Cytochrome b (mitochondrial) and β-Globin/H-19 for genomic DNA. All sequences are listed in Supp. Table 6. Data obtained by qPCR were analyzed by the ΔΔ CT method.

Mitochondrial isolation:

Liver mitochondria were isolated from 10-16 week old male mice as described previously[61]. Briefly, livers were rapidly homogenized in ice-cold isolation buffer (250 mM mannitol, 75 mM sucrose, 100 μM K-EDTA, 10 mM K-HEPES, pH 7.4) supplemented with 500 μM K-EGTA (pH 7.4). Homogenates were centrifuged at 1000 × g for 10 min. Supernatants were removed and centrifuged at 10,000 × g for 15 min. Pellets were washed three times in isolation buffer supplemented with 0.5% fatty acid-free bovine serum albumin (Sigma A-6003). The first wash buffer was also supplemented with 500μM EGTA. The final mitochondrial pellet was resuspended in buffer without EGTA or bovine serum albumin and used for complex activity assays (see above) and for respiration studies.

Heart mitochondria were essentially isolated as previously described with minor modifications[62]. All steps were performed at 4^0C. Briefly, tissues were rinsed in a buffer containing 100 mM KCl, 5 mM $MgCl_2$, 5 mM EGTA and 5 mM sodium pyrophosphate at pH 7.4, and thereafter homogenized by in 2 ml of HES buffer (HEPES 5 mM, EDTA 1 mM, Sucrose 0.25M, pH 7.4 adjusted with KOH 1M) using a glass dounce homogenizer (20 strokes with loose pestle, 20 strokes tight pestle). The homogenate was centrifuged at 500 × g for 10 minutes at 4 °C (pellet discarded and supernatant re-centrifuged at 500 × g). The supernatant was centrifuged at 9000 × g for 15 minutes at 4 °C and the mitochondrial pellet was resuspended in 100-200 μl of HES buffer with 0.2% of BSA fatty acid-free. Protein was quantified using BCA (Pierce) and the value of HES-BSA buffer alone was subtracted.

Mitochondrial oxygen consumption measurements:

Mitochondrial oxygen consumption measurements using the XF24 Seahorse instrument were performed as described in detail below. Clarke electrode based respiration studies were performed at 30°C using 500 μg of mitochondrial preparation in 500 μL of respiration buffer. State 2 respiration was initiated by adding substrate — 5 mM glutamate and 5 mM malate. State 3 respiration was measured by the addition of ADP to final concentration of 2.5 mM. State 4 respiration was measured following ADP consumption. Respiration due to proton leak was determined using 0.5 μM oligomycin. This was subtracted from non-mitochondrial respiration using 20 μM myxothiazol.

Complex I activity: Complex I activity was measured in whole tissue or isolated mitochondrial lysates following established protocols[56, 57].

Complex IV activity: We determined complex IV activity as described previoulsy[58].

ATP production rates in isolated heart mitochondria: ATP synthesis rates in isolated heart mitochondria were determined using the luciferin/luciferase based ATP Bioluminescence Assay Kit CLS II (Roche) essentially as described[59]. In short, 5-10 µg of heart mitochondria were dissolved in 50 µl buffer A (125 KCL, 10mM Hepes, 5 mM $MgCl_2$ and 2 mM K_2HPO_4,pH7.44) to determine complex I (pyruvate/ malate, 5mM final) or complex II (succinate, 5 mM final) driven ATP synthesis. Following standard practice, succinate driven ATP generation was measured in the presence of complex I inhibitor rotenone (0.5µM) to avoid the reverse electron transfer effect [15]. Measurements with substrates were repeated in the presence of inhibitors of respiratory complex (rotenone (CI), oligomycin (C IV), antimycin A (CIII), 0.5µM) to determine the rates of non-mitochondrial ATP production. The background of the assay was determined with mitochondria alone. The measurements for all samples were started simultaneously by adding 50 µl of luciferin/luciferase buffer containing 1mM ADP (0.5mM final). The initial slope of the increase in ATP-supported luciferase chemiluminescence was used to determine the rate of ATP production after subtraction of the background and non-mitochondrial values. Using an ATP standard provided in the kit, the slopes were converted in nmoles/min/mg protein.

ATP content: Liver and beating hearts from age and sex matched mice were quickly snap frozen for ATP determination by HPLC in a specialized NIH funded metabolic core (n= 5 for each group).

Echocardiography: Five age and sex matched WT, G1 and G4 mice were examined at different ages (three months, 6 months and 15 months). Murine transthoracic echocardiography was conducted in conscious mice using a Vevo 770 high-resolution microultrasound system (VisualSonics, Toronto, ON) as previously described[63]. Briefly, the heart was imaged in a 2-dimensional parasternal short-axis view with M-mode echocardiogram of the midventricle recorded at the level of the papillary muscle. Heart rate, posterior wall thickness, end-diastolic and end-systolic dimensions of the left ventricle was measured from the M-mode image. Left ventricle (LV) fractional shortening was calculated (as defined by end-diastolic dimension minus the end-systolic dimension normalized for the end-diastolic dimension) and was used as an index of cardiac contraction.

Doxorubicin induced cardiomyopathy: To induce cardiomyopathy Doxorubicin was used as previously described except that a lower dosage of 7.5 mg/kg body weight was used[64, 65]. 8 week old male mice were injected intraperitoneal with 7.5 mg/kg Doxorubicin and analyzed by echocardiography 7 days later (n=3-5 per group).

Bone Marrow Transplants: CD45.1 positive recipient mice (purchased from Jackson or Taconic Laboratories, age and sex matched to donors) were irradiated with a total of 10.5 Gy γ-radiation (5 Gy and 5.5 Gy 3 hours apart) on the day of transplantation. Bone marrow (BM) transplants were performed using

donor nucleated bone marrow cells obtained from the long bones of WT, G1 or G4 *mTert* (all CD45.2+) donor mice. Competitive blood repopulation was performed by mixing the specified CD45.2 cells together with nucleated bone marrow cells prepared from congenic CD45.1 mice. For whole BM competitive assays, each CD45.1 recipient received $1x10^6$ CD45.2 donor cells mixed with $1x10^6$ CD45.1 competitor cells (n= 8 donors per genotype, with 3 recipients per individual donor; total recipient number per group = 24). For competitive transplants each recipient received 1500 purified HSC derived from WT, G1 or G4 mTert mice together with 3 x 10^5 CD45.1 competitor bone marrow cells. Donor derived peripheral blood reconstitution (i.e. chimerism) was assessed for 4 months following transplantation by FACS analysis of nucleated peripheral blood cells stained with anti-CD45.1 and anti-CD45.2-specific antibodies. Blood chimerism for each recipient was calculated as the percentage of all CD45+ cells that were CD45.2+/CD45.1

Glucose measurement in vivo and in vitro: Peripheral glucose concentrations were determined in 12 week old male mice (10 per WT, G1 and G4 groups) through tail vein bleeds during ad libidum feeding following a 16 h starvation period using an Ascenscia Elite XL glucometer (Bayer). Aliquots of adenoviruses expressing either GFP or PGC-1α have been described[66] and were kindly provided by Bruce Spiegelman, expanded and titered at Welgen Corp. Worcester, MA. Mouse *Tert* cDNA was cloned into adenovirus vector and expanded and titered at Welgen Corp. Worcester, MA. For virus injections, a total of 1×10^9 plaque-forming units per recombinant virus was administered by tail vein injection. Per group 8 mice (sex, age, and weight matched) were injected. 5 days post infection, glucose levels were determined before and after starvation (16 h). Hepatocyte cultures and determination of glucose levels in the supernatant of cultured hepatocytes (n= 5 per group) was performed according to published protocols[66]. In short, primary hepatocytes from different groups were cultured in six-well plates at a concentration of $1x10^6$ in 10% FCS containing DMEM. In the overexpression studies, cells were infected with Ad-GFP, Ad-Tert or Ad-PGC respectively (MOI 30). 48 hrs post-infection medium was changed to glucose free DMEM containing sodium lactate (20mM) and sodium pyruvate (2mM). 3 hours later glucose production was determined in the supernatant (normalized to protein content).

Mouse embryonic fibroblast studies: Mouse embryonic fibroblasts (MEFs) were generated using standard techniques from WT, *p53*$^{-/-}$, G2 and G2 *p53*$^{-/-}$ embryos. Cells used in these experiments were from passages 3-5. For p53 activation, 90% confluent cells were either treated with ETOH vehicle or 4-OHT dissolved in 70% ETOH at a final concentration of 200 nM for 48 hours. Mitochondrial mass was determined by staining live cells with 25nM MitoGreen (Invitrogen) for 30min in HBSS or by qPCR using primers for Cyt B and β-Globin.

Reporter assays: Promoter sequences for PGC1α and PGC1β were cloned into the pGL4 (Promega, Madison WI) luciferase reporter vector. Sequences of

lengths 2.8 kb (PGC-1α) and 2.6 kb (PGC-1β) upstream of the start sites of PGC1α and PGC1β respectively were amplified by PCR from genomic mouse heart DNA. Upstream lengths were chosen based on putative p53 binding sites identified by TRANSFAC[67]. PCR was performed using Phusion High-Fidelity DNA Polymerase (Finnzymes) with the following primers PGC1α: Forward: 5' TGGGGAGACAGAAAAATCCA3' and Reverse: 5'CCAGCCCCTTACTGAGAGTG 3'. PGC1β: Forward 5' CATTAAGCACGGA ACTTTTACCTT 3' and Reverse 5' GATAGTTGAGGAAGAAGGACGAGA 3'. All cloned sequences were sequence verified. The PG13-luc plasmid containing 13 copies of a synthetic p53 DNA binding site and MG15-luc containing 15 copies of a *mutated* p53 DNA binding site were used as positive and negative controls during the transfection assays and have been extensively described[68,69]. A β-galactosidase expressing plasmid was used to normalize transfection efficiency. G2 $p53^{+/+}$, G2 $p53^{-/-}$ MEFs were transiently transfected (Lipofectamine 2000, Invitrogen) with either empty PGL4, PGL4-PGC1α/PGC-1β, PG-13 (positive control), MG15 (negative control) vectors and assessed along with β-Galactosidase and p53 transcriptional activity using the luciferase reporter assay and β-Galactosidase Assay System (Promega).
For p53 over-expression studies, G2 $p53^{-/-}$ were transfected with pCDNA-p53 and the above luciferase constructs and β-galactosidase to normalize transfection efficiency and p53 transcriptional activity measured in each luciferase assay. Experiments measuring ether endogenous p53 activity or exogenous p53 were done in triplicate wells and repeated three times.

Chromatin IP: For chromatin IP we followed the protocol provided with the EZ ChIP kit from Upstate Biotechnology. In short, cells from 4 15 cm plates were fixed, lyzed and sheared (3 x 10 sec, idle time 45 sec). For overnight immunoprecipitations 5 µg of a rabbit p53 antibody (FL393, Santa Cruz, sc-6243) and an equal amount control rabbit IgG (sc 2027, Santa Cruz) was used. After extensive washing, the immunoprecipitants were eluted with 2% SDS in 0.1 M NaH_2CO_3. Cross-linking was reversed by heating overnight at 65^0 C and samples were treated with proteinase K for 1 h at 45°C. Input DNA and immunoprecipitated DNA were purified using the PCR purification kit (Qiagen) and analyzed. QPCR was used to quantify the promoter binding with 30 cycles total (95^0 C, 30 sec, 55^0 C, 30 sec, 72^0 C 1 min). PCR products were subsequently separated in 2% agarose gel to visualize and results are expressed as fold enrichment.

For adenoviral delivery of p53, Ad-p53 was commercially purchased (Vector Biolabs # 1260) and $p53^{-/-}$ and G2 $p53^{-/-}$ MEFs were infected at 0.10 and 80 MOI. Cells were harvested 36 hours after infection and processed for either RNA or ChIP analysis. DO-1 p53 antibody was used for the p53 ChIP after adenoviral infection. ChIP was analyzed by qPCR with and results are presented as percent input following the formula $100 \times 2^{(\text{Adjusted input - Ct (IP)})}$. Primer sequences used in the ChIP assays are provided in Supplemental Table 6.

Apoptosis Assays:
Tunel staining was performed on heart and liver section using a commercial kit (ApopTag® Peroxidase In Situ Apoptosis Detection Kit, S7100, Milipore) following the manufacture's instructions. Cleaved caspase 3 western blotting was performed with an antibody against cleaved caspase 3 (AP1027, EMD)

Western blotting: Liver tissue was homogenized in lysis buffer (50 mM Tris (pH 7.4), 150 mM NaCl, 1% NP-40, 50 mM NaF, 1 mM dithiothreitol, 2 mg ml-1 pepstatin A) including complete inhibitor cocktail (Roche) and phosphatase inhibitor (cocktails I and II , Sigma). 80 µg of lysat was electrophoresed and transferred to nitrocellulose membranes. Blots were blocked with 5% non-fat dry milk, and incubated overnight at 4 °C with anti-PGC-1α (EMD Biosciences, ST1202, 1:250), ERRα (Novus Biologicals, EPR46Y, 1:250), NRF-1 (Rockland, 200-401-869, 1:250), Tfam (Santa Cruz, 1:250, sc-23588) and anti-ATPsynthase, anti-p53 rabbit polyclonal (FL939,Santa Cruz), anti-p21 (sc-397, Santa Cruz), anti-MDM2 (#556353,Pharmingen), 1/10,000 anti-vinculin (Sigma) antibodies respectively , washed and incubated with secondary antibodies (1/10000 goat anti-rabbit-HRP/anti-mouse -HRP,Pierce) and developed with the Femto chemiluminescent reagent (Pierce).

ROS assays: RT-qPCR analysis of ROS defense genes on cDNA derived from HSC, liver or heart was performed as described in Material and Methods using published primer sequences (St-Pierre et al, Cell, 2006 Oct 20;127(2):397-408). For determination of ROS levels by FACS HSC were isolated from 3 WT and 3 G4 12 week old male mice and ROS levels were determined after staining in 5 µM CM-H_2DFCDA (Invitrogen) for 30 minutes at 37 °C (n=3). For determination of carbonylated proteins by western blot we used the Milipore OxyBlot Protein Detection kit S7150 with 20µg total liver protein loaded per group as directed by the manufacturer. Mitochondrial H_2O_2 production was measured using the Amplex Red-Horseradish peroxidase method (Invitrogen) as described previously[70]. This assay is based on the Horseradish peroxidase (2 units/ml) H_2O_2-dependent oxidation of nonfluorescent Amplex Red (80 µm) to fluorescent resorufin red. In short, 30 µg mitochondria were diluted in 50 µl reaction buffer (125 mM KCl, 10 mM HEPES, 5 mM $MgCl_2$, 2 mM K_2HPO_4, pH 7.44) to determine complex I (pyruvate /malate, 5 mM) or complex II (succinate, 5 mM) driven H_2O_2 production with and without inhibitors (rotenone, antimycin A, 0.5µM). Mitochondrial H_2O_2 production was measured after the addition of 50 µl of reaction buffer containing horseradish peroxidase and Amplex Red. Fluorescence was followed at an excitation wavelength of 545 nm and an emission wavelength of 590 nm for 5 minutes. The slope of the increase in fluorescence is converted to the rate of H_2O_2 production with a standard curve. All of the assays were performed at 25 °C. The results are reported as pmoles/min/mg protein.

Telomere length measurement by Q-FISH-LSC For quantification of telomere length in either isolated, cytospun HSC cells or liver and heart tissues the the

iCys Research Imaging Cytometer (Compucyte) was performed as described early (Wu et al., Telomere dysfunction: a potential cancer predisposition factor. J Natl Cancer Inst. 2003 Aug 20;95(16):1211-8) with few following modifications. Cellular spreads were prepared by using a standard cytogenetic method: cell suspension in methanol – acetic acid (1:1) was dropped onto uncoated microscope slides (Fisher Sci.) and air-dried. Press-to-Seal silicone isolators (Invitrogen) allowed applying up to twenty four independent cell samples to the same slide in order to minimize sample-to-sample variations of the experimental conditions. FFPE tissue sections, about 5 mm thick, were deparaffinized and treated with proteinase K under the selected conditions in order to make chromosomal DNA accessible for hybridization. Tissue slides or cell spreads were denatured in 70% formamide 70oC for 3 minutes. PNA probe FITC-00-T2AG3 was hybridized under the following conditions: 70% formamide, 0.06x SSC, 0.2% BSA, 0.5 ng/μL tRNA, 0.5 ng/μL PNA probe; 3 hours at 25oC. To achieve very uniform telomere-tissue-FISH we used MAUI Mixer (BioMicro) with 40μL chamber. To collect the population data on telomere length, the iCys LSC was customized with the 633 nm HeNe red laser replaced by a 532 nm green diode laser (405 - 488 - 532), added 60X dry objective, and increased spatial resolution from 0.5 to 0.1 mkm size of stage steps. To avoid any possible drawbacks of “different day experiments”, we carried out only relative quantification: a cross-comparison of samples using a multiple samples - single slide setup. DAPI-normalized background corrected telomere fluorescence has been used for the quantification (Meeker et al. Telomere length assessment in human archival tissues: combined telomere fluorescence in situ hybridization and immunostaining. Am J Pathol. 2002 Apr;160(4):1259-68). The target number for each sample was approximately 1500 cells quantified.

Telomere dysfunction induced foci (TIF): Frozen liver sections were fixed in 2% PFA for 15 minutes. 53BP1 immunostaining was done using a rabbit anti-53BP-1antibody (Bethyl, IHC 0001), followed by an anti-rabbit biotinylated secondary antibody (Vector Laboratories) and FITC conjugated Streptavidin (Invitrogen). Subsequently telomere FISH was performed using denaturation at 83°C for 3 minutes and hybridization with a Cy3-labeled PNA telomeric probe (Applied Biosystems) in 70% formamide at room temperature for 2 hours. Slides were mounted in Vectashield medium with DAPI. 500 nuclei were analyzed using filter sets and software developed by Applied Spectral Imaging. Liver sections from gamma-irradiated mice were used as positive control for the validity of the 53BP1 signal.

Statistics: If not otherwise indicated student t-test was used to calculate statistical differences among groups and error bars present s.e.m.

Detailed protocol for Respirometry of isolated mitochondria

For a more detailed protocol and for updates in the protocol visit ***www.shirihai-lab.org.*** This protocol has been established thanks to important contributions of Drs. Alvaro Elorza, Dr. George Rogers, Dr. Martin Brand, Dr. David Ferrick, Dr. David Nicholls and Dr. Anne N. Murphy.

1. Mitochondrial isolation. Hearts were incubated and minced in ice-cold fiber relaxation buffer (during approximately 10 minutes; KCl 100 mM, EGTA 5 mM, HEPES 5 mM adjusted with KOH to pH 7.0; in order to facilitate the release of intermyofibrillar mitochondria) and they were homogenized in 2 ml of HES buffer (HEPES 5 mM, EDTA 1 mM, Sucrose 0.25M, pH 7.4 adjusted with KOH 1M) using a glass dounce homogenizer (20 strokes with loose pestle, 20 strokes tight pestle). The homogenate was centrifuged at 500xg for 10 minutes at 4 °C (pellet discarded and supernatant re-centrifuged at 500xg). The supernatant was centrifuged at 9000xg for 15 minutes at 4 °C and the crude mitochondrial pellet was re-suspended in 100-200 µl of HES buffer with 0.2% of BSA FFA-free (an additional centrifugation step for washing the pellet can be performed). Protein was quantified using BCA (Pierce) and the value of protein measured in HES-BSA 0.2% buffer alone was subtracted.

Livers were homogenized after washing the blood with PBS and using a Potter-Elvehjem (teflon-glass) homogenizer instead, performing 15 stokes in ice-cold isolation buffer (250 mM mannitol, 75 mM sucrose, 100 µM K-EDTA, 10 mM K-HEPES,pH7.4) supplemented with 500 µM K-EGTA (pH 7.4). Homogenates were centrifuged at 1000×g for 10 min. Supernatants were removed and centrifuged at 10,000 × g for 15 min. Pellets were washed three times in isolation buffer supplemented with 0.5% fatty acid-free bovine serum albumin (Sigma A-6003). The first wash buffer was also supplemented with 500 µM EGTA. The final mitochondrial pellet was re-suspended in HES buffer with 0.2% of BSA FFA-free for respiration (and without BSA for complexes activity). This isolation protocol was developed by Kristal, B. S. & Brown, A. M. J Biol Chem 274, 23169-75 (1999).

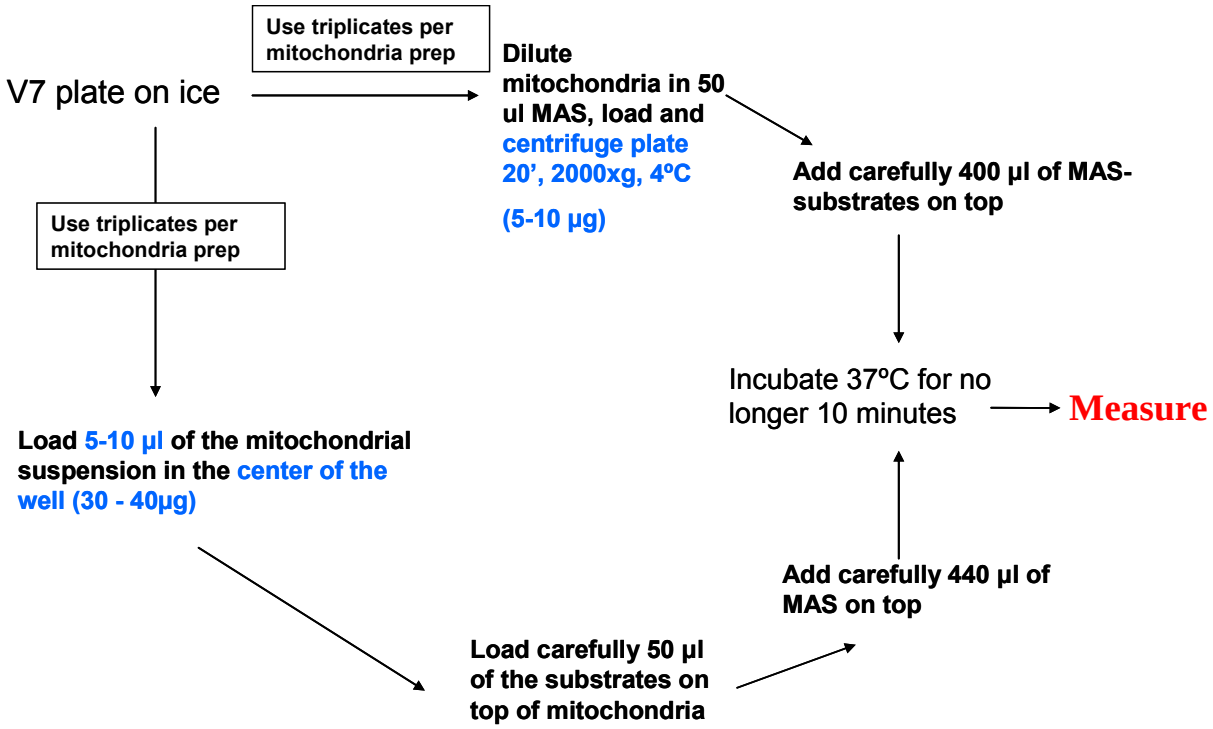
2. Mitochondrial oxygen consumption measurements using XF24.

2.1 V7 Plate loading

The amount of mitochondria was titrated, as the absolute amount of protein loaded is highly dependent on the mitochondrial isolation protocol and the loading methodology used. In the present manuscript, isolated mitochondria (30-40 µg in HES-BSA 0.2% buffer per well, n=3-4 replicates per mouse) were loaded in the center of the well (using 5-10 µl, low volume that facilitates the

contact and adhesion of mitochondria to the bottom of the well) of a V7 plate on ice and 440-445 µl of ice cold **M**itochondrial **A**ssay **S**olution (**MAS**: Sucrose 70 mM, Mannitol 220 mM, KH_2PO_4 5 mM, $MgCl_2$ 5 mM, HEPES 2 mM, EGTA 1 mM, BSA fatty acid-free 0.2 %, pH 7.4 adjusted with KOH 1 M) + 50 µl of MAS buffer with 10X substrates (complex II driven respiration: succinate 50 mM + rotenone 20 µM; complex I : pyruvate + malate, 50 mM or glutamate + malate 50 mM) were added on top. Alternatively, the mitochondrial suspension can be diluted in MAS at a certain concentration and load 50 µl in the V7 plate. After loading, centrifugation of the V7 plate during 20 minutes at 2000xg (4ºC) is performed to attach the mitochondria at the bottom of the plate. After centrifugation, 400 µl of MAS + substrates 1X (ice cold, 5mM each, 2 µM rotenone for complex II) is added on top. With this centrifugation step, it is possible to reduce the amount of mitochondria to 5 µg. This step was not used in the present manuscript, but was successfully developed by Dr. George Rogers, Dr. Alvaro Elorza and Dr. Anne N. Murphy (personal communication). The loaded V7 plate was incubated for 5-9 minutes at 37ºC (no CO_2 incubator) before loading it into the XF24. Mitochondria attachment to the bottom of the plate can be observed using a microscope (20x) before and after the measurements. The initial consumption rate of oxygen measured before the first injection (port A) is state II (no ADP present, only respiration due to proton leak and contaminant ADP, also known as pseudo-state IV; see below).

***Scheme plate loading*:**



2.2 Loading the cartridge

The dilutions of ADP and the different mitochondrial chemicals are freshly prepared the day of the experiment from concentrated stocks. The four sequential injection ports of the Seahorse cartridge contained (in MAS solution and adjusted to pH 7.4): **A** (first port injected): 50 µl 10X substrate and ADP 2.5 mM; **B**: 55 µl Oligomycin 20 µM (ATP synthase inhibitor); **C**: 60 µl 2,4-dinitrophenol (DNP; uncoupler) 1 mM; **D**: 65 µl Antimycin A 40 µM (complex III inhibitor). Therefore the final concentrations are ADP 250 µM, Oligomycin 2 µM, DNP 100 µM and Antimycin 4 µM. Oxygen consumption rates (pmols oxygen per minute) were monitored in real time after the injection. State III was determined after port **A** injection, State IV after port **B** and uncoupled respiration rates after port **C**. Antimycin A was used as a control (port **D**), as it blocks mitochondrial oxygen consumption linked to the electron transport chain. The ratio between state III and state IV is used as a control for the quality of the mitochondrial preparation and it is known as RCR (respiratory control ratio).

2.3 Measurement protocol (performed at 37 ºC)

Calibration of the cartridge: 29 min

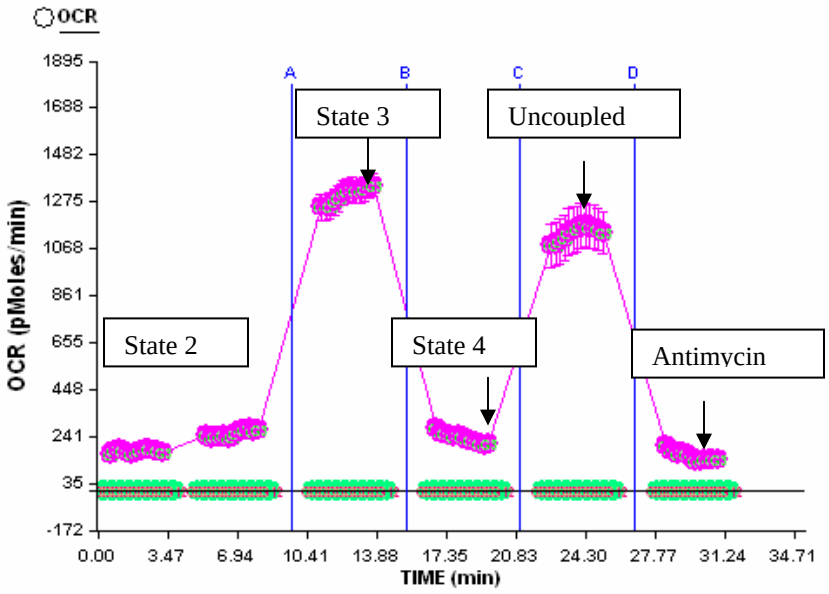
Load V7 plate.

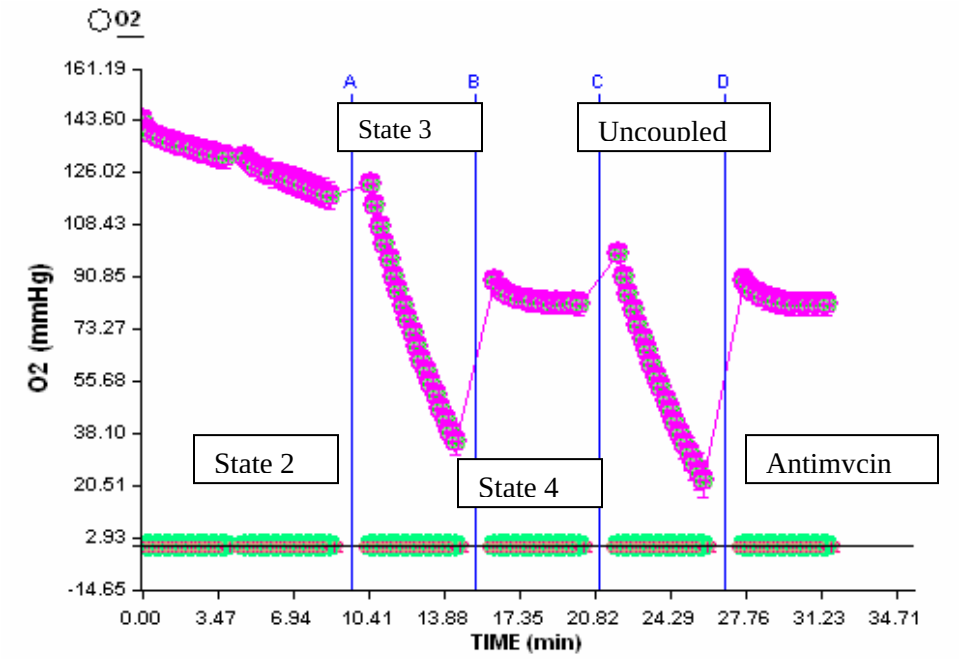
1) Equilibration (12 min; 3 cycles of 2 min Mix, 2 min Wait).
2) State II (8 min 50 sec; 2 cycles of 25 sec Mix, 4 min Measure).
3) Injection port A.
4) State III (4 min 30-60 sec; 1 cycle of 25 sec Mix, 4 min Measure, 30-60 sec Mix*).
5) Injection port B.
6) State IV (4 min 30-60 sec; 1 cycle of 25 sec Mix, 4 min Measure, 30-60 sec Mix*).
7) Injection port C.
8) Uncoupled (4 min 30-60 sec; 1 cycle of 25 sec Mix, 4 min Measure, 30-60 sec Mix*).
9) Injection port D.
10) Antimycin A (4 min 30-60 sec; 1 cycle of 25 sec Mix, 4 min Measure).

* Adjust the time to restore oxygen concentration in the well.

3. Representative OCR tracings.

For state III and DNP (uncoupled respiration), the higher average value of OCR (oxygen consumption rates, pmols oxygen consumed per minute, calculated using the AKOS algorithm) for each mouse was selected. For state IV and antimycin A, the lower OCR values were selected. The values selected in this particular trace are pointed with the arrows. In this representative tracing, we show isolated mitochondria from heart (30 µg protein/well, n=4 replicates ± SEM) under 5 mM pyruvate and malate and a state III/state IV or RCR > 4 (6.78), showing that it is a good quality mitochondrial preparation, together with the inhibition with antimycin A. Increase of respiration with the uncoupler (port C) must be close to state III or higher.





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Supplemental table 1
HSC downregulated 260 probe sets

Entrez Gene Name
melanoma antigen family D, 2
heterogeneous nuclear ribonucleoprotein U (scaffold attachment factor A)
ATPase, H+ transporting, lysosomal accessory protein 2
placenta-specific 8
S100 calcium binding protein A8
lymphocyte antigen 6 complex, locus C1
centrosomal protein 76kDa
proteinase 3
proliferating cell nuclear antigen
chromosome 16 open reading frame 13
chromosome 4 open reading frame 27
LIM domain containing preferred translocation partner in lipoma
predicted gene 4076
immunoglobulin kappa chain complex
neutrophilic granule protein
splicing factor, arginine/serine-rich 6
immunoglobulin heavy constant mu
predicted gene 10883
tumor protein p53 binding protein 1
immunoglobulin kappa chain complex
cytochrome c, somatic
ARP3 actin-related protein 3 homolog (yeast)
LATS, large tumor suppressor, homolog 2 (Drosophila)
poly(A) binding protein, cytoplasmic 1
CDC28 protein kinase regulatory subunit 1B
serglycin
glutaminyl-tRNA synthetase
phosphoinositide-3-kinase interacting protein 1
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
transmembrane emp24 domain trafficking protein 2
mast cell protease 9
citrate synthase
cytochrome c oxidase subunit Vib polypeptide 1 (ubiquitous)
DEK oncogene
transmembrane emp24 protein transport domain containing 9
succinate dehydrogenase complex, subunit B, iron sulfur (Ip)
nucleoporin 62kDa
chromosome 20 open reading frame 24
SMT3 suppressor of mif two 3 homolog 2 (yeast)
granulin
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit C3 (subunit 9)
malate dehydrogenase 1, NAD (soluble)
TAF9 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 32kDa
DNA (cytosine-5-)-methyltransferase 3 beta
ubiquitin B
ataxin 10
granulin

phosphoglycerate kinase 1
myosin, light chain 9, regulatory
ubiquinol-cytochrome c reductase binding protein
guanine nucleotide binding protein (G protein), gamma 5
H2A histone family, member Z
phosphoglycerate kinase 1
cytochrome c oxidase subunit Va
heat shock protein 90kDa alpha (cytosolic), class A member 1
H3 histone, family 3C
ubiquitin B
proliferation-associated 2G4, 38kDa
cytochrome c oxidase subunit Va
transmembrane BAX inhibitor motif containing 6
CGG triplet repeat binding protein 1
phosphoglycerate kinase 1
heat shock 60kDa protein 1 (chaperonin)
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, zeta polypeptide
nucleophosmin 1
anoctamin 8
immunoglobulin kappa chain complex
CD93 molecule
proteasome (prosome, macropain) subunit, alpha type, 6
ubiquitin B
trinucleotide repeat containing 6A
guanine nucleotide binding protein (G protein), gamma 5
Sec61 alpha 1 subunit (S. cerevisiae)
family with sequence similarity 120A
ribosomal protein L15 pseudogene 3
NADH dehydrogenase (ubiquinone) 1, subcomplex unknown, 2, 14.5kDa
RAN, member RAS oncogene family
S100 calcium binding protein A9
myeloperoxidase
Sec61 beta subunit
tubulin, alpha 4a
dihydrouridine synthase 2-like, SMM1 homolog (S. cerevisiae)
glycosyltransferase 8 domain containing 2
ferritin, heavy polypeptide 1
heterochromatin protein 1, binding protein 3
complement component 1, q subcomponent binding protein
ribosomal protein S3
beclin 1, autophagy related
T-cell specific GTPase
histidine triad nucleotide binding protein 1
chaperonin containing TCP1, subunit 2 (beta)
non-POU domain containing, octamer-binding
PHD finger protein 5A
interferon activated gene 203
RIKEN cDNA 6820431F20 gene
RAB14, member RAS oncogene family
chaperonin containing TCP1, subunit 2 (beta)
ribosomal protein S3A
spindlin 1

ribosomal protein L26
cytochrome c oxidase subunit VIa polypeptide 1
phosphoinositide-3-kinase, catalytic, delta polypeptide
vimentin
eukaryotic translation initiation factor 4 gamma, 2
ribosomal protein L4
coagulation factor II (thrombin) receptor
peptidylprolyl isomerase A
transmembrane emp24 domain trafficking protein 2
peptidylprolyl isomerase F
ribonuclease T2
SMT3 suppressor of mif two 3 homolog 2 (yeast)
peptidylglycine alpha-amidating monooxygenase
ribosomal protein L7A
tubulin, alpha 1b
H2A histone family, member Z
H2A histone family, member Z
similar to hCG1795014
ribosomal protein S7
malate dehydrogenase 2, NAD (mitochondrial)
single-stranded DNA binding protein 1
cyclin-dependent kinase 6
eukaryotic translation elongation factor 1 alpha 1
ribosomal protein L29
ribosomal protein S26
transmembrane emp24 domain trafficking protein 2
translocase of outer mitochondrial membrane 20 homolog (yeast)
thioredoxin
calmodulin 2 (phosphorylase kinase, delta)
cylindromatosis (turban tumor syndrome)
ribosomal protein L7
ribosomal protein L7
transketolase
heterogeneous nuclear ribonucleoprotein A2/B1
non-POU domain containing, octamer-binding
retinoblastoma binding protein 7
ribosomal protein L23a
BSD domain containing 1
ribosomal protein L17
death-associated protein
ribosomal protein L29
ribosomal protein S2
splicing factor, arginine/serine-rich 3
H2A histone family, member Z
heterogeneous nuclear ribonucleoprotein D-like
FK506 binding protein 3, 25kDa
TSC22 domain family, member 4
APEX nuclease (multifunctional DNA repair enzyme) 1
ribosomal protein S2
LIM domain only 2 (rhombotin-like 1)
ATP synthase, H+ transporting, mitochondrial F1 complex, alpha subunit 1, cardiac muscle
ribosomal protein L10 pseudogene 16

eukaryotic translation initiation factor 3, subunit I
hypothetical LOC729505
serine incorporator 3
cofilin 1 (non-muscle)
ubiquitin C
hyaluronan-mediated motility receptor (RHAMM)
prolyl endopeptidase
actin, beta
hexokinase 1
ribosomal protein L24
ubiquitin C
eukaryotic translation initiation factor 3, subunit I
splicing factor 3b, subunit 4, 49kDa
COX17 cytochrome c oxidase assembly homolog (S. cerevisiae)
GDP dissociation inhibitor 2
hemoglobin, alpha 2
protein tyrosine phosphatase, receptor type, S
FBJ murine osteosarcoma viral oncogene homolog
cathepsin G
potassium voltage-gated channel, subfamily H (eag-related), member 3
ATPase, H+ transporting, lysosomal accessory protein 2
erythroid differentiation regulator 1
heat shock 70kDa protein 8
ubiquitin A-52 residue ribosomal protein fusion product 1
chaperonin containing TCP1, subunit 3 (gamma)
heterogeneous nuclear ribonucleoprotein A3
ornithine decarboxylase antizyme 1
ribosomal protein L28
ubiquitin A-52 residue ribosomal protein fusion product 1
anaphase promoting complex subunit 5
high-mobility group nucleosome binding domain 1
ribosomal protein S6
solute carrier family 5 (sodium/glucose cotransporter), member 9
carbonic anhydrase VII
serine incorporator 3
similar to [Human Ig rearranged gamma chain mRNA, V-J-C region and complete cds.], gene product
glucose phosphate isomerase
ribosomal protein L17
ribosomal protein L23a
ribosomal protein S5
ribosomal protein S6
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, beta polypeptide
ribosomal protein L23a
ribosomal protein L6
ribosomal protein S2
ribosomal protein L26
ribosomal protein S11
ribosomal protein S18 pseudogene 5
ribosomal protein S6
ribosomal protein S6
ribosomal protein S4, X-linked
ribosomal protein L23a

ribosomal protein L19
ribosomal protein L24
selenoprotein P, plasma, 1
high-mobility group nucleosome binding domain 1
ribosomal protein S6
family with sequence similarity 135, member A
ribosomal protein L11
tumor protein, translationally-controlled 1
glia maturation factor, gamma
SERPINE1 mRNA binding protein 1
non-metastatic cells 2, protein (NM23B) expressed in
ribosomal protein S28
apoptosis inhibitor 5
DEAD (Asp-Glu-Ala-Asp) box polypeptide 5
RAN, member RAS oncogene family
PRP19/PSO4 pre-mRNA processing factor 19 homolog (S. cerevisiae)
ribosomal protein S28
actin related protein 2/3 complex, subunit 2, 34kDa
clathrin, light chain (Lca)
ribosomal protein L5
glutathione peroxidase 1
ribosomal protein S18 pseudogene 5
ribosomal protein S29
coiled-coil-helix-coiled-coil-helix domain containing 2
ERO1-like (S. cerevisiae)
ribosomal protein L12
ribosomal protein L31
ribosomal protein S29
eukaryotic translation initiation factor 3, subunit F
ERO1-like (S. cerevisiae)
guanine nucleotide binding protein (G protein), beta polypeptide 2-like 1
ribosomal protein L10A
ribosomal protein L35
small nuclear ribonucleoprotein polypeptide G
chaperonin containing TCP1, subunit 4 (delta)
ribosomal protein L18
ribosomal protein L35
ribosomal protein L9
ribosomal protein S16
stathmin 1
X (inactive)-specific transcript (non-protein coding)
activating transcription factor 4 (tax-responsive enhancer element B67)
ribosomal protein L30
ribosomal protein L35
ribosomal protein S28
coiled-coil domain containing 72
ribosomal protein L21
heterogeneous nuclear ribonucleoprotein F
ribosomal protein L23
ribosomal protein L3
ribosomal protein S16
ribosomal protein S8

superoxide dismutase 1, soluble
chromobox homolog 3 (HP1 gamma homolog, Drosophila)
ribosomal protein S29
ribosomal protein L22
ribosomal protein L9

HSC upregulated 20 probe sets

immunglobulin kappa chain variable 28
hemoglobin alpha adult chain1
coagilation factor II (thrombin) receptor
dihydrouridine synthase 2-like
proliferation-asscociated 2G4
trnasformation related protein 53 binding protein 1
splicing factor,arginine /serine- rich6
neutrophilic granule protein protein
erythroid differntiation regulator 1
S100 calcium binding protein A9
chymase2, mast cell
ribosomal RNA processing 15 homolog (S. cerevisiae)
serum amyloid A4, constitutive
scavenger receptor class A, member 5 (putative)
syndecan 4
serine dehydratase
Sec61 alpha 1 subunit (S. cerevisiae)
nudix (nucleoside diphosphate linked moiety X)-type motif 4
paired box 8

Supp. Table 2 TERT Liver

Downregulated 1209 probe sets

Entrez Gene Name
RIKEN cDNA 0610009L18 gene
RIKEN cDNA 0610012H03 gene
RIKEN cDNA 1110001A16 gene
RIKEN cDNA 1110006G14 gene
RIKEN cDNA 1110054M08 gene
RIKEN cDNA 1110059G02 gene
RIKEN cDNA 1500017E21 gene
RIKEN cDNA 1700012L04 gene
RIKEN cDNA 1700020I14 gene
RIKEN cDNA 1700025K04 gene
RIKEN cDNA 1810019D21 gene
RIKEN cDNA 1810058I24 gene
RIKEN cDNA 2010003K15 gene
RIKEN cDNA 2010109N14 gene
RIKEN cDNA 2610001J05 gene
RIKEN cDNA 2610024B07 gene
RIKEN cDNA 2810468N07 gene
glyceraldehyde-3-phosphate dehydrogenase pseudogene
RIKEN cDNA 3100002H20 gene
RIKEN cDNA 4930553P13 gene
RIKEN cDNA 4930554C24 gene
RIKEN cDNA 4931408D14 gene
RIKEN cDNA 5730407I07 gene
RIKEN cDNA 6720418B01 gene
RIKEN cDNA 9030419F21 gene
RIKEN cDNA 9130409I23 gene
RIKEN cDNA 9930033D15 gene
RIKEN cDNA A430033K04 gene
expressed sequence AA408650
achalasia, adrenocortical insufficiency, alacrimia (Allgrove, triple-A)
acetoacetyl-CoA synthetase
acetoacetyl-CoA synthetase
arylacetamide deacetylase (esterase)
alpha- and gamma-adaptin binding protein
4-aminobutyrate aminotransferase
ATP-binding cassette, sub-family B (MDR/TAP), member 6
ATP-binding cassette, sub-family B (MDR/TAP), member 8
ATP-binding cassette, sub-family C (CFTR/MRP), member 3
ATP-binding cassette, sub-family D (ALD), member 1
ATP-binding cassette, sub-family D (ALD), member 3
abhydrolase domain containing 14B
abhydrolase domain containing 15
abhydrolase domain containing 3

abhydrolase domain containing 4
acetyl-Coenzyme A acyltransferase 1
acetyl-Coenzyme A acyltransferase 1
acetyl-Coenzyme A acyltransferase 1B
acetyl-Coenzyme A acyltransferase 2
acetyl-Coenzyme A carboxylase alpha
acetyl-Coenzyme A carboxylase beta
acyl-Coenzyme A dehydrogenase family, member 10
acyl-Coenzyme A dehydrogenase family, member 8
acyl-Coenzyme A dehydrogenase family, member 9
acyl-Coenzyme A dehydrogenase family, member 9
acyl-Coenzyme A dehydrogenase, long chain
acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain
acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain
acyl-Coenzyme A dehydrogenase, very long chain
acetyl-Coenzyme A acetyltransferase 1
acetyl-Coenzyme A acetyltransferase 1
acetyl-Coenzyme A acetyltransferase 1
acetyl-Coenzyme A acetyltransferase 2
1-aminocyclopropane-1-carboxylate synthase homolog (Arabidopsis)(non-functional)
ATP citrate lyase
ATP citrate lyase
aconitase 2, mitochondrial
acyl-CoA thioesterase 1
acyl-CoA thioesterase 1
acyl-CoA thioesterase 13
acyl-CoA thioesterase 2
acyl-CoA thioesterase 4
acyl-CoA thioesterase 4
acyl-CoA thioesterase 8
acyl-Coenzyme A oxidase 1, palmitoyl
acyl-Coenzyme A oxidase 1, palmitoyl
acyl-Coenzyme A oxidase 1, palmitoyl
acyl-CoA synthetase family member 3
acyl-CoA synthetase long-chain family member 5
acyl-CoA synthetase medium-chain family member 5
aspartoacylase (aminocyclase) 3
ADAM metallopeptidase domain 28
adenylate cyclase 6
alcohol dehydrogenase, iron containing, 1
acireductone dioxygenase 1
adiponectin receptor 2
adiponectin receptor 2
AFG3 ATPase family gene 3-like 2 (yeast)
aspartylglucosaminidase
ATP/GTP binding protein-like 5
amylo-1, 6-glucosidase, 4-alpha-glucanotransferase
agmatine ureohydrolase (agmatinase)
1-acylglycerol-3-phosphate O-acyltransferase 2 (lysophosphatidic acid acyltransferase, beta)
1-acylglycerol-3-phosphate O-acyltransferase 3
1-acylglycerol-3-phosphate O-acyltransferase 3
aminoglycoside phosphotransferase domain containing 1

ATP/GTP binding protein 1
alanine-glyoxylate aminotransferase 2
alanine-glyoxylate aminotransferase 2-like 1
expressed sequence AI317395
expressed sequence AI317395
expressed sequence AI317395
apoptosis-inducing factor, mitochondrion-associated, 3
adenylate kinase 2
adenylate kinase 2
A kinase (PRKA) anchor protein 1
aldo-keto reductase family 1, member A1 (aldehyde reductase)
aldo-keto reductase family 1, member A1 (aldehyde reductase)
aldo-keto reductase family 1, member A1 (aldehyde reductase)
aldo-keto reductase family 1, member A1 (aldehyde reductase)
aldo-keto reductase family 1, member C20
aldo-keto reductase family 7, member A2 (aflatoxin aldehyde reductase)
aminolevulinate, delta-, dehydratase
aldehyde dehydrogenase 1 family, member A1
aldehyde dehydrogenase family 1, subfamily A7
aldehyde dehydrogenase 2 family (mitochondrial)
aldehyde dehydrogenase 2 family (mitochondrial)
aldehyde dehydrogenase 2 family (mitochondrial)
aldehyde dehydrogenase 3 family, member A2
aldehyde dehydrogenase 4 family, member A1
aldehyde dehydrogenase 5 family, member A1
aldehyde dehydrogenase 6 family, member A1
aldehyde dehydrogenase 7 family, member A1
aldehyde dehydrogenase 7 family, member A1
aldehyde dehydrogenase 9 family, member A1
aldehyde dehydrogenase 9 family, member A1
aldolase B, fructose-bisphosphate
amidohydrolase domain containing 1
amidohydrolase domain containing 1
antagonist of mitotic exit network 1 homolog (S. cerevisiae)
amylase, alpha 2A (pancreatic)
angiopoietin-like 3
ankylosis, progressive homolog (mouse)
ankyrin repeat and sterile alpha motif domain containing 4B
acidic (leucine-rich) nuclear phosphoprotein 32 family, member A
annexin A6
annexin A7
aldehyde oxidase 1
adaptor-related protein complex 3, mu 1 subunit
amyloid beta (A4) precursor-like protein 2
apolipoprotein A-I binding protein
apolipoprotein A-II
apolipoprotein A-V
apolipoprotein C-I
apolipoprotein C-III
apolipoprotein E
apolipoprotein H (beta-2-glycoprotein I)
apolipoprotein L, 3

adaptor protein, phosphotyrosine interaction, PH domain and leucine zipper containing 2
aprataxin
aquaporin 4
aquaporin 8
aquaporin 9
androgen receptor
actin related protein M1
cAMP-regulated phosphoprotein, 19kDa
cAMP-regulated phosphoprotein, 19kDa
arrestin domain containing 3
arylsulfatase A
arylsulfatase B
arylsulfatase B
arylsulfatase family, member K
asialoglycoprotein receptor 1
aspartoacylase (Canavan disease)
asparaginase homolog (S. cerevisiae)
asparaginase like 1
ATPase family, AAA domain containing 3A
activating transcription factor 5
ATG4 autophagy related 4 homolog A (S. cerevisiae)
ATG5 autophagy related 5 homolog (S. cerevisiae)
ATG5 autophagy related 5 homolog (S. cerevisiae)
ATG5 autophagy related 5 homolog (S. cerevisiae)
ATG7 autophagy related 7 homolog (S. cerevisiae)
ATG7 autophagy related 7 homolog (S. cerevisiae)
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit B1
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit d
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit F2
ATPase, class II, type 9A
ATPase, class II, type 9A
ATP synthase mitochondrial F1 complex assembly factor 1
ataxin 10
expressed sequence AU015680
expressed sequence AU018778
AU RNA binding protein/enoyl-Coenzyme A hydratase
antizyme inhibitor 1
RIKEN cDNA B230114P17 gene
butyrobetaine (gamma), 2-oxoglutarate dioxygenase (gamma-butyrobetaine hydroxylase) 1
butyrobetaine (gamma), 2-oxoglutarate dioxygenase (gamma-butyrobetaine hydroxylase) 1
cDNA sequence BC026585
B-cell receptor-associated protein 29
butyrylcholinesterase
3-hydroxybutyrate dehydrogenase, type 1
3-hydroxybutyrate dehydrogenase, type 1
blocked early in transport 1 homolog (S. cerevisiae)
bifunctional apoptosis regulator
betaine-homocysteine methyltransferase
BH3 interacting domain death agonist
baculoviral IAP repeat-containing 3
bolA homolog 3 (E. coli)
biphenyl hydrolase-like (serine hydrolase)

brain protein I3
brain protein 44
Berardinelli-Seip congenital lipodystrophy 2 (seipin)
chromosome 10 open reading frame 35
chromosome 10 open reading frame 58
chromosome 11 open reading frame 1
chromosome 11 open reading frame 17
chromosome 11 open reading frame 31
chromosome 11 open reading frame 51
chromosome 11 open reading frame 54
chromosome 11 open reading frame 54
chromosome 11 open reading frame 71
chromosome 12 open reading frame 62
chromosome 12 open reading frame 73
chromosome 14 open reading frame 145
chromosome 14 open reading frame 149
chromosome 14 open reading frame 153
chromosome 14 open reading frame 159
chromosome 14 open reading frame 68
chromosome 16 open reading frame 72
chromosome 17 open reading frame 37
chromosome 17 open reading frame 48
chromosome 17 open reading frame 90
chromosome 17 open reading frame 90
chromosome 18 open reading frame 19
chromosome 18 open reading frame 19
chromosome 18 open reading frame 55
chromosome 19 open reading frame 56
chromosome 19 open reading frame 60
chromosome 1 open reading frame 128
chromosome 1 open reading frame 151
chromosome 1 open reading frame 174
chromosome 1 open reading frame 210
chromosome 20 open reading frame 30
chromosome 20 open reading frame 43
chromosome 20 open reading frame 43
chromosome 21 open reading frame 33
chromosome 22 open reading frame 9
C2 calcium-dependent domain containing 2
chromosome 2 open reading frame 47
chromosome 2 open reading frame 60
chromosome 6 open reading frame 203
chromosome 6 open reading frame 89
chromosome 6 open reading frame 89
chromosome 6 open reading frame 89
RIKEN cDNA C730029A08 gene
RIKEN cDNA C730029A08 gene
RIKEN cDNA C730049O14 gene
expressed sequence C78859
chromosome 7 open reading frame 10
chromosome 7 open reading frame 59
chromosome 8 open reading frame 38

chromosome 8 open reading frame 40
chromosome 8 open reading frame 42
chromosome 8 open reading frame 82
chromosome 9 open reading frame 119
chromosome 9 open reading frame 5
chromosome 9 open reading frame 69
carbonic anhydrase III, muscle specific
carbonic anhydrase III, muscle specific
carbonic anhydrase III, muscle specific
carbonic anhydrase VA, mitochondrial
carbonic anhydrase VIII
calcium binding protein 39-like
chaperone, ABC1 activity of bc1 complex homolog (S. pombe)
calcium channel, voltage-dependent, L type, alpha 1D subunit
calcium binding and coiled-coil domain 1
calcium/calmodulin-dependent protein kinase II beta
calpain, small subunit 1
calcium regulated heat stable protein 1, 24kDa
caspase 6, apoptosis-related cysteine peptidase
calpastatin
calpastatin
catalase
catalase
caveolin 1, caveolae protein, 22kDa
carbonyl reductase 4
coiled-coil domain containing 107
coiled-coil domain containing 28A
coiled-coil domain containing 53
coiled-coil domain containing 58
coiled-coil domain containing 93
cyclin G1
cyclin G1
cyclin H
CD36 molecule (thrombospondin receptor)
CD36 molecule (thrombospondin receptor)
CD36 molecule (thrombospondin receptor)
CD59a antigen
CD81 molecule
cyclin-dependent kinase 7
CDV3 homolog (mouse)
centromere protein V
carboxylesterase 1 (monocyte/macrophage serine esterase 1)
carboxylesterase 1 (monocyte/macrophage serine esterase 1)
carboxylesterase 1 (monocyte/macrophage serine esterase 1)
carboxylesterase 1
carboxylesterase 5
choline dehydrogenase
choline kinase beta
chimerin (chimaerin) 2
choline phosphotransferase 1
choline phosphotransferase 1

choline phosphotransferase 1
conserved helix-loop-helix ubiquitous kinase
cell death-inducing DFFA-like effector b
CDGSH iron sulfur domain 1
CDGSH iron sulfur domain 1
CDGSH iron sulfur domain 3
cytoplasmic linker associated protein 2
claudin 2
calmin (calponin-like, transmembrane)
calsyntenin 3
cytidine monophosphate N-acetylneuraminic acid synthetase
carboxymethylenebutenolidase homolog (Pseudomonas)
COX assembly mitochondrial protein homolog (S. cerevisiae)
CKLF-like MARVEL transmembrane domain containing 8
CCR4-NOT transcription complex, subunit 8
Coenzyme A synthase
Coenzyme A synthase
component of oligomeric golgi complex 4
collagen, type XIV, alpha 1
collagen, type IV, alpha 3 (Goodpasture antigen) binding protein
catechol-O-methyltransferase
coatomer protein complex, subunit gamma 2
COP9 constitutive photomorphogenic homolog subunit 6 (Arabidopsis)
coatomer protein complex, subunit zeta 2
coenzyme Q2 homolog, prenyltransferase (yeast)
coenzyme Q5 homolog, methyltransferase (S. cerevisiae)
coenzyme Q9 homolog (S. cerevisiae)
coronin, actin binding protein, 1B
COX15 homolog, cytochrome c oxidase assembly protein (yeast)
COX19 cytochrome c oxidase assembly homolog (S. cerevisiae)
cytochrome c oxidase subunit Vb
cytochrome c oxidase subunit Vib polypeptide 1 (ubiquitous)
cytochrome c oxidase subunit VIIc
cytochrome c oxidase subunit 8A (ubiquitous)
cytochrome c oxidase subunit 8A (ubiquitous)
coproporphyrinogen oxidase
coproporphyrinogen oxidase
carnitine palmitoyltransferase 2
carnitine palmitoyltransferase 2
carnitine acetyltransferase
cellular repressor of E1A-stimulated genes 1
cellular repressor of E1A-stimulated genes 1
carnitine O-octanoyltransferase
crystallin, lambda 1
crystallin, lambda 1
crystallin, zeta (quinone reductase)
crystallin, zeta (quinone reductase)
citrate synthase
citrate synthase
casein kinase 1, gamma 3
CTAGE family, member 5

cathepsin O
cullin 4A
chemokine (C-X-C motif) ligand 9
cytochrome b5 type B (outer mitochondrial membrane)
cytochrome b5 type B (outer mitochondrial membrane)
cytochrome b5 type B (outer mitochondrial membrane)
cytochrome b5 reductase 3
cytochrome b5 reductase 3
cytochrome P450, family 2, subfamily C, polypeptide 18
cytochrome P450, family 2, subfamily c, polypeptide 29
cytochrome P450, family 2, subfamily c, polypeptide 38
cytochrome P450, family 2, subfamily d, polypeptide 26
cytochrome P450, family 2, subfamily D, polypeptide 6
cytochrome P450, family 2, subfamily j, polypeptide 5
cytochrome P450, family 46, subfamily A, polypeptide 1
cytochrome P450, family 4, subfamily A, polypeptide 11
cytochrome P450, family 4, subfamily a, polypeptide 14
cytochrome P450, family 8, subfamily B, polypeptide 1
cysteinyl leukotriene receptor 1
RIKEN cDNA D130020L05 gene
D-2-hydroxyglutarate dehydrogenase
hypothetical protein D930001B02
dihydroxyacetone kinase 2 homolog (S. cerevisiae)
death associated protein 3
death-associated protein kinase 1
DAZ associated protein 2
diazepam binding inhibitor (GABA receptor modulator, acyl-Coenzyme A binding protein)
diazepam binding inhibitor (GABA receptor modulator, acyl-Coenzyme A binding protein)
diazepam binding inhibitor (GABA receptor modulator, acyl-Coenzyme A binding protein)
diazepam binding inhibitor (GABA receptor modulator, acyl-Coenzyme A binding protein)
D site of albumin promoter (albumin D-box) binding protein
D site of albumin promoter (albumin D-box) binding protein
DDB1 and CUL4 associated factor 11
DDB1 and CUL4 associated factor 12-like 1
dodecenoyl-Coenzyme A delta isomerase (3,2 trans-enoyl-Coenzyme A isomerase)
DNA cross-link repair 1A (PSO2 homolog, S. cerevisiae)
dynactin 2 (p50)
dynactin 4 (p62)
DCN1, defective in cullin neddylation 1, domain containing 4 (S. cerevisiae)
dimethylarginine dimethylaminohydrolase 1
dimethylarginine dimethylaminohydrolase 1
dimethylarginine dimethylaminohydrolase 1
dimethylarginine dimethylaminohydrolase 1
DDHD domain containing 2
2,4-dienoyl CoA reductase 1, mitochondrial
2,4-dienoyl CoA reductase 1, mitochondrial
DENN/MADD domain containing 2D
2-deoxyribose-5-phosphate aldolase homolog (C. elegans)
Der1-like domain family, member 2
diacylglycerol O-acyltransferase homolog 2 (mouse)
DiGeorge syndrome critical region gene 6

dihydrodiol dehydrogenase (dimeric)
dehydrogenase/reductase (SDR family) member 4
dehydrogenase/reductase (SDR family) member 7B
dehydrogenase E1 and transketolase domain containing 1
DIP2 disco-interacting protein 2 homolog C (Drosophila)
DIRAS family, GTP-binding RAS-like 1
dihydrolipoamide S-acetyltransferase
dihydrolipoamide S-acetyltransferase
dihydrolipoamide S-acetyltransferase
dihydrolipoamide S-succinyltransferase (E2 component of 2-oxo-glutarate complex)
DnaJ (Hsp40) homolog, subfamily C, member 15
DnaJ (Hsp40) homolog, subfamily C, member 19
DnaJ (Hsp40) homolog, subfamily C, member 28
dedicator of cytokinesis 9
dipeptidyl-peptidase 4
dpy-30 homolog (C. elegans)
dihydropyrimidinase
dihydropyrimidinase
DNA-damage regulated autophagy modulator 2
desmoplakin
dystrobrevin binding protein 1
deltex 3-like (Drosophila)
dual specificity phosphatase 22
dual specificity phosphatase 23
dual specificity phosphatase 6
dynein, light chain, roadblock-type 1
dynein, light chain, Tctex-type 3
dynein, light chain, Tctex-type 3
estrogen receptor binding site associated, antigen, 9
emopamil binding protein-like
enoyl Coenzyme A hydratase 1, peroxisomal
enoyl Coenzyme A hydratase domain containing 3
enoyl Coenzyme A hydratase, short chain, 1, mitochondrial
ephrin-A5
enoyl-Coenzyme A, hydratase/3-hydroxyacyl Coenzyme A dehydrogenase
eukaryotic translation initiation factor 1
ELMO/CED-12 domain containing 2
ELOVL family member 5, elongation of long chain fatty acids (FEN1/Elo2, SUR4/Elo3-like, yeast)
ELOVL family member 5, elongation of long chain fatty acids (FEN1/Elo2, SUR4/Elo3-like, yeast)
ELOVL family member 6, elongation of long chain fatty acids (FEN1/Elo2, SUR4/Elo3-like, yeast)
ELOVL family member 6, elongation of long chain fatty acids (FEN1/Elo2, SUR4/Elo3-like, yeast)
enolase 1, (alpha)
enolase 1, (alpha)
enolase 1, (alpha)
glutamyl aminopeptidase (aminopeptidase A)
ectonucleoside triphosphate diphosphohydrolase 5
ectonucleoside triphosphate diphosphohydrolase 5
ectonucleoside triphosphate diphosphohydrolase 5
ectonucleoside triphosphate diphosphohydrolase 5
ectonucleoside triphosphate diphosphohydrolase 5
enhancer of yellow 2 homolog (Drosophila)

epoxide hydrolase 2, cytoplasmic
endoplasmic reticulum-golgi intermediate compartment (ERGIC) 1
ER lipid raft associated 2
endoplasmic reticulum metallopeptidase 1
esterase 22
esterase D/formylglutathione hydrolase
electron-transferring-flavoprotein dehydrogenase
ethylmalonic encephalopathy 1
exosome component 7
fatty acid binding protein 1, liver
fatty acid binding protein 1, liver
fatty acid binding protein 2, intestinal
Fas (TNFRSF6)-associated via death domain
fatty acid desaturase domain family, member 6
fatty acid desaturase domain family, member 6
fumarylacetoacetate hydrolase domain containing 1
fumarylacetoacetate hydrolase domain containing 2A
fumarylacetoacetate hydrolase domain containing 2A
fumarylacetoacetate hydrolase domain containing 2A
family with sequence similarity 102, member A
family with sequence similarity 104, member A
family with sequence similarity 108, member A1
family with sequence similarity 108, member A1
family with sequence similarity 126, member A
family with sequence similarity 13, member A
family with sequence similarity 13, member A
family with sequence similarity 158, member A
family with sequence similarity 73, member B
family with sequence similarity 73, member B
family with sequence similarity 73, member B
family with sequence similarity 82, member A1
family with sequence similarity 82, member A1
family with sequence similarity 82, member A1
family with sequence similarity 82, member A2
family with sequence similarity 82, member A2
family with sequence similarity 89, member A
fatty acid synthase
fructose-1,6-bisphosphatase 1
F-box protein 3
FCF1 small subunit (SSU) processome component homolog (S. cerevisiae)
fibroblast growth factor receptor-like 1
fibroblast growth factor receptor-like 1
fat storage-inducing transmembrane protein 1
FK506 binding protein 1B, 12.6 kDa
flightless I homolog (Drosophila)
flightless I homolog (Drosophila)
flavin containing monooxygenase 1
folliculin interacting protein 2
ferritin, heavy polypeptide 1
ferritin, heavy polypeptide 1
ferritin, light polypeptide

ferritin, light polypeptide
fucosidase, alpha-L- 1, tissue
fusion (involved in t(12;16) in malignant liposarcoma)
fucosyltransferase 11 (alpha (1,3) fucosyltransferase)
frizzled homolog 4 (Drosophila)
G0/G1switch 2
galactokinase 1
galactose mutarotase (aldose 1-epimerase)
galactose-1-phosphate uridylyltransferase
glyceraldehyde-3-phosphate dehydrogenase
glyceraldehyde-3-phosphate dehydrogenase
glyceraldehyde-3-phosphate dehydrogenase
glyceraldehyde-3-phosphate dehydrogenase
growth arrest-specific 1
growth arrest-specific 1
growth arrest-specific 2
glucan (1,4-alpha-), branching enzyme 1
guanylate binding protein family, member 6
guanylate binding protein family, member 6
glutaryl-Coenzyme A dehydrogenase
glucokinase (hexokinase 4) regulator
G elongation factor, mitochondrial 1
gamma-glutamyl cyclotransferase
growth hormone inducible transmembrane protein
GLE1 RNA export mediator homolog (yeast)
glyoxalase I
glyoxalase I
glyoxalase I
glutaredoxin 5
GDP-mannose pyrophosphorylase A
glucosamine-6-phosphate deaminase 1
glucosamine-6-phosphate deaminase 1
N-acetylglucosamine-1-phosphate transferase, alpha and beta subunits
glycerol-3-phosphate acyltransferase, mitochondrial
glycerol-3-phosphate dehydrogenase 1 (soluble)
glycerol-3-phosphate dehydrogenase 2 (mitochondrial)
glycerol-3-phosphate dehydrogenase 2 (mitochondrial)
glutamic pyruvate transaminase (alanine aminotransferase) 2
glutathione peroxidase 4 (phospholipid hydroperoxidase)
GRAM domain containing 3
glycogen synthase kinase 3 beta
glutathione S-transferase alpha 5
glutathione S-transferase alpha 5
glutathione S-transferase kappa 1
glutathione S-transferase mu 1
glutathione S-transferase mu 2 (muscle)
glutathione S-transferase mu 4
glutathione S-transferase mu 5
glutathione S-transferase mu 5
glutathione S-transferase mu 5
glutathione S-transferase, mu 6

glutathione S-transferase, theta 3
glutathione transferase zeta 1
glycosyltransferase-like domain containing 1
general transcription factor IIH, polypeptide 5
GDNF-inducible zinc finger protein 1
3-hydroxyanthranilate 3,4-dioxygenase
hydroxyacyl-Coenzyme A dehydrogenase
hydroxyacyl-Coenzyme A dehydrogenase
hydroxyacyl-Coenzyme A dehydrogenase
hydroxyacyl-Coenzyme A dehydrogenase/3-ketoacyl-Coenzyme A thiolase/enoyl-Coenzyme
hydroxyacyl-Coenzyme A dehydrogenase/3-ketoacyl-Coenzyme A thiolase/enoyl-Coenzyme
host cell factor C1 regulator 1 (XPO1 dependent)
hCG1645727
histone deacetylase 11
histone deacetylase 11
histone deacetylase 3
haloacid dehalogenase-like hydrolase domain containing 2
hemochromatosis
homogentisate 1,2-dioxygenase (homogentisate oxidase)
HGF activator
3-hydroxyisobutyrate dehydrogenase
3-hydroxyisobutyrate dehydrogenase
3-hydroxyisobutyryl-Coenzyme A hydrolase
homeodomain interacting protein kinase 2
homeodomain interacting protein kinase 2
Holliday junction recognition protein
major histocompatibility complex, class I, C
major histocompatibility complex, class I, C
major histocompatibility complex, class II, DQ alpha 1
major histocompatibility complex, class II, DQ beta 1
major histocompatibility complex, class II, DR alpha
holocarboxylase synthetase (biotin-(proprionyl-Coenzyme A-carboxylase (ATP-hydrolysing)) ligase)
3-hydroxymethyl-3-methylglutaryl-Coenzyme A lyase
3-hydroxy-3-methylglutaryl-Coenzyme A synthase 2 (mitochondrial)
3-hydroxy-3-methylglutaryl-Coenzyme A synthase 2 (mitochondrial)
histamine N-methyltransferase
hook homolog 3 (Drosophila)
hydroxyprostaglandin dehydrogenase 15-(NAD)
hydroxyprostaglandin dehydrogenase 15-(NAD)
heat-responsive protein 12
heat shock factor binding protein 1
hydroxysteroid (17-beta) dehydrogenase 10
hydroxysteroid (17-beta) dehydrogenase 10
hydroxysteroid (17-beta) dehydrogenase 11
hydroxysteroid (17-beta) dehydrogenase 12
hydroxysteroid (17-beta) dehydrogenase 4
hydroxysteroid (17-beta) dehydrogenase 4
hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 7
hydroxypyruvate isomerase homolog (E. coli)
isocitrate dehydrogenase 1 (NADP+), soluble

isocitrate dehydrogenase 3 (NAD+) gamma
isocitrate dehydrogenase 3 (NAD+) gamma
interferon-induced protein with tetratricopeptide repeats 1-like
interferon responsive gene 15
IMP2 inner mitochondrial membrane peptidase-like (S. cerevisiae)
inhibin, beta E
indolethylamine N-methyltransferase
iron-sulfur cluster scaffold homolog (E. coli)
isochorismatase domain containing 1
isochorismatase domain containing 2b
integral membrane protein 2B
kelch repeat and BTB (POZ) domain containing 11
potassium voltage-gated channel, subfamily H (eag-related), member 3
3-ketodihydrosphingosine reductase
KH domain containing, RNA binding, signal transduction associated 3
ketohexokinase (fructokinase)
KIAA0020
KIAA0020
KIAA0141
KIAA0564
KIAA0564
KIAA0922
KIAA1530
kinesin family member 1B
Kruppel-like factor 10
kelch-like 22 (Drosophila)
kelch-like 5 (Drosophila)
keratin 8
L-2-hydroxyglutarate dehydrogenase
lactamase, beta 2
lysosomal-associated membrane protein 2
LAG1 homolog, ceramide synthase 2
LAG1 homolog, ceramide synthase 6
linker for activation of T cells family, member 2
lysocardiolipin acyltransferase 1
liver expressed antimicrobial peptide 2
lectin, galactoside-binding, soluble, 1
lectin, galactoside-binding, soluble, 1
lectin, galactoside-binding, soluble, 3 binding protein
lectin, galactoside-binding, soluble, 8
lectin, galactoside-binding, soluble, 9B
phospholysine phosphohistidine inorganic pyrophosphate phosphatase
lipoic acid synthetase
lipoic acid synthetase
lipase A, lysosomal acid, cholesterol esterase
lipase A, lysosomal acid, cholesterol esterase
lipase, hepatic
lipase, endothelial
lipase, endothelial
lipoyltransferase 1

ribosomal protein L13 pseudogene 12
hypothetical protein LOC389203
hypothetical LOC440335
cell division cycle 42 pseudogene
similar to S-phase kinase-associated protein 1A (p19A)
lon peptidase 2, peroxisomal
lysophosphatidylcholine acyltransferase 3
leucine rich repeat containing 28
leucine-rich repeat kinase 1
LSM2 homolog, U6 small nuclear RNA associated (S. cerevisiae)
LUC7-like 2 (S. cerevisiae)
LYR motif containing 2
LYR motif containing 5
mannose-6-phosphate receptor (cation dependent)
MACRO domain containing 1
monoamine oxidase B
mitogen-activated protein kinase 15
membrane-associated ring finger (C3HC4) 2
myristoylated alanine-rich protein kinase C substrate
mannose-binding lectin (protein C) 2, soluble (opsonic defect)
muscleblind-like (Drosophila)
methylcrotonoyl-Coenzyme A carboxylase 1 (alpha)
methylcrotonoyl-Coenzyme A carboxylase 2 (beta)
methylcrotonoyl-Coenzyme A carboxylase 2 (beta)
methylmalonyl CoA epimerase
malate dehydrogenase 1, NAD (soluble)
malate dehydrogenase 1, NAD (soluble)
malic enzyme 1, NADP(+)-dependent, cytosolic
malic enzyme 1, NADP(+)-dependent, cytosolic
methyltransferase like 5
methyltransferase like 7B
mitofusin 2
O-6-methylguanine-DNA methyltransferase
microsomal glutathione S-transferase 1
microsomal glutathione S-transferase 3
MID1 interacting protein 1 (gastrulation specific G12 homolog (zebrafish))
mitochondrial intermediate peptidase
McKusick-Kaufman syndrome
malectin
methylmalonic aciduria (cobalamin deficiency) cblD type, with homocystinuria
membrane metallo-endopeptidase
monoacylglycerol O-acyltransferase 1
MOCO sulphurase C-terminal domain containing 1
mannose-P-dolichol utilization defect 1
mitochondrial ribosomal protein L14
mitochondrial ribosomal protein L16
mitochondrial ribosomal protein L22
mitochondrial ribosomal protein L39
mitochondrial ribosomal protein L41
mitochondrial ribosomal protein L41

mitochondrial ribosomal protein L45
mitochondrial ribosomal protein L48
mitochondrial ribosomal protein L49
mitochondrial ribosomal protein L49
mitochondrial ribosomal protein S14
mitochondrial ribosomal protein S16
mitochondrial ribosomal protein S17
mitochondrial ribosomal protein S18B
mitochondrial ribosomal protein S2
mitochondrial ribosomal protein S27
mitochondrial ribosomal protein S33
mitochondrial ribosomal protein S35
methionine sulfoxide reductase A
methionine sulfoxide reductase B2
myotubularin related protein 9
mechanistic target of rapamycin (serine/threonine kinase)
metaxin 2
metaxin 3
muted homolog (mouse)
asparaginyl-tRNA synthetase 2, mitochondrial (putative)
N-acetyltransferase 9 (GCN5-related, putative)
neutral cholesterol ester hydrolase 1
non-protein coding RNA 116
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 13
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3, 9kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 4, 9kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 6, 14kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 7, 14.5kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 7, 14.5kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 9, 39kDa
NADH dehydrogenase (ubiquinone) 1, alpha/beta subcomplex, 1, 8kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, assembly factor 1
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 2, 8kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 2, 8kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 8, 19kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 9, 22kDa
NADH dehydrogenase (ubiquinone) Fe-S protein 1, 75kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 5, 15kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 5, 15kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 6, 13kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 8, 23kDa (NADH-coenzyme Q reductase)
N-terminal EF-hand calcium binding protein 1
nuclear factor (erythroid-derived 2)-like 1
nuclear factor (erythroid-derived 2)-like 2
nuclear factor (erythroid-derived 2)-like 2
NFU1 iron-sulfur cluster scaffold homolog (S. cerevisiae)
nipsnap homolog 1 (C. elegans)
nipsnap homolog 1 (C. elegans)
nitrilase family, member 2
nicotinamide nucleotide adenylyltransferase 1

nephronophthisis 3 (adolescent)
NAD(P)H dehydrogenase, quinone 2
NAD(P)H dehydrogenase, quinone 2
NAD(P)H dehydrogenase, quinone 2
nuclear receptor subfamily 1, group D, member 1
nuclear receptor subfamily 2, group F, member 2
nuclear receptor subfamily 2, group F, member 2
NSFL1 (p97) cofactor (p47)
5'-nucleotidase, ecto (CD73)
nudix (nucleoside diphosphate linked moiety X)-type motif 1
nudix (nucleoside diphosphate linked moiety X)-type motif 12
nudix (nucleoside diphosphate linked moiety X)-type motif 16-like 1
nudix (nucleoside diphosphate linked moiety X)-type motif 9
2'-5'-oligoadenylate synthetase-like
OCIA domain containing 2
OCIA domain containing 2
odz, odd Oz/ten-m homolog 3 (Drosophila)
odz, odd Oz/ten-m homolog 3 (Drosophila)
olfactomedin 3
oligodendrocyte transcription factor 1
optic atrophy 1 (autosomal dominant)
olfactory receptor, family 2, subfamily T, member 33
origin recognition complex, subunit 5-like (yeast)
ORM1-like 1 (S. cerevisiae)
ORM1-like 3 (S. cerevisiae)
oxysterol binding protein-like 3
oxysterol binding protein-like 3
oxysterol binding protein-like 8
O-sialoglycoprotein endopeptidase-like 1
O-sialoglycoprotein endopeptidase-like 1
ornithine carbamoyltransferase
oxidoreductase NAD-binding domain containing 1
protein kinase C and casein kinase substrate in neurons 2
platelet-activating factor acetylhydrolase, isoform Ib, subunit 1 (45kDa)
pantothenate kinase 1
pantothenate kinase 1
3'-phosphoadenosine 5'-phosphosulfate synthase 1
progestin and adipoQ receptor family member VII
progestin and adipoQ receptor family member IX
Parkinson disease (autosomal recessive, early onset) 7
Parkinson disease (autosomal recessive, early onset) 7
poly (ADP-ribose) polymerase family, member 9
phenazine biosynthesis-like protein domain containing
pre-B-cell leukemia homeobox 1
pyruvate carboxylase
pterin-4 alpha-carbinolamine dehydratase/dimerization cofactor of hepatocyte nuclear factor
pterin-4 alpha-carbinolamine dehydratase/dimerization cofactor of hepatocyte nuclear factor
propionyl Coenzyme A carboxylase, alpha polypeptide
proprotein convertase subtilisin/kexin type 4
proprotein convertase subtilisin/kexin type 6

phosphate cytidylyltransferase 1, choline, alpha
programmed cell death 4 (neoplastic transformation inhibitor)
programmed cell death 6
phosphodiesterase 3B, cGMP-inhibited
pyruvate dehydrogenase (lipoamide) alpha 1
pyruvate dehydrogenase (lipoamide) beta
pyruvate dehydrogenase (lipoamide) beta
pyruvate dehydrogenase kinase, isozyme 1
pyruvate dehydrogenase kinase, isozyme 1
pyruvate dehydrogenase kinase, isozyme 1
pyruvate dehydrogenase kinase, isozyme 2
p53 and DNA-damage regulated 1
pyridoxal (pyridoxine, vitamin B6) phosphatase
PDZ domain containing 1
phosphatidylethanolamine binding protein 1
phosphatidylethanolamine binding protein 1
peroxisomal trans-2-enoyl-CoA reductase
PERP, TP53 apoptosis effector
PET112-like (yeast)
peroxisomal biogenesis factor 1
peroxisomal biogenesis factor 11 alpha
peroxisomal biogenesis factor 11 gamma
peroxisomal biogenesis factor 11 gamma
peroxisomal biogenesis factor 16
peroxisomal biogenesis factor 19
peroxisomal biogenesis factor 19
peroxisomal biogenesis factor 3
peroxisomal biogenesis factor 3
peroxisomal biogenesis factor 5
peroxisomal biogenesis factor 7
prefoldin subunit 2
phosphoglycerate mutase 1 (brain)
plasma glutamate carboxypeptidase
phosphogluconate dehydrogenase
phosphoglucomutase 1
progesterone receptor membrane component 1
progesterone receptor membrane component 2
progesterone receptor membrane component 2
phosphorylase kinase, alpha 2 (liver)
phosphatidylinositol glycan anchor biosynthesis, class P
phosphatidylinositol glycan anchor biosynthesis, class Q
phosphatidylinositol glycan anchor biosynthesis, class Y
phosphoinositide-3-kinase, regulatory subunit 6
PTEN induced putative kinase 1
PTEN induced putative kinase 1
phosphatidylinositol transfer protein, cytoplasmic 1
pyruvate kinase, liver and RBC
pyruvate kinase, liver and RBC
pyruvate kinase, liver and RBC
perilipin 2

peptidase M20 domain containing 1
peptidase M20 domain containing 1
phosphomannomutase 1
paroxysmal nonkinesigenic dyskinesia
poly(A)-specific ribonuclease (PARN)-like domain containing 1
polymerase (RNA) III (DNA directed) polypeptide B
protein-O-mannosyltransferase 1
paraoxonase 1
pyrophosphatase (inorganic) 2
phosphatidic acid phosphatase type 2B
phosphatidic acid phosphatase type 2B
peroxisome proliferator-activated receptor alpha
peroxisome proliferator-activated receptor alpha
peroxisome proliferator-activated receptor gamma
phosphopantothenoylcysteine synthetase
peptidylprolyl isomerase H (cyclophilin H)
peptidylprolyl isomerase (cyclophilin)-like 3
protein phosphatase 1B (formerly 2C), magnesium-dependent, beta isoform
protein phosphatase 1, catalytic subunit, alpha isoform
protein phosphatase 2, regulatory subunit B', alpha isoform
PQ loop repeat containing 1
PQ loop repeat containing 1
peroxiredoxin 3
peroxiredoxin 6
PRELI domain containing 1
protein kinase, cAMP-dependent, catalytic, beta
proline synthetase co-transcribed homolog (bacterial)
PRP19/PSO4 pre-mRNA processing factor 19 homolog (S. cerevisiae)
PRP19/PSO4 pre-mRNA processing factor 19 homolog (S. cerevisiae)
PRP19/PSO4 pre-mRNA processing factor 19 homolog (S. cerevisiae)
proline-rich coiled-coil 1
paraspeckle component 1
prostaglandin reductase 2
prostaglandin reductase 2
PTK2B protein tyrosine kinase 2 beta
protein tyrosine phosphatase, mitochondrial 1
protein tyrosine phosphatase, non-receptor type 6
protein tyrosine phosphatase, receptor type, D
protein tyrosine phosphatase, receptor type, D
protein tyrosine phosphatase, receptor type, D
6-pyruvoyltetrahydropterin synthase
pituitary tumor-transforming 1
pituitary tumor-transforming 1 interacting protein
phosphorylase, glycogen, liver
quinoid dihydropteridine reductase
quinoid dihydropteridine reductase
RAB14, member RAS oncogene family
RAB1B, member RAS oncogene family
RAB2A, member RAS oncogene family
RAB GTPase activating protein 1-like

retinoic acid receptor responder (tazarotene induced) 2
Ras association (RalGDS/AF-6) domain family member 3
Ras association (RalGDS/AF-6) domain family member 6
RNA binding motif protein 26
regulator of chromosome condensation (RCC1) and BTB (POZ) domain containing protein 2
regulator of chromosome condensation (RCC1) and BTB (POZ) domain containing protein 2
retinol dehydrogenase 14 (all-trans/9-cis/11-cis)
retinol dehydrogenase 16 (all-trans)
retinol dehydrogenase 7
receptor accessory protein 6
arginine-glutamic acid dipeptide (RE) repeats
retinol saturase (all-trans-retinol 13,14-reductase)
retinol saturase (all-trans-retinol 13,14-reductase)
replication factor C (activator 1) 3, 38kDa
regucalcin (senescence marker protein-30)
regulator of G-protein signaling 16
regulator of G-protein signaling 16
regulator of G-protein signaling 16
Rh family, B glycoprotein (gene/pseudogene)
required for meiotic nuclear division 1 homolog (S. cerevisiae)
required for meiotic nuclear division 5 homolog A (S. cerevisiae)
ring finger protein 125
ring finger protein 14
ring finger protein 167
ring finger protein 181
roadblock domain containing 3
RAR-related orphan receptor C
selenoprotein O
replication protein A3, 14kDa
ribose 5-phosphate isomerase A
ribosomal protein S27-like
radical S-adenosyl methionine domain containing 2
reticulon 4
receptor (chemosensory) transporter protein 4
runt-related transcription factor 2
S100 calcium binding protein A1
S100 calcium binding protein A10
S100 calcium binding protein A10
sterile alpha motif domain containing 9-like
SAR1 homolog B (S. cerevisiae)
sarcosine dehydrogenase
sarcosine dehydrogenase
Shwachman-Bodian-Diamond syndrome
SH3-binding domain kinase 1
stearoyl-CoA desaturase (delta-9-desaturase)
stearoyl-CoA desaturase (delta-9-desaturase)
selenocysteine lyase
SCO cytochrome oxidase deficient homolog 2 (yeast)
secernin 3

succinate dehydrogenase complex, subunit C, integral membrane protein, 15kDa
succinate dehydrogenase complex, subunit D, integral membrane protein
SEC14-like 2 (S. cerevisiae)
SEC22 vesicle trafficking protein homolog B (S. cerevisiae)
SEC22 vesicle trafficking protein homolog C (S. cerevisiae)
SEC24 family, member C (S. cerevisiae)
SECIS binding protein 2-like
SEH1-like (S. cerevisiae)
sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short
septin 9
small EDRK-rich factor 2
serine hydrolase-like 2
serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 1
serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 6
serpin peptidase inhibitor, clade B (ovalbumin), member 1
splicing factor 3b, subunit 5, 10kDa
sideroflexin 1
sideroflexin 5
sarcoglycan, gamma (35kDa dystrophin-associated glycoprotein)
SHANK-associated RH domain interactor
serine hydroxymethyltransferase 1 (soluble)
sedoheptulokinase
sialic acid acetylesterase
sirtuin (silent mating type information regulation 2 homolog) 3 (S. cerevisiae)
sirtuin (silent mating type information regulation 2 homolog) 5 (S. cerevisiae)
sirtuin (silent mating type information regulation 2 homolog) 5 (S. cerevisiae)
solute carrier family 10 (sodium/bile acid cotransporter family), member 1
solute carrier family 10 (sodium/bile acid cotransporter family), member 1
solute carrier family 12 (potassium/chloride transporters), member 7
solute carrier family 16, member 2 (monocarboxylic acid transporter 8)
solute carrier family 16, member 7 (monocarboxylic acid transporter 2)
solute carrier family 22 (organic cation transporter), member 1
solute carrier family 22 (extraneuronal monoamine transporter), member 3
solute carrier family 22 (organic anion transporter), member 9
solute carrier family 22 (organic anion transporter), member 9
solute carrier family 22 (organic anion transporter), member 9
solute carrier family 25 (mitochondrial carrier; dicarboxylate transporter), member 10
solute carrier family 25 (mitochondrial carrier; dicarboxylate transporter), member 10
solute carrier family 25 (mitochondrial carrier; oxoglutarate carrier), member 11
solute carrier family 25 (carnitine/acylcarnitine translocase), member 20
solute carrier family 25 (carnitine/acylcarnitine translocase), member 20
solute carrier family 25, member 39
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
solute carrier family 26 (sulfate transporter), member 1
solute carrier family 2 (facilitated glucose transporter), member 2

solute carrier family 4, sodium bicarbonate cotransporter, member 4
solute carrier family 4, sodium bicarbonate cotransporter, member 4
solute carrier family 5 (sodium-dependent vitamin transporter), member 6
solute carrier organic anion transporter family, member 1B3
solute carrier organic anion transporter family, member 2B1
solute carrier organic anion transporter family, member 2B1
SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 4
SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily c, member 2
SET and MYND domain containing 2
small nucleolar RNA host gene 11 (non-protein coding)
SNF related kinase
small nuclear ribonucleoprotein 27kDa (U4/U6.U5)
small nuclear ribonucleoprotein polypeptide N
sorting nexin 19
sorting nexin 9
superoxide dismutase 1, soluble
sorbin and SH3 domain containing 1
sorbin and SH3 domain containing 1
sorbin and SH3 domain containing 1
SPC24, NDC80 kinetochore complex component, homolog (S. cerevisiae)
secreted phosphoprotein 2, 24kDa
spectrin, beta, non-erythrocytic 1
U2-associated SR140 protein
sarcalumenin
signal recognition particle 14kDa (homologous Alu RNA binding protein)
signal recognition particle 14kDa (homologous Alu RNA binding protein)
serine racemase
StAR-related lipid transfer (START) domain containing 5
signal transducer and activator of transcription 1, 91kDa
serine/threonine kinase 25 (STE20 homolog, yeast)
stomatin
stomatin (EPB72)-like 2
STE20-related kinase adaptor beta
SUB1 homolog (S. cerevisiae)
succinate-CoA ligase, ADP-forming, beta subunit
succinate-CoA ligase, ADP-forming, beta subunit
succinate-CoA ligase, alpha subunit
succinate-CoA ligase, GDP-forming, beta subunit
succinate-CoA ligase, GDP-forming, beta subunit
succinate receptor 1
sulfatase 2
sulfite oxidase
surfeit 1
suppressor of zeste 12 homolog (Drosophila)
synapse associated protein 1, SAP47 homolog (Drosophila)
transaldolase 1
tubulin folding cofactor E
tubulin folding cofactor E-like
tubulin folding cofactor E-like

transcobalamin II; macrocytic anemia
transcobalamin II; macrocytic anemia
transcobalamin II; macrocytic anemia
T-cell leukemia translocation altered gene
T-cell leukemia translocation altered gene
transcription factor AP-2 gamma (activating enhancer binding protein 2 gamma)
transcription factor CP2-like 1
tissue factor pathway inhibitor 2
transforming growth factor, beta receptor associated protein 1
thymocyte selection associated
threonine synthase-like 2 (S. cerevisiae)
thyroid hormone responsive (SPOT14 homolog, rat)
thyroid hormone responsive (SPOT14 homolog, rat)
thymocyte nuclear protein 1
T-cell immunoglobulin and mucin domain containing 2
translocase of inner mitochondrial membrane 44 homolog (yeast)
transketolase
transketolase
TLC domain containing 1
transmembrane 4 L six family member 1
transmembrane 9 superfamily member 3
transmembrane BAX inhibitor motif containing 6
transmembrane protein 106B
transmembrane protein 109
transmembrane protein 120A
transmembrane protein 123
transmembrane protein 134
transmembrane protein 135
transmembrane protein 144
transmembrane protein 14C
transmembrane protein 18
transmembrane protein 184B
transmembrane protein 192
transmembrane protein 192
transmembrane protein 203
transmembrane inner ear
transmembrane inner ear
translocase of outer mitochondrial membrane 70 homolog A (S. cerevisiae)
tropomyosin 2 (beta)
tropomyosin 2 (beta)
tumor protein p63 regulated 1-like
TP53RK binding protein
TP53RK binding protein
trafficking protein particle complex 4
tripartite motif-containing 25
tripartite motif-containing 25
tripartite motif-containing 5
tripartite motif-containing 5
TruB pseudouridine (psi) synthase homolog 1 (E. coli)

translin
translin-associated factor X
tetraspanin 14
thiosulfate sulfurtransferase (rhodanese)
tetratricopeptide repeat domain 23
transthyretin
transthyretin
transthyretin
transthyretin
TRAF and TNF receptor associated protein
tumor suppressor candidate 2
thioredoxin
thioredoxin interacting protein
thioredoxin-like 4B
thioredoxin reductase 2
ubiquitin-like modifier activating enzyme 5
ubiquitin-conjugating enzyme E2D 3 (UBC4/5 homolog, yeast)
ubiquitin-conjugating enzyme E2D 3 (UBC4/5 homolog, yeast)
ubiquitin-conjugating enzyme E2E 2 (UBC4/5 homolog, yeast)
ubiquitin-conjugating enzyme E2I (UBC9 homolog, yeast)
ubiquitin-conjugating enzyme E2L 3
ubiquitin-like 7 (bone marrow stromal cell-derived)
ubiquitin protein ligase E3 component n-recognin 3 (putative)
UBX domain protein 4
uridine-cytidine kinase 1
ubiquinol-cytochrome c reductase complex (7.2 kD)
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP glucuronosyltransferase 1 family, polypeptide A3
UDP glycosyltransferase 3 family, polypeptide A2
UDP glycosyltransferase 3 family, polypeptide A2
UHRF1 binding protein 1
urate oxidase (pseudogene)
ubiquinol-cytochrome c reductase complex chaperone
ubiquinol-cytochrome c reductase, 6.4kDa subunit
ubiquinol-cytochrome c reductase binding protein
ubiquinol-cytochrome c reductase core protein II
ubiquinol-cytochrome c reductase, complex III subunit VII, 9.5kDa
ubiquitin related modifier 1 homolog (S. cerevisiae)
urocanase domain containing 1
ubiquitin specific peptidase 22
uronyl-2-sulfotransferase
vesicle amine transport protein 1 homolog (T. californica)
voltage-dependent anion channel 1
vanin 1
vanin 1

vacuolar protein sorting 41 homolog (S. cerevisiae)
vacuolar protein sorting 41 homolog (S. cerevisiae)
vesicle transport through interaction with t-SNAREs homolog 1B (yeast)
von Willebrand factor C and EGF domains
WD repeat domain 61
WEE1 homolog (S. pombe)
WAP four-disulfide core domain 2
WW domain containing transcription regulator 1
exportin 6
exportin, tRNA (nuclear export receptor for tRNAs)
exportin, tRNA (nuclear export receptor for tRNAs)
exportin, tRNA (nuclear export receptor for tRNAs)
xylulokinase homolog (H. influenzae)
Yip1 interacting factor homolog A (S. cerevisiae)
Yip1 domain family, member 4
zinc binding alcohol dehydrogenase domain containing 2
zinc finger, BED-type containing 5
zinc finger, AN1-type domain 1
zinc finger protein 64 homolog (mouse)
zinc finger protein 277
zinc finger protein 761
zinc finger, SWIM-type containing 7

Supp. Table 2

TERT Liver 148 probe sets upregulated

Entrez Gene Name
RIKEN cDNA 0610040F04 gene
RIKEN cDNA 1100001G20 gene
RIKEN cDNA 1700092E16 gene
RIKEN cDNA 4921506L19 gene
RIKEN cDNA 4933415B22 gene
RIKEN cDNA 5033425B01 gene
RIKEN cDNA 5330421C15 gene
ATP-binding cassette, sub-family A (ABC1), member 2
ankyrin repeat and BTB (POZ) domain containing 2
acyl-CoA synthetase long-chain family member 4
ADAM metallopeptidase domain 23
angiogenin, ribonuclease, RNase A family, 5
ankyrin repeat and zinc finger domain containing 1
apolipoprotein A-I
adenine phosphoribosyltransferase
apolipoprotein A-I
apolipoprotein A-I
apolipoprotein A-I
apolipoprotein M
apolipoprotein M
adenine phosphoribosyltransferase

chromosome 16 open reading frame 5
complement component 1, r subcomponent
complement component 2
complement component 2
complement component 2
chromosome 21 open reading frame 59
chromosome 21 open reading frame 91
chromosome 4 open reading frame 40
complement component 5
complement component 6
complement component 8, alpha polypeptide
complement component 8, beta polypeptide
complement component 9
CD209 molecule
CCAAT/enhancer binding protein (C/EBP), beta
cysteine-rich hydrophobic domain 2
chitinase domain containing 1
claudin 14
cytidine monophosphate-N-acetylneuraminic acid hydroxylase (CMP-N-acetylneuraminate
CREB regulated transcription coactivator 2
casein kinase 1, delta
cytochrome P450, family 2, subfamily c, polypeptide 70
cytochrome P450, family 7, subfamily B, polypeptide 1
DEAD (Asp-Glu-Ala-Asp) box polypeptide 21
DEAD (Asp-Glu-Ala-Asp) box polypeptide 27
dipeptidyl-peptidase 7
dystonin
dystonin
epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)
epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)
epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)
erythrocyte membrane protein band 4.1 (elliptocytosis 1, RH-linked)
ERBB receptor feedback inhibitor 1
coagulation factor XI
ficolin (collagen/fibrinogen domain containing lectin) 2 (hucolin)
fetuin B
fibroblast growth factor receptor 1
fibronectin type III domain containing 3B
GDNF family receptor alpha 1
GDNF family receptor alpha 1
GDNF family receptor alpha 1
glutaredoxin (thioltransferase)
glutaredoxin (thioltransferase)
glucosamine (UDP-N-acetyl)-2-epimerase/N-acetylmannosamine kinase
high density lipoprotein binding protein
huntingtin interacting protein 1 related
HOP homeobox
heparan sulfate (glucosamine) 3-O-sulfotransferase 3B1

insulin-like growth factor binding protein 4
interleukin 17 receptor A
interleukin 1 receptor, type I
interleukin 6 receptor
interferon regulatory factor 5
inter-alpha (globulin) inhibitor H5
inositol 1,4,5-triphosphate receptor, type 2
ribosomal protein L13 pseudogene 12
leucine rich repeat containing 24
lipolysis stimulated lipoprotein receptor
monooxygenase, DBH-like 1
murinoglobulin 1
mucin-like protocadherin
nuclear receptor subfamily 3, group C, member 1 (glucocorticoid receptor)
osteosarcoma amplified 9, endoplasmic reticulum lectin
paired box 4
paternally expressed 3
phosphatase and actin regulator 4
phosphatidylinositol-4-phosphate 5-kinase-like 1
protein-O-mannosyltransferase 2
peptidylprolyl isomerase B (cyclophilin B)
protein phosphatase 1, regulatory (inhibitor) subunit 10
peroxiredoxin 4
protein tyrosine phosphatase, receptor type, O
ribosomal protein L12
ribosomal protein L13a
ribosomal protein, large, P0
ribosomal protein S12
ribosomal protein S16
ribosomal protein S3
ribosomal protein S7
ribosomal protein S8
ribosomal RNA processing 15 homolog (S. cerevisiae)
serum amyloid A4, constitutive
scavenger receptor class A, member 5 (putative)
syndecan 4
serine dehydratase
Sec61 alpha 1 subunit (S. cerevisiae)
serine incorporator 3
serine incorporator 3
serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 1
serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 11
serine (or cysteine) peptidase inhibitor, clade A, member 3K
SET domain containing (lysine methyltransferase) 7
Src homology 2 domain containing adaptor protein B
SKI-like oncogene
solute carrier family 1 (neutral amino acid transporter), member 5
solute carrier family 38, member 2

tyrosine aminotransferase
transmembrane protein 87A
tumor necrosis factor receptor superfamily, member 12A
tyrosylprotein sulfotransferase 1
unc-13 homolog B (C. elegans)
vitronectin
WAS protein family, member 2
WD repeat and FYVE domain containing 1
WD repeat domain 82
WD repeat domain, phosphoinositide interacting 1
X-box binding protein 1

Supp. Table 3 Heart TERT

Decreased 1406 probe sets in G4 mTERT hearts

Entrez Gene Name
RIKEN cDNA 1200016E24 gene
RIKEN cDNA 1200016E24 gene
RIKEN cDNA 1200016E24 gene
RIKEN cDNA 1200016E24 gene
RIKEN cDNA 1810026B05 gene
RIKEN cDNA 2210016H18 gene
RIKEN cDNA 2310002L09 gene
RIKEN cDNA 2310076G13 gene
RIKEN cDNA 2700097O09 gene
RIKEN cDNA 2810455D13 gene
RIKEN cDNA 2810482I07 gene
glyceraldehyde-3-phosphate dehydrogenase pseudogene
RIKEN cDNA 3021401C12 gene
RIKEN cDNA 4930519G04 gene
RIKEN cDNA 5430402M21 gene
RIKEN cDNA 5730458M16 gene
RIKEN cDNA 6330564D18 gene
RIKEN cDNA 8430436O14 gene
RIKEN cDNA 9330175E14 gene
RIKEN cDNA 9530006C21 gene
RIKEN cDNA A130040M12 gene
RIKEN cDNA A530047J11 gene
RIKEN cDNA A530079E22 gene
AP2 associated kinase 1
aminoadipate-semialdehyde dehydrogenase-phosphopantetheinyl transferase
ATP-binding cassette, sub-family C (CFTR/MRP), member 4
abhydrolase domain containing 12
abhydrolase domain containing 4
abl-interactor 1
actin binding LIM protein 1
ankyrin repeat and BTB (POZ) domain containing 2
acyl-Coenzyme A binding domain containing 4
acyl-Coenzyme A binding domain containing 5
acyl-CoA thioesterase 13
acyl-CoA thioesterase 9
acyl-CoA thioesterase 9
actinin, alpha 2
ADAM metallopeptidase with thrombospondin type 1 motif, 9
ADAMTS-like 3
adenylate cyclase 5
adiponectin receptor 1
2-aminoethanethiol (cysteamine) dioxygenase
AE binding protein 2
1-acylglycerol-3-phosphate O-acyltransferase 1 (lysophosphatidic acid acyltransferase, alpha)
AHNAK nucleoprotein 2
aryl hydrocarbon receptor
expressed sequence AI117581
akirin 2

v-akt murine thymoma viral oncogene homolog 1
aldehyde dehydrogenase 1 family, member A2
aldehyde dehydrogenase 6 family, member A1
aldolase A, fructose-bisphosphate
aldolase A, fructose-bisphosphate
arachidonate 5-lipoxygenase-activating protein
adenosine monophosphate deaminase (isoform E)
ankyrin repeat and KH domain containing 1
ankyrin repeat domain 12
anoctamin 6
AN1, ubiquitin-like, homolog (Xenopus laevis)
adaptor-related protein complex 1, sigma 2 subunit
adaptor-related protein complex 3, delta 1 subunit
apolipoprotein D
amyloid beta (A4) precursor protein
adaptor protein, phosphotyrosine interaction, PH domain and leucine zipper containing 1
adaptor protein, phosphotyrosine interaction, PH domain and leucine zipper containing 2
ADP-ribosylation factor 4
ADP-ribosylation factor 6
ADP-ribosylation factor guanine nucleotide-exchange factor 1(brefeldin A-inhibited)
ADP-ribosylation factor related protein 1
Rho GTPase activating protein 21
Rho GTPase activating protein 29
Rho GTPase activating protein 5
Rac/Cdc42 guanine nucleotide exchange factor (GEF) 6
AT rich interactive domain 2 (ARID, RFX-like)
AT rich interactive domain 4B (RBP1-like)
ADP-ribosylation factor-like 6 interacting protein 1
arrestin, beta 2
ADP-ribosyltransferase 3
N-acylsphingosine amidohydrolase (acid ceramidase) 1
ankyrin repeat and SOCS box-containing 11
arsA arsenite transporter, ATP-binding, homolog 1 (bacterial)
additional sex combs like 1 (Drosophila)
arginyltransferase 1
ATG4 autophagy related 4 homolog A (S. cerevisiae)
atlastin GTPase 2
ATPase, class VI, type 11B
ATPase, Na+/K+ transporting, beta 1 polypeptide
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit B1
ATPase, H+ transporting, lysosomal 21kDa, V0 subunit b
ATPase, H+ transporting, lysosomal 21kDa, V0 subunit b
ATPase, H+ transporting, lysosomal 16kDa, V0 subunit c
ATPase, H+ transporting, lysosomal 38kDa, V0 subunit d1
ATPase, H+ transporting, lysosomal 56/58kDa, V1 subunit B2
ATPase, H+ transporting, lysosomal 34kDa, V1 subunit D
ATPase, H+ transporting, lysosomal 34kDa, V1 subunit D
ATPase, H+ transporting, lysosomal 34kDa, V1 subunit D
ATPase, H+ transporting, lysosomal 13kDa, V1 subunit G1
ATPase, Cu++ transporting, alpha polypeptide
ATPase, aminophospholipid transporter (APLT), class I, type 8A, member 1
ATPase, aminophospholipid transporter (APLT), class I, type 8A, member 1

ATPase inhibitory factor 1
ataxia telangiectasia and Rad3 related
ataxin 7
expressed sequence AU015263
expressed sequence AW011738
RIKEN cDNA B230214O09 gene
RIKEN cDNA B230354K17 gene
RIKEN cDNA B430203M17 gene
UDP-Gal:betaGlcNAc beta 1,4- galactosyltransferase, polypeptide 1
UDP-Gal:betaGlcNAc beta 1,4- galactosyltransferase, polypeptide 6
barrier to autointegration factor 1
HLA-B associated transcript 1
BAT2 domain containing 1
HLA-B associated transcript 3
Bardet-Biedl syndrome 2
BCL2-associated transcription factor 1
BCL2-associated transcription factor 1
BMI1 polycomb ring finger oncogene
BMS1 homolog, ribosome assembly protein (yeast)
BCL2/adenovirus E1B interacting protein 3
bromodomain PHD finger transcription factor
BRCA1/BRCA2-containing complex, subunit 3
bromodomain and WD repeat domain containing 1
BTB (POZ) domain containing 6
basic transcription factor 3
basic transcription factor 3
BUD31 homolog (yeast)
chromosome 10 open reading frame 10
chromosome 10 open reading frame 107
chromosome 10 open reading frame 58
chromosome 12 open reading frame 24
chromosome 12 open reading frame 35
chromosome 12 open reading frame 53
hypothetical protein C130006E23
chromosome 13 open reading frame 37
chromosome 15 open reading frame 57
chromosome 16 open reading frame 14
chromosome 16 open reading frame 52
chromosome 16 open reading frame 72
chromosome 16 open reading frame 91
chromosome 18 open reading frame 19
chromosome 19 open reading frame 42
chromosome 1 open reading frame 21
chromosome 1 open reading frame 21
chromosome 1 open reading frame 43
chromosome 1 open reading frame 58
chromosome 1 open reading frame 86
complement component 1, q subcomponent, A chain
complement component 1, q subcomponent, B chain
complement component 1, q subcomponent, B chain
complement component 1, q subcomponent, B chain
complement component 1, q subcomponent binding protein

complement component 1, q subcomponent, C chain
complement component 1, r subcomponent
chromosome 20 open reading frame 196
chromosome 20 open reading frame 196
chromosome 20 open reading frame 24
chromosome 2 open reading frame 67
complement component 3a receptor 1
RIKEN cDNA C430014K11 gene
chromosome 4 open reading frame 29
chromosome 5 open reading frame 51
chromosome 5 open reading frame 53
chromosome 6 open reading frame 125
chromosome 6 open reading frame 136
chromosome 6 open reading frame 162
chromosome 6 open reading frame 62
chromosome 6 open reading frame 72
chromosome 6 open reading frame 72
hypothetical protein C730026J16
chromosome 7 open reading frame 60
chromosome 8 open reading frame 4
chromosome 8 open reading frame 59
chromosome 9 open reading frame 40
chromosome 9 open reading frame 41
chromosome 9 open reading frame 85
calcium binding protein 39
calcitonin receptor-like
caldesmon 1
calmodulin 1 (phosphorylase kinase, delta)
calmodulin 1 (phosphorylase kinase, delta)
calmodulin 1 (phosphorylase kinase, delta)
calreticulin
calreticulin
calreticulin
calcium/calmodulin-dependent protein kinase II delta
calcium/calmodulin-dependent protein kinase II inhibitor 1
calcium/calmodulin-dependent protein kinase kinase 2, beta
calnexin
capping protein (actin filament), gelsolin-like
cell cycle associated protein 1
cell cycle associated protein 1
capping protein (actin filament) muscle Z-line, alpha 1
capping protein (actin filament) muscle Z-line, alpha 1
capping protein (actin filament) muscle Z-line, alpha 2
caspase recruitment domain family, member 10
caspase 12
carbonyl reductase 2
chromobox homolog 1 (HP1 beta homolog Drosophila)
cell division cycle and apoptosis regulator 1
cell division cycle and apoptosis regulator 1
cysteine conjugate-beta lyase, cytoplasmic
coiled-coil domain containing 127
coiled-coil domain containing 41

coiled-coil domain containing 80
coiled-coil domain containing 82
chemokine (C-C motif) ligand 6
chemokine (C-C motif) ligand 6
chemokine (C-C motif) ligand 8
chemokine (C-C motif) ligand 9
cyclin I
cyclin I
cyclin L2
chaperonin containing TCP1, subunit 3 (gamma)
chaperonin containing TCP1, subunit 4 (delta)
chaperonin containing TCP1, subunit 4 (delta)
chaperonin containing TCP1, subunit 4 (delta)
chaperonin containing TCP1, subunit 4 (delta)
CD164 molecule, sialomucin
CD38 molecule
CD44 molecule (Indian blood group)
CD47 molecule
CD53 molecule
CD81 molecule
CDC14 cell division cycle 14 homolog B (S. cerevisiae)
cell division cycle 37 homolog (S. cerevisiae)-like 1
cyclin-dependent kinase 2 associated protein 1
CDKN2A interacting protein N-terminal like
CDP-diacylglycerol synthase (phosphatidate cytidylyltransferase) 2
CDV3 homolog (mouse)
CCAAT/enhancer binding protein (C/EBP), zeta
centrosomal protein 120kDa
centrosomal protein 350kDa
centrosomal protein 68kDa
complement factor properdin
coiled-coil-helix-coiled-coil-helix domain containing 1
coiled-coil-helix-coiled-coil-helix domain containing 2
coiled-coil-helix-coiled-coil-helix domain containing 3
chromodomain helicase DNA binding protein 6
choroideremia-like (Rab escort protein 2)
choline phosphotransferase 1
cytokine inducible SH2-containing protein
cytoskeleton-associated protein 4
chemokine-like factor
chloride channel CLIC-like 1
claudin 12
claudin domain containing 1
C-type lectin domain family 1, member A
chloride intracellular channel 5
chloride intracellular channel 5
CAP-GLY domain containing linker protein 1
CAP-GLY domain containing linker protein 1
CAP-GLY domain containing linker protein family, member 4
CAP-GLY domain containing linker protein family, member 4
ceroid-lipofuscinosis, neuronal 6, late infantile, variant
CLPTM1-like

clathrin, heavy chain (Hc)
clusterin
clusterin
clusterin
CCHC-type zinc finger, nucleic acid binding protein
CNDP dipeptidase 2 (metallopeptidase M20 family)
CNDP dipeptidase 2 (metallopeptidase M20 family)
cornichon homolog 4 (Drosophila)
cornichon homolog 4 (Drosophila)
connector enhancer of kinase suppressor of Ras 1
CCR4-NOT transcription complex, subunit 2
CCR4-NOT transcription complex, subunit 4
CCR4-NOT transcription complex, subunit 7
COBL-like 1
COBL-like 1
COP9 constitutive photomorphogenic homolog subunit 3 (Arabidopsis)
COP9 constitutive photomorphogenic homolog subunit 6 (Arabidopsis)
COP9 constitutive photomorphogenic homolog subunit 7A (Arabidopsis)
coronin, actin binding protein, 1A
COX10 homolog, cytochrome c oxidase assembly protein, heme A: farnesyltransferase (yeast)
COX17 cytochrome c oxidase assembly homolog (S. cerevisiae)
cytochrome c oxidase subunit Va
cytochrome c oxidase subunit Va
cytochrome c oxidase subunit Vib polypeptide 1 (ubiquitous)
cytochrome c oxidase subunit VIIa polypeptide 2 (liver)
ceruloplasmin (ferroxidase)
cytoplasmic polyadenylation element binding protein 3
cytoplasmic polyadenylation element binding protein 3
cytoplasmic polyadenylation element binding protein 4
cleavage and polyadenylation specific factor 6, 68kDa
cleavage and polyadenylation specific factor 6, 68kDa
carboxypeptidase X (M14 family), member 2
cAMP responsive element binding protein 1
cold shock domain protein A
cold shock domain protein A
colony stimulating factor 1 receptor
colony stimulating factor 1 receptor
colony stimulating factor 2 receptor, alpha, low-affinity (granulocyte-macrophage)
casein kinase 1, gamma 3
cleavage stimulation factor, 3' pre-RNA, subunit 2, 64kDa, tau variant
C-terminal binding protein 2
CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) small phosphatase 2
cytotoxic T lymphocyte-associated protein 2 alpha
cathepsin C
cathepsin O
cathepsin S
CUG triplet repeat, RNA binding protein 2
CUG triplet repeat, RNA binding protein 2
CWF19-like 2, cell cycle control (S. pombe)
chemokine (C-X-C motif) ligand 12 (stromal cell-derived factor 1)
chemokine (C-X-C motif) ligand 12 (stromal cell-derived factor 1)

chromosome X open reading frame 56
cytochrome b5 reductase 4
cytochrome b-245, alpha polypeptide
cylindromatosis (turban tumor syndrome)
cytochrome P450, family 4, subfamily a, polypeptide 29
cytohesin 1 interacting protein
DAZ associated protein 2
decorin
dynactin 3 (p22)
dynactin 4 (p62)
dolichyl-diphosphooligosaccharide-protein glycosyltransferase
DEAD (Asp-Glu-Ala-Asp) box polypeptide 1
DEAD (Asp-Glu-Ala-Asp) box polypeptide 17
DEAD (Asp-Glu-Ala-Asp) box polypeptide 5
DEAD (Asp-Glu-Ala-Asp) box polypeptide 5
degenerative spermatocyte homolog 1, lipid desaturase (Drosophila)
DENN/MADD domain containing 4C
diacylglycerol kinase, zeta 104kDa
diacylglycerol kinase, zeta 104kDa
deoxyhypusine synthase
DEAH (Asp-Glu-Ala-His) box polypeptide 15
DEAH (Asp-Glu-Ala-His) box polypeptide 15
DEAH (Asp-Glu-Ala-His) box polypeptide 9
death inducer-obliterator 1
DIX domain containing 1
prostatic androgen-repressed message-1
deleted in liver cancer 1
deleted in liver cancer 1
discs, large homolog 1 (Drosophila)
dystrophia myotonica, WD repeat containing
Dmx-like 2
DnaJ (Hsp40) homolog, subfamily B, member 6
DnaJ (Hsp40) homolog, subfamily B, member 9
DnaJ (Hsp40) homolog, subfamily C, member 12
DnaJ (Hsp40) homolog, subfamily C, member 14
DnaJ (Hsp40) homolog, subfamily C, member 15
DnaJ (Hsp40) homolog, subfamily C, member 3
DnaJ (Hsp40) homolog, subfamily C, member 9
dynamin 1-like
dynamin 2
aspartyl aminopeptidase
DPH3, KTI11 homolog (S. cerevisiae)
dermatopontin
DNA-damage regulated autophagy modulator 2
dual specificity phosphatase 18
dual specificity phosphatase 6
dymeclin
dynein, light chain, Tctex-type 1
DAZ interacting protein 3, zinc finger
RIKEN cDNA E230013L22 gene
endothelial differentiation-related factor 1

embryonic ectoderm development
eukaryotic translation elongation factor 1 delta (guanine nucleotide exchange protein)
EF-hand domain family, member D2
EH-domain containing 4
eukaryotic translation initiation factor 1
eukaryotic translation initiation factor 1A, X-linked
eukaryotic translation initiation factor 1A, Y-linked
eukaryotic translation initiation factor 2C, 3
eukaryotic translation initiation factor 3, subunit A
eukaryotic translation initiation factor 3, subunit F
eukaryotic translation initiation factor 3, subunit G
eukaryotic translation initiation factor 3, subunit J
eukaryotic translation initiation factor 3, subunit J
eukaryotic translation initiation factor 3, subunit L
eukaryotic translation initiation factor 4A, isoform 1
eukaryotic translation initiation factor 4 gamma, 2
eukaryotic translation initiation factor 4H
eukaryotic translation initiation factor 5
eukaryotic translation initiation factor 6
EGF, latrophilin and seven transmembrane domain containing 1
enabled homolog (Drosophila)
enabled homolog (Drosophila)
endoglin
ectonucleotide pyrophosphatase/phosphodiesterase 2
enhancer of polycomb homolog 2 (Drosophila)
glutamyl-prolyl-tRNA synthetase
erythroid differentiation regulator 1
ERGIC and golgi 2
endoplasmic reticulum lectin 1
ERO1-like (S. cerevisiae)
ERO1-like (S. cerevisiae)
ERO1-like (S. cerevisiae)
eukaryotic translation termination factor 1
ets variant 5
ets variant 5
Ewing sarcoma breakpoint region 1
exonuclease 3'-5' domain containing 2
exocyst complex component 3
exocyst complex component 5
exocyst complex component 6
exosome component 10
enhancer of zeste homolog 1 (Drosophila)
coagulation factor XIII, A1 polypeptide
fatty acid binding protein 4, adipocyte
fatty acid binding protein 4, adipocyte
Fas (TNFRSF6) associated factor 1
family with sequence similarity 126, member B
family with sequence similarity 133, member B
family with sequence similarity 134, member B
family with sequence similarity 162, member A
family with sequence similarity 168, member A

family with sequence similarity 21, member A
family with sequence similarity 40, member B
family with sequence similarity 46, member A
family with sequence similarity 48, member A
family with sequence similarity 8, member A1
family with sequence similarity 8, member A1
family with sequence similarity 96, member A
fatty acyl CoA reductase 1
phenylalanyl-tRNA synthetase, beta subunit
FAST kinase domains 2
Fc fragment of IgE, high affinity I, receptor for; gamma polypeptide
Fc fragment of IgG, low affinity IIa, receptor (CD32)
Fc fragment of IgG, low affinity IIb, receptor (CD32)
Fc fragment of IgG, low affinity IIb, receptor (CD32)
Fc fragment of IgG, low affinity IIb, receptor (CD32)
FCH domain only 2
ferrochelatase (protoporphyria)
fermitin family homolog 3 (Drosophila)
fibrinogen-like 2
formin homology 2 domain containing 3
filamin A interacting protein 1
filamin A interacting protein 1-like
FK506 binding protein 15, 133kDa
FK506 binding protein 1A, 12kDa
FK506 binding protein 9, 63 kDa
folliculin
fms-related tyrosine kinase 1 (vascular endothelial growth factor/vascular permeability
formin binding protein 1-like
fibronectin type III domain containing 3A
fibronectin type III domain containing 3B
folliculin interacting protein 1
farnesyltransferase, CAAX box, alpha
forkhead box N2
forkhead box N3
forkhead box P1
FERM domain containing 4B
fibroblast growth factor receptor substrate 2
FRY-like
ferritin, heavy polypeptide 1
ferritin, light polypeptide
ferritin, light polypeptide
far upstream element (FUSE) binding protein 1
fucosidase, alpha-L- 2, plasma
FUN14 domain containing 2
FYN oncogene related to SRC, FGR, YES
frizzled homolog 4 (Drosophila)
GTPase activating protein (SH3 domain) binding protein 1
GABA(A) receptor-associated protein
galactosylceramidase
UDP-N-acetyl-alpha-D-galactosamine:polypeptide N-acetylgalactosaminyltransferase 2
galanin receptor 1

glyceraldehyde-3-phosphate dehydrogenase
GTPase activating Rap/RanGAP domain-like 1
growth arrest-specific 6
glucan (1,4-alpha-), branching enzyme 1
guanylate binding protein family, member 6
GRINL1A complex locus
guanine deaminase
guanine deaminase
GDP dissociation inhibitor 2
GDP dissociation inhibitor 2
GDP dissociation inhibitor 2
GDP dissociation inhibitor 2
glucose-fructose oxidoreductase domain containing 1
geranylgeranyl diphosphate synthase 1
GRB10 interacting GYF protein 2
GTPase, IMAP family member 4
glutaredoxin (thioltransferase)
glutaredoxin (thioltransferase)
glutaredoxin 3
glycosyltransferase 8 domain containing 1
glycolipid transfer protein domain containing 1
glutamate-ammonia ligase (glutamine synthetase)
glyoxylate reductase 1 homolog (Arabidopsis)
predicted gene 11428
predicted gene 13295
predicted gene 5081
guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 2
guanine nucleotide binding protein (G protein), q polypeptide
guanine nucleotide binding protein-like 3 (nucleolar)
glucosamine (N-acetyl)-6-sulfatase
glucosamine (N-acetyl)-6-sulfatase
golgi autoantigen, golgin subfamily a, 4
golgi autoantigen, golgin subfamily a, 5
golgi phosphoprotein 3 (coat-protein)
G patch domain containing 8
glycerol-3-phosphate dehydrogenase 1-like
glucose phosphate isomerase
glucose phosphate isomerase
glucose phosphate isomerase
G protein-coupled receptor 146
glutathione peroxidase 1
G-rich RNA sequence binding factor 1
general transcription factor IIB
glycogenin 1
glycogenin 1
H3 histone, family 3C
histidyl-tRNA synthetase
hepatitis B virus x interacting protein
ribosomal protein L36a pseudogene 8
HEAT repeat containing 5A
headcase homolog (Drosophila)

helicase with zinc finger
hect domain and RLD 2
hexosaminidase A (alpha polypeptide)
hexosaminidase B (beta polypeptide)
hemochromatosis
hemochromatosis
hippocampus abundant transcript-like 1
hypoxia inducible factor 1, alpha subunit (basic helix-loop-helix transcription factor)
histidine triad nucleotide binding protein 1
histidine triad nucleotide binding protein 1
histidine acid phosphatase domain containing 2A
histone cluster 1, H1c
histone cluster 1, H2bi
histone cluster 3, H2a
human immunodeficiency virus type I enhancer binding protein 1
hexokinase 1
hexokinase 1
high-mobility group 20A
heterogeneous nuclear ribonucleoprotein A3
heterogeneous nuclear ribonucleoprotein C (C1/C2)
heterogeneous nuclear ribonucleoprotein F
heterogeneous nuclear ribonucleoprotein F
heterogeneous nuclear ribonucleoprotein H1 (H)
heterogeneous nuclear ribonucleoprotein H1 (H)
heterogeneous nuclear ribonucleoprotein H2 (H')
heterogeneous nuclear ribonucleoprotein K
heterogeneous nuclear ribonucleoprotein R
heterogeneous nuclear ribonucleoprotein L-like
homer homolog 1 (Drosophila)
hydroxysteroid (17-beta) dehydrogenase 10
hydroxysteroid (17-beta) dehydrogenase 10
hydroxysteroid (17-beta) dehydrogenase 12
hydroxysteroid (17-beta) dehydrogenase 4
heat shock protein 90kDa alpha (cytosolic), class A member 1
heat shock protein 90kDa alpha (cytosolic), class A member 1
heat shock protein 90kDa beta (Grp94), member 1
heat shock protein 70kDa family, member 13
galectin-related protein
galectin-related protein
heat shock 10kDa protein 1 (chaperonin 10)
5-hydroxytryptamine (serotonin) receptor 3B
isocitrate dehydrogenase 1 (NADP+), soluble
iduronate 2-sulfatase
interferon, gamma-inducible protein 16
interferon activated gene 203
interferon activated gene 203
interferon, alpha-inducible protein 27-like 2
interferon-induced protein 35
interferon-induced protein 35
interferon induced transmembrane protein 2 (1-8D)
interferon induced transmembrane protein 3 (1-8U)

insulin-like growth factor 1 receptor
IKAROS family zinc finger 5 (Pegasus)
interleukin 10 receptor, beta
interleukin 13 receptor, alpha 1
interleukin 1 receptor-like 1
interleukin 33
IMP1 inner mitochondrial membrane peptidase-like (S. cerevisiae)
IMP3, U3 small nucleolar ribonucleoprotein, homolog (yeast)
inositol monophosphatase domain containing 1
INO80 complex subunit D
inositol polyphosphate-5-phosphatase, 40kDa
insulin receptor
integrator complex subunit 4
inositol hexakisphosphate kinase 1
importin 4
importin 5
IQ motif containing GTPase activating protein 1
IQ motif containing GTPase activating protein 1
interleukin-1 receptor-associated kinase 3
interferon regulatory factor 3
insulin receptor substrate 1
iron-sulfur cluster scaffold homolog (E. coli)
integrin alpha FG-GAP repeat containing 1
integrin, alpha V (vitronectin receptor, alpha polypeptide, antigen CD51)
integrin, beta 5
influenza virus NS1A binding protein
IWS1 homolog (S. cerevisiae)
IWS1 homolog (S. cerevisiae)
Janus kinase 1
junctional adhesion molecule 2
jumonji domain containing 1C
junction mediating and regulatory protein, p53 cofactor
kelch repeat and BTB (POZ) domain containing 3
potassium channel modulatory factor 1
potassium channel tetramerisation domain containing 6
lysine (K)-specific demethylase 3A
KH domain containing, RNA binding, signal transduction associated 1
KH domain containing, RNA binding, signal transduction associated 1
KH domain containing, RNA binding, signal transduction associated 1
KIAA0774
KIAA0947
KIAA1012
KIAA1430
KIAA1462
KIAA1737
KIAA2013
kinesin family member 1C
kinesin family member 5B
kinesin family member 5B
kinesin family member 5B

kelch domain containing 9
kelch-like 13 (Drosophila)
kelch-like 17 (Drosophila)
kelch-like 2, Mayven (Drosophila)
kelch-like 7 (Drosophila)
kelch-like 9 (Drosophila)
karyopherin (importin) beta 1
lysosomal-associated membrane protein 2
lysosomal-associated membrane protein 2
lysosomal protein transmembrane 4 beta
La ribonucleoprotein domain family, member 2
lymphocyte cytosolic protein 1 (L-plastin)
leukemia inhibitory factor receptor alpha
leukocyte immunoglobulin-like receptor, subfamily B (with TM and ITIM domains), member 4
LIM domains containing 1
LIM domains containing 1
leucyl/cystinyl aminopeptidase
hypothetical protein LOC100046468
similar to BKLF
similar to polycomb group ring finger 5
similar to hCG23490
hypothetical LOC152217
ribosomal protein L10 pseudogene 16
ribosomal protein L10 pseudogene 16
ribosomal protein L13 pseudogene 12
ribosomal protein L13 pseudogene 12
double C2, gamma pseudogene
similar to CG32736-PA
similar to nuclear DNA-binding protein
ribosomal protein L15 pseudogene 3
similar to S-phase kinase-associated protein 1A (p19A)
hypothetical LOC729505
lipoprotein lipase
leucine rich repeat containing 40
leucine rich repeat containing 58
leucine rich repeat containing 59
leucine rich repeat (in FLII) interacting protein 1
LSM3 homolog, U6 small nuclear RNA associated (S. cerevisiae)
LTV1 homolog (S. cerevisiae)
LUC7-like 2 (S. cerevisiae)
LUC7-like 2 (S. cerevisiae)
lymphocyte antigen 6 complex, locus A
lymphocyte antigen 6 complex, locus C1
lymphocyte antigen 6 complex, locus E
lysophospholipase I
LYR motif containing 2
LysM, putative peptidoglycan-binding, domain containing 3
LysM, putative peptidoglycan-binding, domain containing 3
lymphatic vessel endothelial hyaluronan receptor 1
lysozyme (renal amyloidosis)

MACRO domain containing 2
v-maf musculoaponeurotic fibrosarcoma oncogene homolog G (avian)
metastasis associated lung adenocarcinoma transcript 1 (non-protein coding)
mannosidase, alpha, class 1A, member 1
mannosidase, alpha, class 2A, member 1
microtubule-associated protein 1 light chain 3 beta
microtubule-associated protein 1 light chain 3 beta
microtubule-associated protein 1 light chain 3 beta
mitogen-activated protein kinase kinase kinase 1
mitogen-activated protein kinase 1
mitogen-activated protein kinase 10
mitogen-activated protein kinase-activated protein kinase 2
methionine adenosyltransferase II, alpha
matrin 3
matrin 3
mitochondrial antiviral signaling protein
muscleblind-like 2 (Drosophila)
methylcrotonoyl-Coenzyme A carboxylase 1 (alpha)
myeloid cell leukemia sequence 1 (BCL2-related)
myeloid cell leukemia sequence 1 (BCL2-related)
myeloid cell leukemia sequence 1 (BCL2-related)
malate dehydrogenase 1, NAD (soluble)
mitochondrial trans-2-enoyl-CoA reductase
mediator complex subunit 1
mediator complex subunit 1
mediator complex subunit 13-like
mediator complex subunit 8
methionyl aminopeptidase 2
mex-3 homolog C (C. elegans)
microfibrillar-associated protein 1
mitochondrial fission factor
macrophage migration inhibitory factor (glycosylation-inhibiting factor)
MAP kinase interacting serine/threonine kinase 2
mutL homolog 3 (E. coli)
myeloid/lymphoid or mixed-lineage leukemia 3
myeloid/lymphoid or mixed-lineage leukemia 5 (trithorax homolog, Drosophila)
MLX interacting protein-like
MAX binding protein
mortality factor 4 like 1
mortality factor 4 like 2
mortality factor 4 like 2
mortality factor 4 like 2
motile sperm domain containing 2
Mov10l1, Moloney leukemia virus 10-like 1, homolog (mouse)
M-phase phosphoprotein 9
mannose receptor, C type 1
mitochondrial ribosomal protein L11
mitochondrial ribosomal protein L13
mitochondrial ribosomal protein L15
mitochondrial ribosomal protein L15

mitochondrial ribosomal protein L41
mitochondrial ribosomal protein L42
mitochondrial ribosomal protein S15
mitochondrial ribosomal protein S17
mitochondrial ribosomal protein S22
mitochondrial ribosomal protein S24
mitochondrial ribosomal protein S25
mitochondrial ribosomal protein S25
mitochondrial ribosomal protein S30
mitochondrial ribosomal protein S36
membrane-spanning 4-domains, subfamily A, member 6A
musashi homolog 2 (Drosophila)
musashi homolog 2 (Drosophila)
musashi homolog 2 (Drosophila)
male-specific lethal 2 homolog (Drosophila)
male-specific lethal 3 homolog (Drosophila)
mature T-cell proliferation 1
methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 2-like
myotubularin related protein 6
5-methyltetrahydrofolate-homocysteine methyltransferase reductase
MAX interactor 1
MYC binding protein 2
myosin, light chain 3, alkali; ventricular, skeletal, slow
myosin regulatory light chain interacting protein
myomesin (M-protein) 2, 165kDa
myomesin (M-protein) 2, 165kDa
myomesin (M-protein) 2, 165kDa
myozenin 2
NGFI-A binding protein 1 (EGR1 binding protein 1)
nascent polypeptide-associated complex alpha subunit
nascent polypeptide-associated complex alpha subunit
NAD kinase
nuclear assembly factor 1 homolog (S. cerevisiae)
nucleosome assembly protein 1-like 1
NMDA receptor regulated 1
N-acetyltransferase 5 (GCN5-related, putative)
neurobeachin
non-SMC condensin II complex, subunit H2
neutral cholesterol ester hydrolase 1
nuclear receptor coactivator 2
nudE nuclear distribution gene E homolog (A. nidulans)-like 1
Nedd4 family interacting protein 1
Nedd4 family interacting protein 2
N-deacetylase/N-sulfotransferase (heparan glucosaminyl) 1
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 12
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 12
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 12
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 6, 17kDa
NADH dehydrogenase (ubiquinone) Fe-S protein 7, 20kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 7, 20kDa (NADH-coenzyme Q reductase)

neuralized homolog 4 (Drosophila)
nexilin (F actin binding protein)
nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 1
nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 2 interacting protein
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha
neuroguidin, EIF4E binding protein
NHL repeat containing 3
NIF3 NGG1 interacting factor 3-like 1 (S. pombe)
nuclear import 7 homolog (S. cerevisiae)
nischarin
nischarin
nucleoside phosphorylase
Niemann-Pick disease, type C2
nuclear receptor subfamily 1, group H, member 3
nuclear receptor subfamily 2, group C, member 2
nuclear receptor subfamily 4, group A, member 3
5'-nucleotidase, cytosolic III
netrin 1
nuclear casein kinase and cyclin-dependent kinase substrate 1
nudix (nucleoside diphosphate linked moiety X)-type motif 21
nucleoporin 160kDa
nucleoporin 54kDa
nucleoporin like 1
nuclear undecaprenyl pyrophosphate synthase 1 homolog (S. cerevisiae)
nuclear undecaprenyl pyrophosphate synthase 1 homolog (S. cerevisiae)
nuclear transport factor 2
obscurin, cytoskeletal calmodulin and titin-interacting RhoGEF
ornithine decarboxylase 1
optineurin
oxysterol binding protein-like 1A
oxysterol binding protein-like 9
oncostatin M receptor
oligosaccharyltransferase complex subunit
OTU domain containing 6B
pyrimidinergic receptor P2Y, G-protein coupled, 6
poly(A) binding protein, cytoplasmic 4 (inducible form)
phosphoribosylaminoimidazole carboxylase, phosphoribosylaminoimidazole
phosphoribosylaminoimidazole carboxylase, phosphoribosylaminoimidazole
PAK1 interacting protein 1
PAP associated domain containing 5
POZ (BTB) and AT hook containing zinc finger 1
pre-B-cell leukemia homeobox 3
protocadherin 7
protocadherin 7
PEST proteolytic signal containing nuclear protein
procollagen C-endopeptidase enhancer
programmed cell death 10
programmed cell death 2
programmed cell death 5

3-phosphoinositide dependent protein kinase-1
p53 and DNA-damage regulated 1
prenyl (decaprenyl) diphosphate synthase, subunit 1
pyridoxal (pyridoxine, vitamin B6) kinase
PDZ domain containing 8
PERP, TP53 apoptosis effector
prefoldin subunit 1
prefoldin subunit 5
prefoldin subunit 6
6-phosphofructo-2-kinase/fructose-2,6-biphosphatase 2
phosphoglycerate kinase 1
progesterone receptor membrane component 2
phosphatase and actin regulator 4
prohibitin
PHD finger protein 12
PHD finger protein 20
PHD finger protein 20
PHD finger protein 3
phosphatidylinositol binding clathrin assembly protein
phosphotyrosine interaction domain containing 1
phosphatidylinositol glycan anchor biosynthesis, class O
phosphoinositide-3-kinase, class 2, alpha polypeptide
phosphoinositide-3-kinase, catalytic, alpha polypeptide
phosphoinositide-3-kinase, catalytic, alpha polypeptide
phosphatidylinositol-4-phosphate 5-kinase, type I, beta
phosphatidylinositol transfer protein, cytoplasmic 1
praja ring finger 2
praja ring finger 2
polycystic kidney disease 1 (autosomal dominant)
plakophilin 2
phospholipase C, beta 4
phospholipase C, beta 4
phospholipase C, delta 3
phospholipase C, epsilon 1
perilipin 3
proteolipid protein 2 (colonic epithelium-enriched)
proteolipid protein 2 (colonic epithelium-enriched)
phospholipid scramblase 2
phospholipid transfer protein
patatin-like phospholipase domain containing 8
protein O-fucosyltransferase 1
polymerase (DNA directed), delta 2, regulatory subunit 50kDa
polymerase (RNA) I polypeptide D, 16kDa
peroxisome proliferator-activated receptor alpha
peroxisome proliferator-activated receptor gamma, coactivator 1 alpha
peroxisome proliferator-activated receptor gamma, coactivator 1 alpha
peroxisome proliferator-activated receptor gamma, coactivator 1 alpha
peroxisome proliferator-activated receptor gamma, coactivator 1 alpha
peroxisome proliferator-activated receptor gamma, coactivator 1 alpha
protein tyrosine phosphatase, receptor type, f polypeptide (PTPRF), interacting protein (liprin), alpha 1

protein phosphatase 1, catalytic subunit, beta isoform
protein phosphatase 1, catalytic subunit, beta isoform
protein phosphatase 1, catalytic subunit, gamma isoform
protein phosphatase 1, regulatory (inhibitor) subunit 11
protein phosphatase 1, regulatory (inhibitor) subunit 11
protein phosphatase 1, regulatory (inhibitor) subunit 12A
protein phosphatase 1, regulatory (inhibitor) subunit 15A
protein phosphatase 2 (formerly 2A), regulatory subunit A, alpha isoform
protein phosphatase 2 (formerly 2A), regulatory subunit A, alpha isoform
protein phosphatase 2 (formerly 2A), regulatory subunit A, alpha isoform
protein phosphatase 2, regulatory subunit B, delta isoform
protein phosphatase 3 (formerly 2B), catalytic subunit, alpha isoform
PPPDE peptidase domain containing 2
prolylcarboxypeptidase (angiotensinase C)
peroxiredoxin 1
peroxiredoxin 1
peroxiredoxin 1
peroxiredoxin 2
peroxiredoxin 4
PRELI domain containing 1
prolyl endopeptidase-like
protein kinase, cAMP-dependent, catalytic, beta
protein kinase D1
protein arginine methyltransferase 6
proline synthetase co-transcribed homolog (bacterial)
PRP40 pre-mRNA processing factor 40 homolog A (S. cerevisiae)
PRP4 pre-mRNA processing factor 4 homolog B (yeast)
PRP4 pre-mRNA processing factor 4 homolog B (yeast)
PRP4 pre-mRNA processing factor 4 homolog B (yeast)
proline rich Gla (G-carboxyglutamic acid) 1
presenilin enhancer 2 homolog (C. elegans)
proteasome (prosome, macropain) subunit, alpha type, 6
proteasome (prosome, macropain) subunit, alpha type, 6
proteasome (prosome, macropain) subunit, beta type, 4
proteasome (prosome, macropain) 26S subunit, ATPase, 2
proteasome (prosome, macropain) 26S subunit, ATPase, 4
proteasome (prosome, macropain) 26S subunit, non-ATPase, 6
prostaglandin E synthase 3 (cytosolic)
prostaglandin E synthase 3 (cytosolic)
prostaglandin reductase 2
protein tyrosine phosphatase type IVA, member 1
protein tyrosine phosphatase type IVA, member 1
protein tyrosine phosphatase-like (proline instead of catalytic arginine), member A
protein tyrosine phosphatase, non-receptor type 12
protein tyrosine phosphatase, non-receptor type 2
protein tyrosine phosphatase, receptor type, C
protein tyrosine phosphatase, receptor type, G
pituitary tumor-transforming 1 interacting protein
poly-U binding splicing factor 60KDa
poliovirus receptor

serine/threonine-protein kinase QSK
serine/threonine-protein kinase QSK
serine/threonine-protein kinase QSK
RAB11 family interacting protein 2 (class I)
RAB11 family interacting protein 5 (class I)
RAB14, member RAS oncogene family
RAB28, member RAS oncogene family
rabaptin, RAB GTPase binding effector protein 1
ras-related C3 botulinum toxin substrate 1 (rho family, small GTP binding protein Rac1)
ralA binding protein 1
RAN, member RAS oncogene family
RAN, member RAS oncogene family
RAN binding protein 2
RAP1A, member of RAS oncogene family
Rap guanine nucleotide exchange factor (GEF) 4
Rap guanine nucleotide exchange factor (GEF) 6
Ras association (RalGDS/AF-6) and pleckstrin homology domains 1
Ras association (RalGDS/AF-6) and pleckstrin homology domains 1
arginyl-tRNA synthetase
RAS p21 protein activator 3
retinoblastoma 1
RB1-inducible coiled-coil 1
RB1-inducible coiled-coil 1
retinoblastoma binding protein 4
retinoblastoma binding protein 4
retinoblastoma binding protein 7
RNA binding motif protein 16
RNA binding motif protein 17
RNA binding motif protein 24
RNA binding motif protein 25
RNA binding motif protein 25
RNA binding motif (RNP1, RRM) protein 3
RNA binding motif protein 5
RNA binding motif, single stranded interacting protein
RNA binding motif protein, X-linked
radixin
radixin
receptor accessory protein 3
receptor accessory protein 5
RALBP1 associated Eps domain containing 1
ring finger and FYVE-like domain containing 1
riboflavin kinase
ras homolog gene family, member A
Rho-related BTB domain containing 3
Rho-related BTB domain containing 3
Rab interacting lysosomal protein-like 1
Ras-like without CAAX 1
ribonuclease T2
ring finger protein 114

ring finger protein 144B
ring finger protein 19B
ring finger protein 19B
RNA binding protein S1, serine-rich domain
RNA binding protein S1, serine-rich domain
Rho-associated, coiled-coil containing protein kinase 1
Rho-associated, coiled-coil containing protein kinase 1
Rho-associated, coiled-coil containing protein kinase 2
ribosomal protein L10A
ribosomal protein L12
ribosomal protein L12
ribosomal protein L13a
ribosomal protein L13a
ribosomal protein L13a
ribosomal protein L13a
ribosomal protein L17
ribosomal protein L22-like 1
ribosomal protein L23a
ribosomal protein L23a
ribosomal protein L24
ribosomal protein L27
ribosomal protein L29
ribosomal protein L3
ribosomal protein L30
ribosomal protein L31
ribosomal protein L35
ribosomal protein L35
ribosomal protein L39
ribosomal protein L5
ribosomal protein L6
ribosomal protein L7
ribosomal protein L7
ribosomal protein L9
ribosomal protein, large, P0
regulation of nuclear pre-mRNA domain containing 1A
ribosomal protein S10
ribosomal protein S10
ribosomal protein S10
ribosomal protein S11
ribosomal protein S12
ribosomal protein S13
ribosomal protein S15A
ribosomal protein S16
ribosomal protein S16
ribosomal protein S20
ribosomal protein S20
ribosomal protein S21
ribosomal protein S24
ribosomal protein S24

ribosomal protein S26
ribosomal protein S27A
ribosomal protein S28
ribosomal protein S29
ribosomal protein S4, X-linked
ribosomal protein S5
ribosomal protein S6
ribosomal protein S6
ribosomal protein S6
ribosomal protein S6
ribosomal protein S6
ribosomal protein S6
ribosomal protein S6 kinase, 70kDa, polypeptide 1
ribosomal protein S9
Ras-related GTP binding D
RRS1 ribosome biogenesis regulator homolog (S. cerevisiae)
round spermatid basic protein 1
reticulon 3
RWD domain containing 1
RWD domain containing 4A
S100 calcium binding protein A10
S100 calcium binding protein A11
S100 calcium binding protein A8
S100 calcium binding protein A9
SAC1 suppressor of actin mutations 1-like (yeast)
Sin3A-associated protein, 30kDa
SAP domain containing ribonucleoprotein
SET binding factor 2
SH3-binding domain kinase 1
strawberry notch homolog 1 (Drosophila)
scavenger receptor class A, member 5 (putative)
schwannomin interacting protein 1
sodium channel, voltage-gated, type VII, alpha
short coiled-coil protein
sterol carrier protein 2
serine carboxypeptidase 1
secernin 1
serologically defined colon cancer antigen 1
Sec61 gamma subunit
SEC62 homolog (S. cerevisiae)
SEC63 homolog (S. cerevisiae)
selenoprotein S
selenoprotein S
selenoprotein W, 1
SERPINE1 mRNA binding protein 1
small EDRK-rich factor 2
serine incorporator 1
serine incorporator 3
serine incorporator 3

SET nuclear oncogene
SET domain containing 6
splicing factor 1
splicing factor 3b, subunit 1, 155kDa
splicing factor 3B, 14 kDa subunit
splicing factor 3b, subunit 2, 145kDa
splicing factor 3b, subunit 3, 130kDa
secreted frizzled-related protein 1
secreted frizzled-related protein 1
splicing factor, arginine/serine-rich 11
splicing factor, arginine/serine-rich 18
serum/glucocorticoid regulated kinase 1
shugoshin-like 1 (S. pombe)
SH3 domain binding glutamic acid-rich protein like
SH3 domain binding glutamic acid-rich protein like
SH3 domain binding glutamic acid-rich protein like 3
SH3-domain GRB2-like endophilin B1
SH3-domain GRB2-like endophilin B1
shisa homolog 5 (Xenopus laevis)
suppressor of IKBKE 1
signal-induced proliferation-associated 1 like 2
v-ski sarcoma viral oncogene homolog (avian)
solute carrier family 16, member 4 (monocarboxylic acid transporter 5)
solute carrier family 20 (phosphate transporter), member 1
solute carrier family 25, member 28
solute carrier family 25, member 30
solute carrier family 25, member 36
solute carrier family 25, member 39
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 4
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 6
solute carrier family 2 (facilitated glucose transporter), member 12
solute carrier family 2 (facilitated glucose transporter), member 9
solute carrier family 3 (activators of dibasic and neutral amino acid transport), member 2
solute carrier family 6 (neurotransmitter transporter, taurine), member 6
solute carrier family 6 (neurotransmitter transporter, taurine), member 6
solute carrier family 6 (neurotransmitter transporter, creatine), member 8
solute carrier organic anion transporter family, member 2B1
solute carrier organic anion transporter family, member 3A1
SMAD family member 4
SMAD family member 7
SMG1 homolog, phosphatidylinositol 3-kinase-related kinase (C. elegans)
survival motor neuron domain containing 1
sphingomyelin phosphodiesterase 1, acid lysosomal
single-strand-selective monofunctional uracil-DNA glycosylase 1
SMAD specific E3 ubiquitin protein ligase 2
staphylococcal nuclease and tudor domain containing 1
small nucleolar RNA host gene (non-protein coding) 6

small nuclear ribonucleoprotein polypeptide A'
sorting nexin 18
suppressor of cytokine signaling 2
suppressor of cytokine signaling 3
suppressor of cytokine signaling 6
superoxide dismutase 2, mitochondrial
SON DNA binding protein
SON DNA binding protein
sorbin and SH3 domain containing 1
sorbin and SH3 domain containing 1
sorbitol dehydrogenase
sorbitol dehydrogenase
son of sevenless homolog 2 (Drosophila)
SRY (sex determining region Y)-box 17
Sp1 transcription factor
sperm associated antigen 9
SPEG complex locus
spinster homolog 2 (Drosophila)
sprouty-related, EVH1 domain containing 2
serine palmitoyltransferase, long chain base subunit 2
U2-associated SR140 protein
steroid receptor RNA activator 1
SLIT-ROBO Rho GTPase activating protein 2
serglycin
signal recognition particle 14kDa (homologous Alu RNA binding protein)
signal recognition particle 14kDa (homologous Alu RNA binding protein)
signal recognition particle 19kDa
sulfiredoxin 1 homolog (S. cerevisiae)
synovial sarcoma translocation gene on chromosome 18-like 2
single-stranded DNA binding protein 1
slingshot homolog 3 (Drosophila)
signal sequence receptor, gamma (translocon-associated protein gamma)
signal sequence receptor, delta (translocon-associated protein delta)
suppression of tumorigenicity 13 (colon carcinoma) (Hsp70 interacting protein)
ST8 alpha-N-acetyl-neuraminide alpha-2,8-sialyltransferase 6
stabilin 1
stromal antigen 2
signal transducer and activator of transcription 3 (acute-phase response factor)
signal transducer and activator of transcription 3 (acute-phase response factor)
serine/threonine kinase 3 (STE20 homolog, yeast)
serine threonine kinase 39 (STE20/SPS1 homolog, yeast)
serine threonine kinase 39 (STE20/SPS1 homolog, yeast)
striatin, calmodulin binding protein 3
STT3, subunit of the oligosaccharyltransferase complex, homolog B (S. cerevisiae)
SMT3 suppressor of mif two 3 homolog 2 (yeast)
synapse associated protein 1, SAP47 homolog (Drosophila)
symplekin
synaptotagmin binding, cytoplasmic RNA interacting protein
synaptotagmin binding, cytoplasmic RNA interacting protein

TAF1 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 250kDa
TAF10 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 30kDa
TAF9 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 32kDa
TAF9 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 32kDa
TAF9 RNA polymerase II, TATA box binding protein (TBP)-associated factor, 32kDa
TatD DNase domain containing 1
TBC1 domain family, member 15
tubulin folding cofactor A
TANK-binding kinase 1
TBP-like 1
T-box 20
aldo-keto reductase family 1, member B10-like
transcription elongation factor B (SIII), polypeptide 1 (15kDa, elongin C)
transcription elongation factor B (SIII), polypeptide 2 (18kDa, elongin B)
transcription elongation factor B (SIII), polypeptide 3 (110kDa, elongin A)
t-complex 11 (mouse)-like 2
trans-2,3-enoyl-CoA reductase-like
testis expressed 261
tissue factor pathway inhibitor (lipoprotein-associated coagulation inhibitor)
tissue factor pathway inhibitor (lipoprotein-associated coagulation inhibitor)
transforming growth factor, beta receptor II (70/80kDa)
transglutaminase 2 (C polypeptide, protein-glutamine-gamma-glutamyltransferase)
transglutaminase 2 (C polypeptide, protein-glutamine-gamma-glutamyltransferase)
transglutaminase 2 (C polypeptide, protein-glutamine-gamma-glutamyltransferase)
trimethylguanosine synthase homolog (S. cerevisiae)
trimethylguanosine synthase homolog (S. cerevisiae)
thrombomodulin
TIA1 cytotoxic granule-associated RNA binding protein
TIA1 cytotoxic granule-associated RNA binding protein
TRAF-interacting protein with forkhead-associated domain, family member B
translocase of inner mitochondrial membrane 10 homolog (yeast)
TCDD-inducible poly(ADP-ribose) polymerase
TM2 domain containing 2
TM2 domain containing 2
transmembrane BAX inhibitor motif containing 1
transmembrane and coiled-coil domain family 3
transmembrane and coiled-coil domains 1
transmembrane emp24-like trafficking protein 10 (yeast)
transmembrane emp24 domain trafficking protein 2
transmembrane emp24 domain trafficking protein 2
transmembrane emp24 domain trafficking protein 2
transmembrane emp24 domain trafficking protein 2
transmembrane emp24 protein transport domain containing 3
transmembrane emp24 protein transport domain containing 7
transmembrane protein 100
transmembrane protein 106B
transmembrane protein 106B
transmembrane protein 115
transmembrane protein 144

transmembrane protein 167A
transmembrane protein 176A
transmembrane protein 182
transmembrane protein 41B
transmembrane protein 45A
transmembrane protein 93
TMEM9 domain family, member B
transmembrane and tetratricopeptide repeat containing 1
tankyrase, TRF1-interacting ankyrin-related ADP-ribose polymerase 2
tankyrase, TRF1-interacting ankyrin-related ADP-ribose polymerase 2
transportin 1
trinucleotide repeat containing 6A
trinucleotide repeat containing 6A
trinucleotide repeat containing 6A
trinucleotide repeat containing 6C
transducer of ERBB2, 1
translocase of outer mitochondrial membrane 20 homolog (yeast)
translocase of outer mitochondrial membrane 20 homolog (yeast)
translocase of outer mitochondrial membrane 20 homolog (yeast)
translocase of outer mitochondrial membrane 7 homolog (yeast)
triosephosphate isomerase 1
tropomyosin 3
tripeptidyl peptidase I
translocated promoter region (to activated MET oncogene)
tumor protein p63 regulated 1-like
tumor protein, translationally-controlled 1
TraB domain containing
trafficking protein particle complex 6B
tripartite motif-containing 24
tripartite motif-containing 28
TRIO and F-actin binding protein
thyroid hormone receptor interactor 11
thyroid hormone receptor interactor 12
TMF1-regulated nuclear protein 1
TROVE domain family, member 2
TROVE domain family, member 2
transient receptor potential cation channel, subfamily M, member 7
tuberous sclerosis 1
tetraspanin 31
tetraspanin 4
translocator protein (18kDa)
titin
tubulin, alpha 1b
tubulin, alpha 1c
tubulin, alpha 4a
tubulin, beta 6
taurine upregulated gene 1
tubby like protein 4

ubiquitin A-52 residue ribosomal protein fusion product 1
ubiquitin A-52 residue ribosomal protein fusion product 1
ubiquitin C
ubiquitin-conjugating enzyme E2D 2 (UBC4/5 homolog, yeast)
ubiquitin-conjugating enzyme E2D 3 (UBC4/5 homolog, yeast)
ubiquitin-conjugating enzyme E2D 3 (UBC4/5 homolog, yeast)
ubiquitin-conjugating enzyme E2D 3 (UBC4/5 homolog, yeast)
ubiquitin-conjugating enzyme E2G 1 (UBC7 homolog, yeast)
ubiquitination factor E4B (UFD2 homolog, yeast)
ubinuclein 2
ubiquitin protein ligase E3 component n-recognin 2
UBX domain protein 2A
UDP-glucose dehydrogenase
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
unc-119 homolog B (C. elegans)
uridine phosphorylase 1
uroporphyrinogen III synthase
ubiquitin specific peptidase 1
ubiquitin specific peptidase 14 (tRNA-guanine transglycosylase)
ubiquitin specific peptidase 25
utrophin
ubiquitously transcribed tetratricopeptide repeat gene, Y-linked
UV radiation resistance associated gene
vesicle-associated membrane protein 3 (cellubrevin)
vesicle-associated membrane protein 4
VAMP (vesicle-associated membrane protein)-associated protein A, 33kDa
VAMP (vesicle-associated membrane protein)-associated protein A, 33kDa
von Hippel-Lindau binding protein 1
valosin containing protein (p97)/p47 complex interacting protein 1
vascular endothelial zinc finger 1
vimentin
VMA21 vacuolar H+-ATPase homolog (S. cerevisiae)
vacuolar protein sorting 26 homolog A (S. pombe)
vacuolar protein sorting 35 homolog (S. cerevisiae)
vacuolar protein sorting 4 homolog A (S. cerevisiae)
von Willebrand factor A domain containing 5A
von Willebrand factor
WW domain containing adaptor with coiled-coil
wings apart-like homolog (Drosophila)
tryptophanyl-tRNA synthetase
tryptophanyl-tRNA synthetase
WW domain binding protein 5
WD repeat and FYVE domain containing 3
WAS/WASL interacting protein family, member 3

Yip1 domain family, member 4
Yip1 domain family, member 5
YTH domain family, member 1
YTH domain family, member 3
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, beta polypeptide
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, beta polypeptide
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, beta polypeptide
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, theta polypeptide
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, theta polypeptide
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, theta polypeptide
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, theta polypeptide
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, theta polypeptide
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, zeta polypeptide
zinc finger and BTB domain containing 2
zinc finger and BTB domain containing 41
zinc finger CCCH-type containing 10
zinc finger CCCH-type containing 14
zinc finger CCCH-type containing 15
zinc finger, CCHC domain containing 6
zinc finger, CCHC domain containing 7
zinc finger, DHHC-type containing 16
zinc finger, DHHC-type containing 3
zinc finger, DHHC-type containing 5
zinc finger E-box binding homeobox 2
zinc finger, AN1-type domain 5
zinc finger, C3H1-type containing
zinc finger protein 161 homolog (mouse)
zinc finger protein 161 homolog (mouse)
zinc finger protein 36, C3H type-like 1
zinc finger protein 422, related sequence 1
zinc finger protein 809
zinc finger protein 871
zinc finger protein 91 homolog (mouse)
zinc finger RNA binding protein
zinc finger, FYVE domain containing 21
zinc fingers and homeoboxes 2
zinc finger, MIZ-type containing 2
zinc metallopeptidase (STE24 homolog, S. cerevisiae)
zinc finger, MYM-type 4
zinc finger, MYM-type 5
zinc finger protein 124
zinc finger protein 148
zinc finger protein 187
zinc finger protein 266
zinc finger protein 367
zinc finger protein 397
zinc finger protein 526
zinc finger protein 560

zinc finger, RAN-binding domain containing 1
zinc finger, RAN-binding domain containing 2
zinc finger (CCCH type), RNA binding motif and serine/arginine rich 1
zinc finger, ZZ-type containing 3

Supp. Table 3 Heart TERT

Increased 138 probe sets in G4 mice

Entrez Gene Name
RIKEN cDNA 2810488G03 gene
RIKEN cDNA 4833408G04 gene
RIKEN cDNA 4930442G15 gene
RIKEN cDNA 4933407I05 gene
acetyl-Coenzyme A acyltransferase 2
adenosylhomocysteinase-like 1
annexin A6
amyloid beta (A4) precursor-like protein 2
aristaless related homeobox
expressed sequence AU020147
B-cell CLL/lymphoma 6
chromosome 2 open reading frame 82
carbonic anhydrase III, muscle specific
cAMP responsive element binding protein 3-like 4
corticotropin releasing hormone receptor 1
DDB1 and CUL4 associated factor 5
DEAD (Asp-Glu-Ala-Asp) box polypeptide 51
diacylglycerol kinase, eta
ubiquitin-conjugating enzyme E2Q (putative) 2 pseudogene
engulfment and cell motility 1
envoplakin
fatty acid binding protein 3, muscle and heart (mammary-derived growth inhibitor)
FCH domain only 1
ganglioside-induced differentiation-associated protein 1
GDP dissociation inhibitor 2
glycoprotein A33 (transmembrane)
heart and neural crest derivatives expressed 2
insulin-degrading enzyme
Impact homolog (mouse)
inter-alpha (globulin) inhibitor H5
leucine-rich repeat LGI family, member 3
protein phosphatase 4, regulatory subunit 1-like
malic enzyme 1, NADP(+)-dependent, cytosolic
musashi homolog 2 (Drosophila)
nucleus accumbens associated 1, BEN and BTB (POZ) domain containing
nucleus accumbens associated 1, BEN and BTB (POZ) domain containing
nudix (nucleoside diphosphate linked moiety X)-type motif 4
paired box 8

protamine 2
proline-rich transmembrane protein 3
RAD9 homolog B (S. pombe)
RAS protein activator like 3
RNA binding motif protein 24
retinitis pigmentosa GTPase regulator interacting protein 1
scratch homolog 2, zinc finger protein (Drosophila)
SEC14-like 2 (S. cerevisiae)
splicing factor 3a, subunit 2, 66kDa
solute carrier family 45, member 2
smoothelin-like 2
stomatin
tescalcin
transferrin receptor (p90, CD71)
transmembrane protein 19
tumor necrosis factor receptor superfamily, member 21
torsin family 1, member B (torsin B)
trypsin domain containing 1
vinculin
vacuolar protein sorting 13 homolog A (S. cerevisiae)
zinc finger protein 36, C3H type-like 2
zinc finger protein 568
zinc finger protein 76 (expressed in testis)
zinc finger and SCAN domain containing 5B
ubiquitin-conjugating enzyme E2E 3 (UBC4/5 homolog, yeast)
unconventional SNARE in the ER 1 homolog (S. cerevisiae)
unconventional SNARE in the ER 1 homolog (S. cerevisiae)
upstream transcription factor 2, c-fos interacting
ubiquitin specific peptidase 53
vesicle-associated membrane protein 8 (endobrevin)
vacuolar protein sorting 54 homolog (S. cerevisiae)
vitronectin
latrophilin 2
leucine-rich alpha-2-glycoprotein 1
low density lipoprotein receptor-related protein associated protein 1
leucine rich repeat containing 42
LSM8 homolog, U6 small nuclear RNA associated (S. cerevisiae)
lymphotoxin beta receptor (TNFR superfamily, member 3)
LYR motif containing 4
membrane associated guanylate kinase, WW and PDZ domain containing 3
MAK16 homolog (S. cerevisiae)
microtubule-associated protein 1 light chain 3 beta
mitogen-activated protein kinase kinase kinase 7 interacting protein 2
mitogen-activated protein kinase kinase kinase kinase 4
MAP7 domain containing 1
mediator complex subunit 15
methyltransferase like 1
matrix metallopeptidase 14 (membrane-inserted)

metallothionein 1E
metallothionein 1F
metadherin
myotubularin related protein 10
myosin IC
myosin IXB
nucleosome assembly protein 1-like 1
nucleosome assembly protein 1-like 1
nucleosome assembly protein 1-like 1
nucleolin
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, zeta
NHP2 ribonucleoprotein homolog (yeast)
NHP2 non-histone chromosome protein 2-like 1 (S. cerevisiae)
NmrA-like family domain containing 1
Notch homolog 4 (Drosophila)
5'-nucleotidase, cytosolic II
neurotrophin 3
nucleotide binding protein 1 (MinD homolog, E. coli)
nucleotide binding protein 1 (MinD homolog, E. coli)
nudix (nucleoside diphosphate linked moiety X)-type motif 18
nudix (nucleoside diphosphate linked moiety X)-type motif 4
orosomucoid 1
orosomucoid 2
oxysterol binding protein-like 9
ovarian tumor suppressor candidate 2
poly (ADP-ribose) polymerase 2
poly(rC) binding protein 2
poly(rC) binding protein 4
polycomb group ring finger 6
erythrocyte membrane protein band 4.1 (elliptocytosis 1, RH-linked)
ERBB receptor feedback inhibitor 1
coagulation factor XI
ficolin (collagen/fibrinogen domain containing lectin) 2 (hucolin)
fetuin B
fibroblast growth factor receptor 1
fibronectin type III domain containing 3B
GDNF family receptor alpha 1

Supp table 4

mTR liver decreased 1393 probe sets

Entrez Gene Name
RIKEN cDNA 0610008F07 gene
RIKEN cDNA 0610012H03 gene
RIKEN cDNA 1110001A16 gene
RIKEN cDNA 1500017E21 gene
RIKEN cDNA 1810008I18 gene
RIKEN cDNA 1810059H22 gene
RIKEN cDNA 2210023G05 gene
RIKEN cDNA 2310016E02 gene
RIKEN cDNA 2410003K15 gene
RIKEN cDNA 2810007J24 gene
RIKEN cDNA 2810410P21 gene
RIKEN cDNA 2810416A17 gene
RIKEN cDNA 2900053A13 gene
RIKEN cDNA 2900057C01 gene
RIKEN cDNA 4632419I22 gene
RIKEN cDNA 4930563F15 gene
RIKEN cDNA 4933407A17 gene
RIKEN cDNA 4933412L11 gene
RIKEN cDNA 4933438B17 gene
RIKEN cDNA 5430439M09 gene
RIKEN cDNA 5730407I07 gene
RIKEN cDNA 6030442K20 gene
RIKEN cDNA 9030619P08 gene
RIKEN cDNA 9130409I23 gene
RIKEN cDNA 9530025L08 gene
hypothetical protein 9530028C05
RIKEN cDNA A230067G21 gene
RIKEN cDNA A530058N18 gene
expressed sequence AA619741
acetoacetyl-CoA synthetase
acetoacetyl-CoA synthetase
arylacetamide deacetylase (esterase)
aminoadipate aminotransferase
4-aminobutyrate aminotransferase
ATP-binding cassette, sub-family A (ABC1), member 8
ATP-binding cassette, sub-family A (ABC1), member 8a
ATP-binding cassette, sub-family B (MDR/TAP), member 11
ATP-binding cassette, sub-family C (CFTR/MRP), member 3
ATP-binding cassette, sub-family C (CFTR/MRP), member 6
ATP-binding cassette, sub-family D (ALD), member 1
abhydrolase domain containing 4
abhydrolase domain containing 6
acetyl-Coenzyme A acyltransferase 1
acetyl-Coenzyme A acyltransferase 1
acetyl-Coenzyme A acyltransferase 1B
acetyl-Coenzyme A acyltransferase 2
acetyl-Coenzyme A carboxylase beta
acyl-Coenzyme A dehydrogenase family, member 10

acyl-Coenzyme A dehydrogenase family, member 9
acyl-Coenzyme A dehydrogenase family, member 9
acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain
acetyl-Coenzyme A acetyltransferase 1
acetyl-Coenzyme A acetyltransferase 1
acetyl-Coenzyme A acetyltransferase 1
acetyl-Coenzyme A acetyltransferase 2
acetyl-Coenzyme A acetyltransferase 2
ATP citrate lyase
ATP citrate lyase
ATP citrate lyase
aconitase 1, soluble
aconitase 2, mitochondrial
acyl-CoA thioesterase 13
acyl-CoA thioesterase 4
acyl-CoA thioesterase 7
acyl-Coenzyme A oxidase 1, palmitoyl
acyl-CoA synthetase family member 2
acyl-CoA synthetase family member 3
acyl-CoA synthetase long-chain family member 5
acyl-CoA synthetase medium-chain family member 1
acyl-CoA synthetase medium-chain family member 3
acyl-CoA synthetase medium-chain family member 5
acyl-CoA synthetase short-chain family member 2
acyl-CoA synthetase short-chain family member 2
aminoacylase 1
aspartoacylase (aminocyclase) 3
alcohol dehydrogenase 1C (class I), gamma polypeptide
alcohol dehydrogenase, iron containing, 1
alcohol dehydrogenase, iron containing, 1
acireductone dioxygenase 1
acireductone dioxygenase 1
adenosine kinase
adrenergic, alpha-1B-, receptor
amino-terminal enhancer of split
afamin
afamin
arylformamidase
arylformamidase
arylformamidase
agmatine ureohydrolase (agmatinase)
aminoglycoside phosphotransferase domain containing 1
alanine-glyoxylate aminotransferase
alanine-glyoxylate aminotransferase 2
alanine-glyoxylate aminotransferase 2-like 1
expressed sequence AI132709
expressed sequence AI317395
expressed sequence AI317395
aminoacyl tRNA synthetase complex-interacting multifunctional protein 2
adenylate kinase 2
adenylate kinase 2
adenylate kinase 3

adenylate kinase 3
adenylate kinase 3-like 1
adenylate kinase 3-like 1
aldo-keto reductase family 1, member C12
aldo-keto reductase family 1, member C12
aldo-keto reductase family 1, member C13
aldo-keto reductase family 1, member C14
aldo-keto reductase family 1, member C19
aldo-keto reductase family 1, member C20
aldo-keto reductase family 1, member C21
aldo-keto reductase family 1, member C4 (chlordecone reductase; 3-alpha hydroxysteroid d
aldo-keto reductase family 1, member C-like 2
aldo-keto reductase family 1, member D1 (delta 4-3-ketosteroid-5-beta-reductase)
AKT interacting protein
aminolevulinate, delta-, dehydratase
aldehyde dehydrogenase 1 family, member A1
aldehyde dehydrogenase family 1, subfamily A7
aldehyde dehydrogenase 1 family, member B1
aldehyde dehydrogenase 1 family, member L1
aldehyde dehydrogenase 2 family (mitochondrial)
aldehyde dehydrogenase 3 family, member A2
aldehyde dehydrogenase 4 family, member A1
aldehyde dehydrogenase 5 family, member A1
aldehyde dehydrogenase 6 family, member A1
aldehyde dehydrogenase 7 family, member A1
aldehyde dehydrogenase 7 family, member A1
aldehyde dehydrogenase 8 family, member A1
aldehyde dehydrogenase 9 family, member A1
asparagine-linked glycosylation 14 homolog (S. cerevisiae)
anaphase promoting complex subunit 11
anaphase promoting complex subunit 13
angiogenin, ribonuclease, RNase A family, 5
angiogenin, ribonuclease, RNase A family, 5
angel homolog 2 (Drosophila)
angiopoietin-like 2
angiopoietin-like 3
angiopoietin-like 6
ankyrin repeat, family A (RFXANK-like), 2
ankyrin repeat domain 13C
annexin A6
annexin A6
annexin A7
aldehyde oxidase 3
adaptor-related protein complex 2, alpha 2 subunit
adaptor-related protein complex 3, mu 1 subunit
adaptor-related protein complex 3, mu 1 subunit
adaptor-related protein complex 3, mu 1 subunit
APAF1 interacting protein
aprataxin and PNKP like factor
apolipoprotein A-I binding protein
apolipoprotein A-II
apolipoprotein B48 receptor

apolipoprotein C-I
apolipoprotein C-III
apolipoprotein L, 3
apolipoprotein L, 3
apolipoprotein L 9b
apolipoprotein O-like
aquaporin 8
androgen receptor
androgen receptor
ADP-ribosylation factor 4
Rho guanine nucleotide exchange factor (GEF) 12
Rho/Rac guanine nucleotide exchange factor (GEF) 2
ADP-ribosylation factor-like 2
ADP-ribosyltransferase 3
ankyrin repeat and SOCS box-containing 6
asialoglycoprotein receptor 2
aspartoacylase (Canavan disease)
alveolar soft part sarcoma chromosome region, candidate 1
argininosuccinate synthetase 1
ATG3 autophagy related 3 homolog (S. cerevisiae)
ATG7 autophagy related 7 homolog (S. cerevisiae)
ATH1, acid trehalase-like 1 (yeast)
ATP synthase, H+ transporting, mitochondrial F1 complex, alpha subunit 1, cardiac muscle
ATP synthase, H+ transporting, mitochondrial F1 complex, beta polypeptide
ATP synthase, H+ transporting, mitochondrial F1 complex, gamma polypeptide 1
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit B1
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit C1 (subunit 9)
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit C3 (subunit 9)
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit d
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit E
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit E
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit E
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit F6
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit F2
ATP synthase, H+ transporting, mitochondrial F0 complex, subunit F2
ATP5S-like
ATPase, aminophospholipid transporter-like, class I, type 8A, member 2
ataxin 2
expressed sequence AU018778
expressed sequence AW111846
expressed sequence AW112010
antizyme inhibitor 1
antizyme inhibitor 1
RIKEN cDNA B230114P17 gene
beta-2-microglobulin
RIKEN cDNA B930059L03 gene
barrier to autointegration factor 1
barrier to autointegration factor 1
butyrobetaine (gamma), 2-oxoglutarate dioxygenase (gamma-butyrobetaine hydroxylase) 1
butyrobetaine (gamma), 2-oxoglutarate dioxygenase (gamma-butyrobetaine hydroxylase) 1
bobby sox homolog (Drosophila)
cDNA sequence BC024137

cDNA sequence BC026585
B-cell receptor-associated protein 31
breast cancer anti-estrogen resistance 1
butyrylcholinesterase
butyrylcholinesterase
beta-carotene oxygenase 2
breakpoint cluster region
3-hydroxybutyrate dehydrogenase, type 1
3-hydroxybutyrate dehydrogenase, type 2
betaine-homocysteine methyltransferase
bicaudal D homolog 2 (Drosophila)
biorientation of chromosomes in cell division 1-like
bolA homolog 3 (E. coli)
biphenyl hydrolase-like (serine hydrolase)
BRCA1/BRCA2-containing complex, subunit 3
brain protein I3
bone marrow stromal cell antigen 2
BTB (POZ) domain containing 2
blood vessel epicardial substance
chromosome 11 open reading frame 17
chromosome 11 open reading frame 54
chromosome 11 open reading frame 54
chromosome 11 open reading frame 73
chromosome 12 open reading frame 73
chromosome 14 open reading frame 126
chromosome 14 open reading frame 149
chromosome 14 open reading frame 159
chromosome 16 open reading frame 13
chromosome 16 open reading frame 14
chromosome 16 open reading frame 68
chromosome 17 open reading frame 37
chromosome 17 open reading frame 39
chromosome 17 open reading frame 68
chromosome 17 open reading frame 80
chromosome 18 open reading frame 1
chromosome 18 open reading frame 19
chromosome 18 open reading frame 55
chromosome 19 open reading frame 60
chromosome 1 open reading frame 144
chromosome 1 open reading frame 210
chromosome 1 open reading frame 50
chromosome 20 open reading frame 196
chromosome 20 open reading frame 196
chromosome 20 open reading frame 72
chromosome 21 open reading frame 33
chromosome 22 open reading frame 32
C2 calcium-dependent domain containing 2
C2 calcium-dependent domain containing 2
C2 calcium-dependent domain containing 2
chromosome 2 open reading frame 44
complement component 3a receptor 1
chromosome 4 open reading frame 33

chromosome 5 open reading frame 33
chromosome 5 open reading frame 45
chromosome 6 open reading frame 1
chromosome 6 open reading frame 105
chromosome 6 open reading frame 108
chromosome 6 open reading frame 120
chromosome 6 open reading frame 125
chromosome 6 open reading frame 162
chromosome 6 open reading frame 89
chromosome 6 open reading frame 89
RIKEN cDNA C730007P19 gene
RIKEN cDNA C730036E19 gene
hypothetical protein C730043O17
expressed sequence C76669
chromosome 7 open reading frame 47
chromosome 7 open reading frame 55
chromosome 7 open reading frame 59
complement component 8, gamma polypeptide
chromosome 9 open reading frame 119
chromosome 9 open reading frame 95
carbonic anhydrase I
carbonic anhydrase XIV
carbonic anhydrase III, muscle specific
carbonic anhydrase III, muscle specific
carbonic anhydrase III, muscle specific
carbonic anhydrase III, muscle specific
carbonic anhydrase VA, mitochondrial
calcium binding and coiled-coil domain 1
calmodulin 1 (phosphorylase kinase, delta)
calmodulin 1 (phosphorylase kinase, delta)
catalase
cysteine conjugate-beta lyase 2
coiled-coil domain containing 107
coiled-coil domain containing 30
coiled-coil domain containing 53
coiled-coil domain containing 56
cyclin D1
cyclin D2
cyclin D2
cyclin L2
CCR4 carbon catabolite repression 4-like (S. cerevisiae)
copper chaperone for superoxide dismutase
CD151 molecule (Raph blood group)
CD1d molecule
CD1d molecule
CD36 molecule (thrombospondin receptor)
CD36 molecule (thrombospondin receptor)
CD36 molecule (thrombospondin receptor)
CD59a antigen
CD59a antigen
CD82 molecule

cyclin-dependent kinase 2 associated protein 2
CDP-diacylglycerol synthase (phosphatidate cytidylyltransferase) 2
CCAAT/enhancer binding protein (C/EBP), alpha
chymotrypsin-like elastase family, member 1
centromere protein M
carboxylesterase 1 (monocyte/macrophage serine esterase 1)
carboxylesterase 1 (monocyte/macrophage serine esterase 1)
carboxylesterase 1 (monocyte/macrophage serine esterase 1)
carboxylesterase 1
carboxylesterase 2
carboxylesterase 3
carboxylesterase 5
carboxylesterase 6
coiled-coil-helix-coiled-coil-helix domain containing 10
coiled-coil-helix-coiled-coil-helix domain containing 3
choline dehydrogenase
cell death-inducing DFFA-like effector b
CDGSH iron sulfur domain 1
CDGSH iron sulfur domain 3
chloride channel 2
C-type lectin domain family 14, member A
calmin (calponin-like, transmembrane)
calmin (calponin-like, transmembrane)
calmin (calponin-like, transmembrane)
cytidine monophosphate-N-acetylneuraminic acid hydroxylase (CMP-N-acetylneuraminate monooxygenase)
carboxymethylenebutenolidase homolog (Pseudomonas)
camello-like 1
camello-like 2
camello-like 2
CKLF-like MARVEL transmembrane domain containing 8
cornichon homolog (Drosophila)
CCR4-NOT transcription complex, subunit 8
component of oligomeric golgi complex 4
component of oligomeric golgi complex 4
component of oligomeric golgi complex 6
collagen, type XIV, alpha 1
collagen, type XIV, alpha 1
collagen, type XXVII, alpha 1
collagen, type III, alpha 1
collagen, type V, alpha 1
collagen, type VI, alpha 3
collectin sub-family member 11
copper metabolism (Murr1) domain containing 1
COP9 constitutive photomorphogenic homolog subunit 7A (Arabidopsis)
coatomer protein complex, subunit zeta 2
coronin 6
COX16 cytochrome c oxidase assembly homolog (S. cerevisiae)
COX19 cytochrome c oxidase assembly homolog (S. cerevisiae)
cytochrome c oxidase subunit Vb
cytochrome c oxidase subunit Vb
cytochrome c oxidase subunit VIa polypeptide 1

cytochrome c oxidase subunit Vib polypeptide 1 (ubiquitous)
cytochrome c oxidase subunit Vib polypeptide 1 (ubiquitous)
cytochrome c oxidase subunit VIc
cytochrome c oxidase subunit VIIa polypeptide 2 (liver)
cytochrome c oxidase subunit VIIa polypeptide 2 (liver)
cytochrome c oxidase subunit VIIc
cytochrome c oxidase subunit 8A (ubiquitous)
cytochrome c oxidase subunit 8A (ubiquitous)
cysteine-rich with EGF-like domains 1
crystallin, lambda 1
crystallin, lambda 1
crystallin, zeta (quinone reductase)
casein kinase 2, alpha 1 polypeptide
component of Sp100-rs
component of Sp100-rs
catenin (cadherin-associated protein), beta 1, 88kDa
cathepsin B
cathepsin B
cathepsin O
cutA divalent cation tolerance homolog (E. coli)
CWF19-like 1, cell cycle control (S. pombe)
chemokine (C-X3-C motif) ligand 1
chromosome X open reading frame 56
cytochrome b5 type A (microsomal)
cytochrome b5 type B (outer mitochondrial membrane)
cytochrome b5 type B (outer mitochondrial membrane)
cytochrome b5 type B (outer mitochondrial membrane)
cytochrome b5 reductase 3
cysteine/histidine-rich 1
cytochrome P450, family 1, subfamily A, polypeptide 2
cytochrome P450, family 2, subfamily A, polypeptide 13
cytochrome P450, family 2, subfamily b, polypeptide 13
cytochrome P450, family 2, subfamily B, polypeptide 6
cytochrome P450, family 2, subfamily B, polypeptide 6
cytochrome P450, family 2, subfamily b, polypeptide 9
cytochrome P450, family 2, subfamily C, polypeptide 18
cytochrome P450, family 2, subfamily C, polypeptide 19
cytochrome P450, family 2, subfamily C, polypeptide 19
cytochrome P450, family 2, subfamily C, polypeptide 19
cytochrome P450, family 2, subfamily c, polypeptide 29
cytochrome P450, family 2, subfamily c, polypeptide 38
cytochrome P450, family 2, subfamily c, polypeptide 39
cytochrome P450, family 2, subfamily c, polypeptide 44
cytochrome P450, family 2, subfamily c, polypeptide 68
cytochrome P450, family 2, subfamily d, polypeptide 13
cytochrome P450, family 2, subfamily d, polypeptide 26
cytochrome P450, family 2, subfamily D, polypeptide 6
cytochrome P450, family 2, subfamily D, polypeptide 6
cytochrome P450, family 2, subfamily E, polypeptide 1
cytochrome P450, family 2, subfamily F, polypeptide 1
cytochrome P450, family 2, subfamily J, polypeptide 2

cytochrome P450, family 2, subfamily j, polypeptide 5
cytochrome P450, family 3, subfamily A, polypeptide 4
cytochrome P450, family 3, subfamily A, polypeptide 4
cytochrome P450, family 4, subfamily A, polypeptide 11
cytochrome P450, family 4, subfamily F, polypeptide 12
cytochrome P450, family 4, subfamily F, polypeptide 2
cytochrome P450, family 4, subfamily V, polypeptide 2
cytochrome P450, family 4, subfamily V, polypeptide 2
cytochrome P450, family 7, subfamily B, polypeptide 1
cytochrome P450, family 7, subfamily B, polypeptide 1
cystin 1
D-2-hydroxyglutarate dehydrogenase
RIKEN cDNA D730039F16 gene
RIKEN cDNA D830046C22 gene
RIKEN cDNA D930017J03 gene
aspartyl-tRNA synthetase
aspartyl-tRNA synthetase 2, mitochondrial
D site of albumin promoter (albumin D-box) binding protein
dodecenoyl-Coenzyme A delta isomerase (3,2 trans-enoyl-Coenzyme A isomerase)
doublecortin-like kinase 3
DNA cross-link repair 1A (PSO2 homolog, S. cerevisiae)
dopachrome tautomerase (dopachrome delta-isomerase, tyrosine-related protein 2)
dicarbonyl/L-xylulose reductase
dimethylarginine dimethylaminohydrolase 1
dimethylarginine dimethylaminohydrolase 1
dimethylarginine dimethylaminohydrolase 1
dimethylarginine dimethylaminohydrolase 1
D-dopachrome tautomerase
2,4-dienoyl CoA reductase 1, mitochondrial
DEP domain containing 6
DEP domain containing 6
DEP domain containing 6
2-deoxyribose-5-phosphate aldolase homolog (C. elegans)
Der1-like domain family, member 2
diacylglycerol O-acyltransferase homolog 2 (mouse)
diacylglycerol O-acyltransferase homolog 2 (mouse)
dehydrogenase/reductase (SDR family) member 1
dehydrogenase/reductase (SDR family) member 11
dehydrogenase/reductase (SDR family) member 3
dehydrogenase/reductase (SDR family) member 7
dehydrogenase/reductase (SDR family) member 7B
deleted in lymphocytic leukemia 2 (non-protein coding)
dystrophin
dimethylglycine dehydrogenase
DnaJ (Hsp40) homolog, subfamily B, member 2
DnaJ (Hsp40) homolog, subfamily B, member 6
dopey family member 2
dipeptidyl-peptidase 4
dipeptidyl-peptidase 4
dipeptidyl-peptidase 4
dipeptidyl-peptidase 8

dihydropyrimidinase
dihydropyrimidinase
desmoglein 2
dual specificity phosphatase 19
dynein, light chain, LC8-type 2
dynein, light chain, Tctex-type 3
dynein, light chain, Tctex-type 3
RIKEN cDNA E530001K10 gene
enoyl Coenzyme A hydratase domain containing 1
enoyl Coenzyme A hydratase domain containing 2
enoyl Coenzyme A hydratase domain containing 3
enoyl Coenzyme A hydratase, short chain, 1, mitochondrial
extracellular matrix protein 1
ECSIT homolog (Drosophila)
ER degradation enhancer, mannosidase alpha-like 1
eukaryotic elongation factor-2 kinase
ephrin-A5
egl nine homolog 3 (C. elegans)
EH-domain containing 3
EH-domain containing 3
eukaryotic translation initiation factor 4A, isoform 2
ELOVL family member 6, elongation of long chain fatty acids (FEN1/Elo2, SUR4/Elo3-like, yeast)
ELOVL family member 6, elongation of long chain fatty acids (FEN1/Elo2, SUR4/Elo3-like, yeast)
ELOVL family member 6, elongation of long chain fatty acids (FEN1/Elo2, SUR4/Elo3-like, yeast)
enolase 1, (alpha)
enolase 1, (alpha)
ectonucleotide pyrophosphatase/phosphodiesterase 1
ectonucleoside triphosphate diphosphohydrolase 5
epoxide hydrolase 1, microsomal (xenobiotic)
epoxide hydrolase 2, cytoplasmic
Era G-protein-like 1 (E. coli)
endoplasmic reticulum-golgi intermediate compartment (ERGIC) 1
ERGIC and golgi 3
ERGIC and golgi 3
esterase 22
esterase D/formylglutathione hydrolase
ethylmalonic encephalopathy 1
exocyst complex component 4
exocyst complex component 8
fatty acid amide hydrolase
fatty acid amide hydrolase
fatty acid binding protein 1, liver
fatty acid binding protein 2, intestinal
fatty acid desaturase 1
fatty acid desaturase 2
fatty acid desaturase 2
fatty acid desaturase 2
fumarylacetoacetate hydrolase (fumarylacetoacetase)
fumarylacetoacetate hydrolase domain containing 2A
fumarylacetoacetate hydrolase domain containing 2A
fumarylacetoacetate hydrolase domain containing 2A

family with sequence similarity 102, member A
family with sequence similarity 102, member A
family with sequence similarity 107, member B
family with sequence similarity 107, member B
family with sequence similarity 120B
family with sequence similarity 129, member A
family with sequence similarity 132, member A
family with sequence similarity 136, member A
family with sequence similarity 149, member B1
family with sequence similarity 158, member A
family with sequence similarity 162, member A
family with sequence similarity 19 (chemokine (C-C motif)-like), member A2
family with sequence similarity 64, member A
family with sequence similarity 82, member B
family with sequence similarity 96, member B
fatty acid synthase
F-box protein, helicase, 18
F-box protein 3
Fc fragment of IgG, low affinity IIb, receptor (CD32)
Fc fragment of IgG, low affinity IIb, receptor (CD32)
Fc fragment of IgG, receptor, transporter, alpha
FCH and double SH3 domains 2
fibroblast growth factor 1 (acidic)
FGGY carbohydrate kinase domain containing
fat storage-inducing transmembrane protein 1
FK506 binding protein 4, 59kDa
glutaredoxin-like protein YDR286C homolog
filamin B, beta
flavin containing monooxygenase 1
flavin containing monooxygenase 5
fructosamine 3 kinase
fibronectin type III domain containing 4
ferritin, heavy polypeptide 1
ferritin, light polypeptide
ferritin, light polypeptide
FXYD domain containing ion transport regulator 1
GABA(A) receptor-associated protein like 1
GABA(A) receptor-associated protein like 1
growth arrest and DNA-damage-inducible, alpha
galactose mutarotase (aldose 1-epimerase)
galactose mutarotase (aldose 1-epimerase)
guanidinoacetate N-methyltransferase
glyceraldehyde-3-phosphate dehydrogenase
growth arrest-specific 1
growth arrest-specific 1
growth arrest-specific 2
golgi-specific brefeldin A resistant guanine nucleotide exchange factor 1
glycine C-acetyltransferase (2-amino-3-ketobutyrate coenzyme A ligase)
glutaryl-Coenzyme A dehydrogenase
GTP cyclohydrolase 1
GTP cyclohydrolase 1

growth differentiation factor 2
G elongation factor, mitochondrial 2
growth hormone inducible transmembrane protein
growth hormone receptor
growth hormone receptor
growth hormone receptor
glutaredoxin 3
glutaminase 2 (liver, mitochondrial)
predicted gene 7609
glucosamine-6-phosphate deaminase 1
glutamic-oxaloacetic transaminase 2, mitochondrial (aspartate aminotransferase 2)
glypican 4
glycerol-3-phosphate dehydrogenase 1-like
gephyrin
gephyrin
G protein-coupled receptor 182
glutathione peroxidase 1
glutathione peroxidase 6 (olfactory)
gelsolin (amyloidosis, Finnish type)
glutathione S-transferase alpha 3
glutathione S-transferase alpha 3
glutathione S-transferase alpha 4
glutathione S-transferase alpha 5
glutathione S-transferase alpha 5
glutathione S-transferase kappa 1
glutathione S-transferase mu 1
glutathione S-transferase mu 2 (muscle)
glutathione S-transferase, mu 3
glutathione S-transferase, mu 3
glutathione S-transferase mu 4
glutathione S-transferase mu 5
glutathione S-transferase mu 5
glutathione S-transferase mu 5
glutathione S-transferase mu 5
glutathione S-transferase, mu 6
glutathione S-transferase theta 1
glutathione S-transferase theta 2
glutathione S-transferase, theta 3
glycosyltransferase-like domain containing 1
general transcription factor IIi
general transcription factor IIi
gulonolactone (L-) oxidase
3-hydroxyanthranilate 3,4-dioxygenase
hyaluronan binding protein 4
hyaluronan binding protein 4
hydroxyacyl-Coenzyme A dehydrogenase
hydroxyacyl-Coenzyme A dehydrogenase
hydroxyacylglutathione hydrolase
hepcidin antimicrobial peptide
hepcidin antimicrobial peptide

host cell factor C1 regulator 1 (XPO1 dependent)
hypothetical protein LOC401399
histone deacetylase 3
haloacid dehalogenase-like hydrolase domain containing 2
heme binding protein 1
HemK methyltransferase family member 1
HemK methyltransferase family member 1
hairy and enhancer of split 6 (Drosophila)
hexosaminidase B (beta polypeptide)
hemochromatosis
homogentisate 1,2-dioxygenase (homogentisate oxidase)
3-hydroxyisobutyrate dehydrogenase
3-hydroxyisobutyrate dehydrogenase
3-hydroxyisobutyryl-Coenzyme A hydrolase
histidine triad nucleotide binding protein 3
histone cluster 1, H2bd
histone cluster 1, H2bd
histone cluster 1, H3f
histone cluster 2, H2ac
histone cluster 2, H2ac
major histocompatibility complex, class I, A
major histocompatibility complex, class I, E
major histocompatibility complex, class I, G
hydroxymethylbilane synthase
heterogeneous nuclear ribonucleoprotein C (C1/C2)
4-hydroxyphenylpyruvate dioxygenase
hydroxyprostaglandin dehydrogenase 15-(NAD)
hydroxyprostaglandin dehydrogenase 15-(NAD)
Hermansky-Pudlak syndrome 4
heat-responsive protein 12
heat shock factor binding protein 1
heat shock factor binding protein 1
hydroxysteroid (11-beta) dehydrogenase 1
hydroxysteroid (17-beta) dehydrogenase 10
hydroxysteroid (17-beta) dehydrogenase 11
hydroxysteroid (17-beta) dehydrogenase 12
hydroxysteroid (17-beta) dehydrogenase 12
hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1
hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1
hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 3
hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 7
heat shock protein 90kDa alpha (cytosolic), class B member 1
heat shock protein 90kDa alpha (cytosolic), class B member 1
heat shock 70kDa protein 4
heat shock 10kDa protein 1 (chaperonin 10)
hydroxypyruvate isomerase homolog (E. coli)
intercellular adhesion molecule 2
isocitrate dehydrogenase 1 (NADP+), soluble
isocitrate dehydrogenase 2 (NADP+), mitochondrial
isocitrate dehydrogenase 3 (NAD+) beta

isocitrate dehydrogenase 3 (NAD+) gamma
indoleamine 2,3-dioxygenase 2
intermediate filament family orphan 2
interferon, alpha-inducible protein 27
interferon, alpha-inducible protein 27
interferon, alpha-inducible protein 27-like 2
interferon-induced protein with tetratricopeptide repeats 3
interferon responsive gene 15
interferon responsive gene 15
interferon responsive gene 15
interleukin 10
IMP1 inner mitochondrial membrane peptidase-like (S. cerevisiae)
IMP2 inner mitochondrial membrane peptidase-like (S. cerevisiae)
inner membrane protein, mitochondrial (mitofilin)
inhibitor of growth family, member 4
indolethylamine N-methyltransferase
IQ motif containing GTPase activating protein 1
interferon regulatory factor 7
insulin receptor substrate 1
isochorismatase domain containing 1
isochorismatase domain containing 1
isochorismatase domain containing 1
isochorismatase domain containing 2b
integrin, alpha 9
integral membrane protein 2B
isovaleryl Coenzyme A dehydrogenase
isovaleryl Coenzyme A dehydrogenase
Josephin domain containing 2
potassium inwardly-rectifying channel, subfamily J, member 6
potassium channel, subfamily K, member 5
potassium channel tetramerisation domain containing 2
potassium channel tetramerisation domain containing 21
kidney expressed gene 1
Kell blood group, metallo-endopeptidase
ketohexokinase (fructokinase)
KIAA0319-like
KIAA0323
KIAA0564
KIAA0564
KIAA1522
KIAA1737
kinesin family member 2C
kinesin light chain 4
kelch-like 13 (Drosophila)
kallikrein B, plasma (Fletcher factor) 1
kynurenine 3-monooxygenase (kynurenine 3-hydroxylase)
lactation elevated 1
lactamase, beta 2
ladinin 1
laminin, alpha 4

limb bud and heart development homolog (mouse)
late cornified envelope 1H
lysocardiolipin acyltransferase 1
leukocyte cell derived chemotaxin 1
leukocyte cell-derived chemotaxin 2
lectin, galactoside-binding, soluble, 1
lectin, galactoside-binding, soluble, 1
lectin, galactoside-binding, soluble, 9B
lipoma HMGIC fusion partner-like 2
leukemia inhibitory factor receptor alpha
LIM domain and actin binding 1
LIM domain and actin binding 1
LIM domain and actin binding 1
lin-7 homolog A (C. elegans)
lin-7 homolog A (C. elegans)
lipase, hepatic
lipase, endothelial
lipoyltransferase 1
lectin, mannose-binding, 1
lectin, mannose-binding, 1
lectin, mannose-binding 2
lipase maturation factor 1
lamin B1
similar to hCG1795014
similar to hCG1795014
similar to hCG1795014
similar to hCG1795014
similar to hCG1795014
hypothetical LOC100130633
hypothetical protein LOC389203
ribosomal protein L15 pseudogene 3
similar to S-phase kinase-associated protein 1A (p19A)
hypothetical protein LOC729991
exonuclease NEF-sp
lon peptidase 1, mitochondrial
leucine rich repeat and fibronectin type III domain containing 1
leucine rich repeat containing 8 family, member A
leucine rich repeat containing 8 family, member D
leucine-rich repeats and transmembrane domains 1
LSM domain containing 1
latent transforming growth factor beta binding protein 4
LYR motif containing 5
leucine-zipper-like transcription regulator 1
MACRO domain containing 1
MAP-kinase activating death domain
v-maf musculoaponeurotic fibrosarcoma oncogene homolog B (avian)
v-maf musculoaponeurotic fibrosarcoma oncogene homolog G (avian)
melanoma antigen, family A, 7
magnesium transporter 1
monoamine oxidase B

mitogen-activated protein kinase 1
MARVEL domain containing 1
mannan-binding lectin serine peptidase 2
mitochondrial antiviral signaling protein
membrane bound O-acyltransferase domain containing 7
methylcrotonoyl-Coenzyme A carboxylase 1 (alpha)
methylcrotonoyl-Coenzyme A carboxylase 1 (alpha)
methylcrotonoyl-Coenzyme A carboxylase 2 (beta)
methylcrotonoyl-Coenzyme A carboxylase 2 (beta)
methylcrotonoyl-Coenzyme A carboxylase 2 (beta)
methylmalonyl CoA epimerase
minichromosome maintenance complex component 3 associated protein
malate dehydrogenase 1, NAD (soluble)
malate dehydrogenase 1, NAD (soluble)
malic enzyme 1, NADP(+)-dependent, cytosolic
male-enhanced antigen 1
male-enhanced antigen 1
maternally expressed 3
methyltransferase 10 domain containing
methyltransferase 11 domain containing 1
methyltransferase 11 domain containing 1
methyltransferase like 7A
methyltransferase like 7A
methyltransferase like 7A
methyltransferase like 7A
methyltransferase like 7B
methyltransferase like 8
MAX gene associated
microsomal glutathione S-transferase 3
melanoma inhibitory activity 2
MID1 interacting protein 1 (gastrulation specific G12 homolog (zebrafish))
mitochondrial intermediate peptidase
McKusick-Kaufman syndrome
malectin
malectin
melanophilin
MLX interacting protein-like
malonyl-CoA decarboxylase
membrane metallo-endopeptidase
matrix metallopeptidase 15 (membrane-inserted)
matrix metallopeptidase 19
MOCO sulphurase C-terminal domain containing 2
motile sperm domain containing 2
mitochondrial ribosomal protein L13
mitochondrial ribosomal protein L14
mitochondrial ribosomal protein L15
mitochondrial ribosomal protein L15
mitochondrial ribosomal protein L24
mitochondrial ribosomal protein L37
mitochondrial ribosomal protein L42

mitochondrial ribosomal protein S16
mitochondrial ribosomal protein S18A
mitochondrial ribosomal protein S21
mitochondrial ribosomal protein S27
mitochondrial ribosomal protein S6
methionine sulfoxide reductase A
methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 1, methenyltetrahydrofolate cyclohydrolase,
myotubularin related protein 9
mitochondrial E3 ubiquitin ligase 1
major urinary protein 3
methylmalonyl Coenzyme A mutase
methylmalonyl Coenzyme A mutase
MAX dimerization protein 4
NEDD4 binding protein 1
NAD kinase
NAD kinase
N-acetylglucosamine kinase
N-acetyltransferase 2 (arylamine N-acetyltransferase)
neurocalcin delta
nuclear cap binding protein subunit 2, 20kDa
non-protein coding RNA 81
non-protein coding RNA 116
Nedd4 family interacting protein 1
NDRG family member 2
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3, 9kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3, 9kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 5, 13kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 7, 14.5kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 7, 14.5kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 7, 14.5kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 7, 14.5kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 9, 39kDa
NADH dehydrogenase (ubiquinone) 1, alpha/beta subcomplex, 1, 8kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 10, 22kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 11, 17.3kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 2, 8kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 3, 12kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 4, 15kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 4, 15kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 5, 16kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 6, 17kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 7, 18kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 8, 19kDa
NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 9, 22kDa
NADH dehydrogenase (ubiquinone) 1, subcomplex unknown, 1, 6kDa
NADH dehydrogenase (ubiquinone) 1, subcomplex unknown, 2, 14.5kDa
NADH dehydrogenase (ubiquinone) 1, subcomplex unknown, 2, 14.5kDa
NADH dehydrogenase (ubiquinone) Fe-S protein 3, 30kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 5, 15kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 8, 23kDa (NADH-coenzyme Q reductase)

NADH dehydrogenase (ubiquinone) Fe-S protein 8, 23kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 8, 23kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) flavoprotein 1, 51kDa
N-terminal EF-hand calcium binding protein 1
neurofibromin 2 (merlin)
NFS1 nitrogen fixation 1 homolog (S. cerevisiae)
NFU1 iron-sulfur cluster scaffold homolog (S. cerevisiae)
neuronal guanine nucleotide exchange factor
nipsnap homolog 1 (C. elegans)
nischarin
nitrilase family, member 2
neurolysin (metallopeptidase M3 family)
NLR family, pyrin domain containing 6
non-metastatic cells 6, protein expressed in (nucleoside-diphosphate kinase)
nicotinamide nucleotide transhydrogenase
aminopeptidase-like 1
NAD(P)H dehydrogenase, quinone 2
NAD(P)H dehydrogenase, quinone 2
NAD(P)H dehydrogenase, quinone 2
nuclear receptor subfamily 1, group H, member 3
nuclear receptor subfamily 1, group I, member 2
nuclear receptor subfamily 1, group I, member 2
nuclear receptor subfamily 5, group A, member 2
neuropilin 2
netrin 3
neurotrophic tyrosine kinase, receptor, type 2
neurotrophic tyrosine kinase, receptor, type 2
neurotrophic tyrosine kinase, receptor, type 3
nucleobindin 1
nudix (nucleoside diphosphate linked moiety X)-type motif 1
nudix (nucleoside diphosphate linked moiety X)-type motif 13
nudix (nucleoside diphosphate linked moiety X)-type motif 7
nudix (nucleoside diphosphate linked moiety X)-type motif 8
nuclear mitotic apparatus protein 1
OAF homolog (Drosophila)
2',5'-oligoadenylate synthetase 1, 40/46kDa
2'-5' oligoadenylate synthetase-like 2
ornithine aminotransferase (gyrate atrophy)
ornithine decarboxylase antizyme 1
oligonucleotide/oligosaccharide-binding fold containing 1
OCIA domain containing 2
oncoprotein induced transcript 3
OMA1 homolog, zinc metallopeptidase (S. cerevisiae)
olfactory receptor, family 10, subfamily AD, member 1
O-sialoglycoprotein endopeptidase
ornithine carbamoyltransferase
ornithine carbamoyltransferase
ornithine carbamoyltransferase
purinergic receptor P2Y, G-protein coupled, 1
phosphofurin acidic cluster sorting protein 2

palladin, cytoskeletal associated protein
pantothenate kinase 1
polyamine oxidase (exo-N4-amino)
3'-phosphoadenosine 5'-phosphosulfate synthase 2
3'-phosphoadenosine 5'-phosphosulfate synthase 2
3'-phosphoadenosine 5'-phosphosulfate synthase 2
par-3 partitioning defective 3 homolog (C. elegans)
poly (ADP-ribose) polymerase 1
parvin, alpha
phenazine biosynthesis-like protein domain containing
phenazine biosynthesis-like protein domain containing
pterin-4 alpha-carbinolamine dehydratase/dimerization cofactor of hepatocyte nuclear factor 1 alpha
pterin-4 alpha-carbinolamine dehydratase/dimerization cofactor of hepatocyte nuclear factor 1 alpha (TCF1) 2
propionyl Coenzyme A carboxylase, alpha polypeptide
propionyl Coenzyme A carboxylase, beta polypeptide
protein-L-isoaspartate (D-aspartate) O-methyltransferase domain containing 1
protein-L-isoaspartate (D-aspartate) O-methyltransferase domain containing 2
proprotein convertase subtilisin/kexin type 6
PCTAIRE protein kinase 1
PCTAIRE protein kinase 3
phosphatidylcholine transfer protein
prenylcysteine oxidase 1
programmed cell death 6 interacting protein
programmed cell death 6 interacting protein
phosphodiesterase 4D interacting protein
phosphodiesterase 4D interacting protein
pyruvate dehydrogenase (lipoamide) alpha 1
pyruvate dehydrogenase kinase, isozyme 1
pyruvate dehydrogenase kinase, isozyme 1
pyruvate dehydrogenase kinase, isozyme 2
p53 and DNA-damage regulated 1
pyridoxal (pyridoxine, vitamin B6) kinase
PDZ domain containing 1
phosphatidylethanolamine binding protein 1
phosphatidylethanolamine binding protein 1
peroxisomal trans-2-enoyl-CoA reductase
peptidase D
period homolog 2 (Drosophila)
period homolog 2 (Drosophila)
PET112-like (yeast)
peroxisomal biogenesis factor 11 gamma
peroxisomal biogenesis factor 11 gamma
peroxisomal biogenesis factor 6
peroxisomal biogenesis factor 6
prefoldin subunit 2
phosphofructokinase, liver
post-GPI attachment to proteins 2
pyroglutamyl-peptidase I
progesterone receptor membrane component 1

phosphatidylinositol glycan anchor biosynthesis, class Q
polymeric immunoglobulin receptor
phosphoinositide-3-kinase, regulatory subunit 1 (alpha)
pipecolic acid oxidase
pitrilysin metallopeptidase 1
pyruvate kinase, liver and RBC
pyruvate kinase, liver and RBC
pyruvate kinase, liver and RBC
phospholipase A2, group VI (cytosolic, calcium-independent)
phospholipid scramblase 2
peptidase M20 domain containing 1
peptidase M20 domain containing 1
peptidase (mitochondrial processing) beta
polyserase 3
polymerase (DNA directed), gamma
protein-O-mannosyltransferase 1
paraoxonase 1
peroxisome proliferator-activated receptor alpha
peroxisome proliferator-activated receptor alpha
peroxisome proliferator-activated receptor alpha
phosphopantothenoylcysteine decarboxylase
pancreatic progenitor cell differentiation and proliferation factor homolog (zebrafish)
protein phosphatase 1, regulatory (inhibitor) subunit 11
protein phosphatase 1, regulatory (inhibitor) subunit 15B
protein phosphatase 1, regulatory (inhibitor) subunit 3E
prolylcarboxypeptidase (angiotensinase C)
peroxiredoxin 2
peroxiredoxin 3
peroxiredoxin 6
proline/arginine-rich end leucine-rich repeat protein
protein kinase, cAMP-dependent, catalytic, alpha
protein kinase, AMP-activated, gamma 2 non-catalytic subunit
protein kinase C, zeta
protein kinase, interferon-inducible double stranded RNA dependent activator
prolactin receptor
prolactin receptor
prolactin receptor
prion protein
prion protein
proline dehydrogenase (oxidase) 2
phosphoribosyl pyrophosphate synthetase-associated protein 2
proline rich 13
proline-rich transmembrane protein 1
protease, serine, 36
presenilin 2 (Alzheimer disease 4)
proteasome (prosome, macropain) subunit, alpha type, 1
proteasome (prosome, macropain) 26S subunit, non-ATPase, 2
proteasome (prosome, macropain) 26S subunit, non-ATPase, 5
proteasome (prosome, macropain) activator subunit 2 (PA28 beta)

prostaglandin reductase 2
prostaglandin reductase 2
prostaglandin reductase 2
prostaglandin reductase 2
PTK2B protein tyrosine kinase 2 beta
parathymosin
parathymosin
prostate tumor overexpressed 1
protein tyrosine phosphatase, receptor type, D
6-pyruvoyltetrahydropterin synthase
pituitary tumor-transforming 1
pituitary tumor-transforming 1
pumilio homolog 1 (Drosophila)
poliovirus receptor-related 3
peroxisomal membrane protein 2, 22kDa
pyrroline-5-carboxylate reductase-like
phosphorylase, glycogen, liver
quinoid dihydropteridine reductase
quinoid dihydropteridine reductase
RAB14, member RAS oncogene family
RAB22A, member RAS oncogene family
RAB27B, member RAS oncogene family
ras-related C3 botulinum toxin substrate 1 (rho family, small GTP binding protein Rac1)
RAD23 homolog A (S. cerevisiae)
retinoic acid early transcript 1E
RAP1, GTP-GDP dissociation stimulator 1
retinoic acid receptor responder (tazarotene induced) 2
retinoic acid receptor responder (tazarotene induced) 2
Ras association (RalGDS/AF-6) domain family (N-terminal) member 7
RNA binding motif protein 47
retinol dehydrogenase 16 (all-trans)
retinol dehydrogenase 16 (all-trans)
retinol dehydrogenase 7
RAD52 motif 1
radixin
radixin
receptor accessory protein 6
reelin
REX4, RNA exonuclease 4 homolog (S. cerevisiae)
RFNG O-fucosylpeptide 3-beta-N-acetylglucosaminyltransferase
regucalcin (senescence marker protein-30)
Rh family, B glycoprotein (gene/pseudogene)
regulating synaptic membrane exocytosis 4
required for meiotic nuclear division 1 homolog (S. cerevisiae)
ribonuclease T2
ring finger protein 13
ring finger protein 130
ring finger protein 167
ring finger protein 170

ring finger protein 213
ring finger protein 5
arginyl aminopeptidase (aminopeptidase B)
roadblock domain containing 3
RAR-related orphan receptor B
RAR-related orphan receptor C
retinitis pigmentosa GTPase regulator interacting protein 1
ribose 5-phosphate isomerase A
ribosomal protein L22
ribosomal protein S6 kinase, 90kDa, polypeptide 5
retbindin
reticulon 4
receptor (chemosensory) transporter protein 4
S100 calcium binding protein A1
S100 calcium binding protein A1
S100 calcium binding protein A10
S100 calcium binding protein A10
S100 calcium binding protein A13
sarcosine dehydrogenase
sarcosine dehydrogenase
SH3-binding domain kinase 1
sterol-C5-desaturase (ERG3 delta-5-desaturase homolog, S. cerevisiae)-like
selenocysteine lyase
sodium channel, nonvoltage-gated 1 alpha
SCO cytochrome oxidase deficient homolog 2 (yeast)
sterol carrier protein 2
succinate dehydrogenase complex, subunit A, flavoprotein (Fp)
succinate dehydrogenase complex, subunit A, flavoprotein (Fp)
succinate dehydrogenase complex assembly factor 2
succinate dehydrogenase complex, subunit B, iron sulfur (Ip)
succinate dehydrogenase complex, subunit C, integral membrane protein, 15kDa
succinate dehydrogenase complex, subunit C, integral membrane protein, 15kDa
short chain dehydrogenase/reductase family 9C, member 7
SEC14-like 2 (S. cerevisiae)
SEC31 homolog A (S. cerevisiae)
sel-1 suppressor of lin-12-like (C. elegans)
selenium binding protein 1
selenium binding protein 1
selenoprotein K
selenoprotein T
Sep (O-phosphoserine) tRNA:Sec (selenocysteine) tRNA synthase
small EDRK-rich factor 2
small EDRK-rich factor 2
small EDRK-rich factor 2
small EDRK-rich factor 2
serine hydrolase-like 2
serine hydrolase-like 2
serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 6
serpin peptidase inhibitor, clade B (ovalbumin), member 1

serpin peptidase inhibitor, clade H (heat shock protein 47), member 1, (collagen binding protein 1)
serpin peptidase inhibitor, clade H (heat shock protein 47), member 1, (collagen binding protein 1)
sideroflexin 5
serum/glucocorticoid regulated kinase 2
NKF3 kinase family member
SH3-binding domain protein 5-like
SH3 domain containing 19
serine hydroxymethyltransferase 1 (soluble)
serine hydroxymethyltransferase 1 (soluble)
serine hydroxymethyltransferase 1 (soluble)
serine hydroxymethyltransferase 1 (soluble)
serine hydroxymethyltransferase 2 (mitochondrial)
serine hydroxymethyltransferase 2 (mitochondrial)
serine hydroxymethyltransferase 2 (mitochondrial)
serine hydroxymethyltransferase 2 (mitochondrial)
sedoheptulokinase
sialic acid acetylesterase
sialic acid acetylesterase
sialic acid acetylesterase
sirtuin (silent mating type information regulation 2 homolog) 5 (S. cerevisiae)
solute carrier family 12 (potassium/chloride transporters), member 7
solute carrier family 16, member 2 (monocarboxylic acid transporter 8)
solute carrier family 16, member 2 (monocarboxylic acid transporter 8)
solute carrier family 17 (sodium phosphate), member 3
solute carrier family 18 (vesicular monoamine), member 1
solute carrier family 1 (glial high affinity glutamate transporter), member 3
solute carrier family 22 (organic cation transporter), member 1
solute carrier family 22, member 18
solute carrier family 22, member 18
solute carrier family 22 (organic anion transporter), member 9
solute carrier family 25 (mitochondrial carrier; oxoglutarate carrier), member 11
solute carrier family 25, member 13 (citrin)
solute carrier family 25 (mitochondrial carrier; ornithine transporter) member 15
solute carrier family 25 (mitochondrial carrier; phosphate carrier), member 23
solute carrier family 25, member 37
solute carrier family 25, member 44
solute carrier family 27 (fatty acid transporter), member 5
solute carrier family 29 (nucleoside transporters), member 1
solute carrier family 2 (facilitated glucose transporter), member 2
solute carrier family 31 (copper transporters), member 1
solute carrier family 31 (copper transporters), member 1
solute carrier family 38, member 3
solute carrier family 38, member 3
solute carrier family 39 (zinc transporter), member 10
solute carrier family 39 (zinc transporter), member 9
solute carrier family 47, member 1
solute carrier family 5 (sodium/glucose cotransporter), member 2
solute carrier family 7 (cationic amino acid transporter, y+ system), member 12
solute carrier family 9 (sodium/hydrogen exchanger), member 3 regulator 1

solute carrier organic anion transporter family, member 2B1
solute carrier organic anion transporter family, member 5A1
SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 2
SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 2
SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a-like 1
SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 2
SET and MYND domain containing 2
SET and MYND domain containing 3
synaptosomal-associated protein, 23kDa
synaptosomal-associated protein, 23kDa
sorting nexin 12
sorting nexin 3
sorting nexin 9
suppressor of cytokine signaling 7
superoxide dismutase 2, mitochondrial
sorbin and SH3 domain containing 1
sorbitol dehydrogenase
sorbitol dehydrogenase
SP100 nuclear antigen
Sp5 transcription factor
spinster homolog 2 (Drosophila)
secreted phosphoprotein 2, 24kDa
sprouty-related, EVH1 domain containing 1
sprouty-related, EVH1 domain containing 1
sulfide quinone reductase-like (yeast)
S1 RNA binding domain 1
S1 RNA binding domain 1
steroid-5-alpha-reductase, alpha polypeptide 1 (3-oxo-5 alpha-steroid delta 4-dehydrogenase alpha 1)
steroid-5-alpha-reductase, alpha polypeptide 1 (3-oxo-5 alpha-steroid delta 4-dehydrogenase alpha 1)
serine racemase
serine racemase
synovial sarcoma translocation gene on chromosome 18-like 1
suppression of tumorigenicity 13 (colon carcinoma) (Hsp70 interacting protein)
suppression of tumorigenicity 13 (colon carcinoma) (Hsp70 interacting protein)
ST3 beta-galactoside alpha-2,3-sialyltransferase 6
ST3 beta-galactoside alpha-2,3-sialyltransferase 6
signal transducer and activator of transcription 1, 91kDa
stress-induced-phosphoprotein 1
stomatin
stomatin
stomatin
stimulated by retinoic acid 13 homolog (mouse)
succinate-CoA ligase, alpha subunit
succinate-CoA ligase, GDP-forming, beta subunit
succinate-CoA ligase, GDP-forming, beta subunit
succinate receptor 1
sulfotransferase family, cytosolic, 1C, member 2
sulfotransferase family 3A, member 1
sulfite oxidase

synaptotagmin-like 1
TatD DNase domain containing 1
TBC1 domain family, member 10A
TBC1 domain family, member 10A
TBC1 domain family, member 7
TBC1 domain family, member 9B (with GRAM domain)
transcription elongation factor A (SII), 3
transcobalamin II; macrocytic anemia
thyrotrophic embryonic factor
testis expressed 264
tissue factor pathway inhibitor 2
threonine synthase-like 2 (S. cerevisiae)
thyroid hormone responsive (SPOT14 homolog, rat)
thyroid hormone responsive (SPOT14 homolog, rat)
TIMP metallopeptidase inhibitor 2
tubulointerstitial nephritis antigen-like 1
thymidine kinase 1, soluble
TLC domain containing 1
TLC domain containing 2
transmembrane BAX inhibitor motif containing 4
transmembrane BAX inhibitor motif containing 6
transmembrane channel-like 4
transmembrane protein 106A
transmembrane protein 134
transmembrane protein 144
transmembrane protein 14C
transmembrane protein 184B
transmembrane protein 195
transmembrane protein 205
transmembrane protein 25
transmembrane protein 50A
transmembrane protein 80
transmembrane inner ear
thymosin beta 10
transmembrane and tetratricopeptide repeat containing 4
transmembrane and ubiquitin-like domain containing 2
tensin 3
translocase of outer mitochondrial membrane 6 homolog (yeast)
thiamin pyrophosphokinase 1
tropomyosin 2 (beta)
tropomyosin 2 (beta)
transmembrane protein, adipocyte asscociated 1
trafficking protein, kinesin binding 1
trafficking protein, kinesin binding 1
TNF receptor-associated protein 1
TNF receptor-associated protein 1
trafficking protein particle complex 4
tripartite motif-containing 34

thiosulfate sulfurtransferase (rhodanese)
tetratricopeptide repeat domain 23
tetratricopeptide repeat domain 38
tetratricopeptide repeat domain 39B
transthyretin
transthyretin
tubulin, alpha 1c
tubulin, alpha 3e
tubulin, beta
tubulin, beta 2C
Tu translation elongation factor, mitochondrial
thioredoxin 2
thioredoxin 2
thioredoxin reductase 2
thioredoxin reductase 2
tyrosine kinase 2
trypsin domain containing 1
trypsin domain containing 1
ubiquitin-conjugating enzyme E2B (RAD6 homolog)
ubiquitin-conjugating enzyme E2H (UBC8 homolog, yeast)
ubiquitin-conjugating enzyme E2H (UBC8 homolog, yeast)
ubiquitin-conjugating enzyme E2L 3
ubiquitin-conjugating enzyme E2W (putative)
ubiquitin family domain containing 1
ubiquitin protein ligase E3 component n-recognin 3 (putative)
UBX domain protein 11
uridine-cytidine kinase 1
UDP-glucose dehydrogenase
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP-glucose pyrophosphorylase 2
UDP glucuronosyltransferase 2 family, polypeptide A3
UDP glucuronosyltransferase 2 family, polypeptide B10
UDP glucuronosyltransferase 2 family, polypeptide B15
UDP glucuronosyltransferase 2 family, polypeptide B4
UDP glycosyltransferase 3 family, polypeptide A2
UDP glycosyltransferase 3 family, polypeptide A2
UDP glycosyltransferase 3 family, polypeptide A2
unc-51-like kinase 2 (C. elegans)
unc-51-like kinase 2 (C. elegans)
unc-51-like kinase 2 (C. elegans)
uridine monophosphate synthetase
uridine monophosphate synthetase
urate oxidase (pseudogene)
ureidopropionase, beta
uridine phosphorylase 2

ubiquinol-cytochrome c reductase core protein I
ubiquinol-cytochrome c reductase, Rieske iron-sulfur polypeptide 1
urocanase domain containing 1
uroporphyrinogen III synthase
uronyl-2-sulfotransferase
valyl-tRNA synthetase 2, mitochondrial (putative)
voltage-dependent anion channel 1
voltage-dependent anion channel 1
very low density lipoprotein receptor
very low density lipoprotein receptor
very low density lipoprotein receptor
very low density lipoprotein receptor
vanin 1
vanin 1
vanin 2
vacuolar protein sorting 25 homolog (S. cerevisiae)
vacuolar protein sorting 41 homolog (S. cerevisiae)
WD repeat domain 24
WD repeat domain 48
WD and tetratricopeptide repeats 1
WEE1 homolog (S. pombe)
WEE1 homolog (S. pombe)
WAP, follistatin/kazal, immunoglobulin, kunitz and netrin domain containing 2
Werner syndrome, RecQ helicase-like
WW domain containing E3 ubiquitin protein ligase 1
X (inactive)-specific transcript (non-protein coding)
X-ray repair complementing defective repair in Chinese hamster cells 6
zinc finger, BED-type containing 5
zinc finger and BTB domain containing 20
zinc finger and BTB domain containing 40
zinc finger and BTB domain containing 7B
zinc finger CCCH-type containing 8
zinc finger CCCH-type, antiviral 1
zinc finger, CCHC domain containing 14
zinc finger, DHHC-type containing 20
zinc finger, DHHC-type containing 9
zinc finger protein 386 (Kruppel-like)
zinc finger protein 54
zinc finger protein 862
zinc finger protein 871
zinc finger protein 124
zinc finger protein 124
zinc finger protein 426
zinc finger protein 692
zinc finger protein 808

mTR liver increased
439 probe sets

RIKEN cDNA 1110065P20 gene
RIKEN cDNA 1700027F06 gene
RIKEN cDNA 2210016H18 gene
RIKEN cDNA 2310039H08 gene
RIKEN cDNA 2310061J03 gene
RIKEN cDNA 2900046L07 gene
RIKEN cDNA 9130019O22 gene
RIKEN cDNA A930036K24 gene
ATP-binding cassette, sub-family A (ABC1), member 1
actin binding LIM protein 1
actin-related protein 10 homolog (S. cerevisiae)
ADAM metallopeptidase domain 23
aldo-keto reductase family 1, member B1 (aldose reductase)
alkB, alkylation repair homolog 4 (E. coli)
alpha-1-microglobulin/bikunin precursor
anoctamin 10
amyloid P component, serum
APEX nuclease (multifunctional DNA repair enzyme) 1
APEX nuclease (multifunctional DNA repair enzyme) 1
apolipoprotein A-I
apolipoprotein A-I
apolipoprotein A-I
apolipoprotein A-I
adenine phosphoribosyltransferase
AT rich interactive domain 1A (SWI-like)
ariadne homolog 2 (Drosophila)
ariadne homolog 2 (Drosophila)
arylsulfatase G
N-acylsphingosine amidohydrolase (acid ceramidase) 1
ankyrin repeat and SOCS box-containing 7
activating transcription factor 4 (tax-responsive enhancer element B67)
ATPase, H+ transporting, lysosomal 13kDa, V1 subunit G1
UDP-Gal:betaGlcNAc beta 1,3-galactosyltransferase, polypeptide 1
Bardet-Biedl syndrome 5
bolA homolog 2 (E. coli)
breast cancer metastasis suppressor 1
chromosome 10 open reading frame 32
chromosome 11 open reading frame 59
chromosome 12 open reading frame 35
chromosome 14 open reading frame 119
chromosome 16 open reading frame 72
chromosome 18 open reading frame 21
chromosome 20 open reading frame 108
chromosome 20 open reading frame 108
complement component 3
complement component 4B (Chido blood group)
complement component 5
chromosome 5 open reading frame 32

complement component 8, alpha polypeptide
complement component 8, beta polypeptide
chromosome 9 open reading frame 150
calmodulin binding transcription activator 2
calpain 10
chromobox homolog 3 (HP1 gamma homolog, Drosophila)
chemokine (C-C motif) ligand 6
chemokine (C-C motif) ligand 6
CD14 molecule
CD302 molecule
CDP-diacylglycerol--inositol 3-phosphatidyltransferase (phosphatidylinositol synthase)
cyclin-dependent kinase 2 associated protein 1
cyclin-dependent kinase 9
CCAAT/enhancer binding protein (C/EBP), delta
complement factor B
complement factor H
complement factor H
complement factor I
chromatin modifying protein 6
chondroitin polymerizing factor 2
chloride channel calcium activated 1
chloride channel calcium activated 1
catechol-O-methyltransferase
ceruloplasmin (ferroxidase)
ceruloplasmin (ferroxidase)
ceruloplasmin (ferroxidase)
ceruloplasmin (ferroxidase)
carboxypeptidase B2 (plasma)
copine VIII
copine VIII
copine VIII
cleavage and polyadenylation specific factor 4, 30kDa
CREB regulated transcription coactivator 2
colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)
cathepsin L2
cullin 1
cytochrome P450, family 3, subfamily A, polypeptide 7
DEAD (Asp-Glu-Ala-Asp) box polypeptide 1
DEAD (Asp-Glu-Ala-Asp) box polypeptide 39
DEAD (Asp-Glu-Ala-Asp) box polypeptide 39
DEAD (Asp-Glu-Ala-Asp) box polypeptide 5
DENN/MADD domain containing 5A
DIP2 disco-interacting protein 2 homolog A (Drosophila)
DnaJ (Hsp40) homolog, subfamily C, member 16
dystonin
dynein, light chain, LC8-type 1
dynein, light chain, LC8-type 1
dynein, light chain, LC8-type 1

eukaryotic translation initiation factor 3, subunit F
eukaryotic translation initiation factor 3, subunit I
eukaryotic translation initiation factor 3, subunit I
eukaryotic translation initiation factor 3, subunit M
eukaryotic translation initiation factor 6
energy homeostasis associated
energy homeostasis associated
ectonucleotide pyrophosphatase/phosphodiesterase 3
enhancer of rudimentary homolog (Drosophila)
ERO1-like (S. cerevisiae)
ERO1-like (S. cerevisiae)
epithelial splicing regulatory protein 2
eukaryotic translation termination factor 1
exosome component 1
coagulation factor XII (Hageman factor)
coagulation factor V (proaccelerin, labile factor)
family with sequence similarity 133, member B
F-box protein 3
fibrinogen alpha chain
fibrinogen beta chain
fibrinogen gamma chain
fibrinogen-like 1
FK506 binding protein 15, 133kDa
fibronectin 1
furin (paired basic amino acid cleaving enzyme)
growth arrest-specific 2 like 1
growth arrest-specific 5 (non-protein coding)
predicted gene 11428
guanine nucleotide binding protein (G protein), alpha 13
guanine nucleotide binding protein (G protein), beta polypeptide 2-like 1
Golgi-localized protein
glycosylphosphatidylinositol anchored high density lipoprotein binding protein 1
G protein-coupled receptor kinase 6
glutathione synthetase
glutathione S-transferase pi 1
GTF2I repeat domain containing 1
H1 histone family, member 0
histidine triad nucleotide binding protein 1
hexokinase 1
major histocompatibility complex, class I, B
heterogeneous nuclear ribonucleoprotein A0
heterogeneous nuclear ribonucleoprotein A3
heterogeneous nuclear ribonucleoprotein K
heterogeneous nuclear ribonucleoprotein K
heterogeneous nuclear ribonucleoprotein K
heterogeneous nuclear ribonucleoprotein D-like
heterogeneous nuclear ribonucleoprotein D-like
haptoglobin

immediate early response 3
interferon induced transmembrane protein 1 (9-27)
interferon induced transmembrane protein 2 (1-8D)
interleukin 1 receptor, type I
interleukin-1 receptor-associated kinase 3
inter-alpha (globulin) inhibitor H3
inter-alpha (globulin) inhibitor H4 (plasma Kallikrein-sensitive glycoprotein)
influenza virus NS1A binding protein
junctional adhesion molecule 2
potassium channel, subfamily T, member 2
KIAA0892
KIAA0913
klotho beta
Kruppel-like factor 4 (gut)
kininogen 1
kininogen 1
v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog
lipopolysaccharide binding protein
lamin B receptor
lipocalin 2
lipopolysaccharide-induced TNF factor
ribosomal protein S18 pseudogene 5
ribosomal protein L10 pseudogene 16
ribosomal protein L13 pseudogene 12
ribosomal protein L13 pseudogene 12
hypothetical protein LOC552889
latrophilin 2
leucine-rich alpha-2-glycoprotein 1
low density lipoprotein receptor-related protein associated protein 1
leucine rich repeat containing 42
LSM8 homolog, U6 small nuclear RNA associated (S. cerevisiae)
lymphotoxin beta receptor (TNFR superfamily, member 3)
LYR motif containing 4
membrane associated guanylate kinase, WW and PDZ domain containing 3
MAK16 homolog (S. cerevisiae)
microtubule-associated protein 1 light chain 3 beta
mitogen-activated protein kinase kinase kinase 7 interacting protein 2
mitogen-activated protein kinase kinase kinase kinase 4
MAP7 domain containing 1
mediator complex subunit 15
methyltransferase like 1
matrix metallopeptidase 14 (membrane-inserted)
MAS-related GPR, member A4
methylthioribose-1-phosphate isomerase homolog (S. cerevisiae)
male-specific lethal 1 homolog (Drosophila)
methionine sulfoxide reductase B3
metallothionein 1E

nucleosome assembly protein 1-like 1
nucleosome assembly protein 1-like 1
nucleosome assembly protein 1-like 1
nucleolin
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, zeta
NHP2 ribonucleoprotein homolog (yeast)
NHP2 non-histone chromosome protein 2-like 1 (S. cerevisiae)
NmrA-like family domain containing 1
Notch homolog 4 (Drosophila)
5'-nucleotidase, cytosolic II
neurotrophin 3
nucleotide binding protein 1 (MinD homolog, E. coli)
nucleotide binding protein 1 (MinD homolog, E. coli)
nudix (nucleoside diphosphate linked moiety X)-type motif 18
nudix (nucleoside diphosphate linked moiety X)-type motif 4
orosomucoid 1
orosomucoid 2
oxysterol binding protein-like 9
ovarian tumor suppressor candidate 2
poly (ADP-ribose) polymerase 2
poly(rC) binding protein 2
poly(rC) binding protein 4
polycomb group ring finger 6
6-phosphofructo-2-kinase/fructose-2,6-biphosphatase 4
phosphoglycolate phosphatase
PHD finger protein 20-like 1
phosphorylase kinase, gamma 2 (testis)
protein inhibitor of activated STAT, 2
phosphatidylserine decarboxylase
phosphatidylinositol transfer protein, beta
phospholipase A2, group VII (platelet-activating factor acetylhydrolase, plasma)
plexin C1
polynucleotide kinase 3'-phosphatase
phosphatidic acid phosphatase type 2A
protoporphyrinogen oxidase
protein phosphatase 1, regulatory (inhibitor) subunit 2
protein phosphatase 2 (formerly 2A), regulatory subunit A, alpha isoform
protein phosphatase 3 (formerly 2B), catalytic subunit, alpha isoform
protein phosphatase 4, regulatory subunit 2
prolyl endopeptidase-like
proteoglycan 4
protein kinase C, eta
protein tyrosine phosphatase type IVA, member 2
protein tyrosine phosphatase, non-receptor type 3
pregnancy-zone protein
quaking homolog, KH domain RNA binding (mouse)
quaking homolog, KH domain RNA binding (mouse)

receptor accessory protein 5
receptor accessory protein 5
RALBP1 associated Eps domain containing 1
Rab interacting lysosomal protein-like 2
ribonuclease, RNase A family, 4
ribonuclease H2, subunit A
ring finger protein 138
retinitis pigmentosa 9 (autosomal dominant)
RNA polymerase II associated protein 3
ribosomal protein L13a
ribosomal protein L13a
ribosomal protein L13a
ribosomal protein L13a
ribosomal protein L14
ribosomal protein L14
ribosomal protein L14
ribosomal protein L14
ribosomal protein L17
ribosomal protein L17
ribosomal protein L18
ribosomal protein L18a
ribosomal protein L19
ribosomal protein L22
ribosomal protein L23a
ribosomal protein L23a
ribosomal protein L23a
ribosomal protein L24
ribosomal protein L26
ribosomal protein L26
ribosomal protein L27a
ribosomal protein L28
ribosomal protein L30
ribosomal protein L34
ribosomal protein L34
ribosomal protein L35
ribosomal protein L35
ribosomal protein L35
ribosomal protein L35
ribosomal protein L35
ribosomal protein L37a
ribosomal protein L37a
ribosomal protein L38
ribosomal protein L39
ribosomal protein L41
ribosomal protein L6
ribosomal protein L7
ribosomal protein L7A

ribosomal protein S10
ribosomal protein S11
ribosomal protein S12
ribosomal protein S15A
ribosomal protein S16
ribosomal protein S16
ribosomal protein S19
ribosomal protein S20
ribosomal protein S20
ribosomal protein S21
ribosomal protein S21
ribosomal protein S21
ribosomal protein S21
ribosomal protein S24
ribosomal protein S25
ribosomal protein S26
ribosomal protein S27A
ribosomal protein S28
ribosomal protein S28
ribosomal protein S28
ribosomal protein S29
ribosomal protein S3
ribosomal protein S3A
ribosomal protein S5
ribosomal protein S6
ribosomal protein S6
ribosomal protein S7
ribosomal protein S9
ribosomal protein SA
ribosome binding protein 1 homolog 180kDa (dog)
ribosomal RNA processing 1 homolog (S. cerevisiae)
serum amyloid A2
serum amyloid A2
SAM and SH3 domain containing 1
scavenger receptor class B, member 1
scavenger receptor class B, member 1
scavenger receptor class B, member 1
SCY1-like 3 (S. cerevisiae)
SEC13 homolog (S. cerevisiae)
Sec61 alpha 1 subunit (S. cerevisiae)
selenophosphate synthetase 1
septin 5
serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 10
serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 11
serine (or cysteine) peptidase inhibitor, clade A, member 3K
serine (or cysteine) peptidase inhibitor, clade A, member 3K
serine (or cysteine) peptidase inhibitor, clade A, member 3M

solute carrier family 35 (UDP-glucuronic acid/UDP-N-acetylgalactosamine dual transporter), member D1
solute carrier family 39 (zinc transporter), member 14
solute carrier family 3 (cystine, dibasic and neutral amino acid transporters, activator of cystine, dibasic and
solute carrier family 41, member 1
solute carrier family 41, member 2
solute carrier family 6 (neurotransmitter transporter, creatine), member 8
solute carrier family 7 (cationic amino acid transporter, y+ system), member 7
SMAD family member 4
SMAD family member 4
structural maintenance of chromosomes 6
sphingomyelin phosphodiesterase 1, acid lysosomal
small nuclear ribonucleoprotein polypeptide B''
sorting nexin 24
sorting nexin 7
spermatogenesis associated, serine-rich 2
serglycin
signal recognition particle receptor (docking protein)
single-stranded DNA binding protein 2
structure specific recognition protein 1
six transmembrane epithelial antigen of the prostate 2
suppressor of Ty 16 homolog (S. cerevisiae)
transforming, acidic coiled-coil containing protein 1
transforming, acidic coiled-coil containing protein 1
transgelin 2
TatD DNase domain containing 2
transducin (beta)-like 3
testis-specific kinase 1
transferrin receptor 2
transferrin receptor 2
THO complex 3
thyroid hormone receptor associated protein 3
thymidine kinase 2, mitochondrial
transmembrane 4 L six family member 4
transmembrane emp24 protein transport domain containing 7
transmembrane emp24 protein transport domain containing 7
transmembrane emp24 protein transport domain containing 7
transmembrane protein 165
transmembrane protein 176B
transmembrane protein 38B
transmembrane protein 62
transmembrane protein 71
transmembrane protein 82
TMEM9 domain family, member B
tripartite motif-containing 2
tripartite motif-containing 2
tripartite motif-containing 2
tripartite motif-containing 28

translocator protein (18kDa)
translocator protein (18kDa)
tetratricopeptide repeat domain 1
TWIST neighbor
ubiquitin-conjugating enzyme E2E 3 (UBC4/5 homolog, yeast)
unconventional SNARE in the ER 1 homolog (S. cerevisiae)
unconventional SNARE in the ER 1 homolog (S. cerevisiae)
upstream transcription factor 2, c-fos interacting
ubiquitin specific peptidase 53
vesicle-associated membrane protein 8 (endobrevin)
vacuolar protein sorting 54 homolog (S. cerevisiae)
vitronectin
WW domain binding protein 5
WD repeat domain 33
WW and C2 domain containing 2

Supp Table 5
mTERC heart decreased

Entrez Gene Name
RIKEN cDNA 1700020I14 gene
RIKEN cDNA 1700020I14 gene
RIKEN cDNA 1700020I14 gene
RIKEN cDNA 1700113I22 gene
RIKEN cDNA 2310009A05 gene
RIKEN cDNA 2310014D11 gene
RIKEN cDNA 2310029O18 gene
RIKEN cDNA 4632419I22 gene
RIKEN cDNA 4933404G15 gene
RIKEN cDNA 5730416F02 gene
RIKEN cDNA 6720475J19 gene
RIKEN cDNA 6720475J19 gene
RIKEN cDNA 8430436N08 gene
RIKEN cDNA 9130004J05 gene
RIKEN cDNA 9130017K11 gene
RIKEN cDNA 9430087J23 gene
hypothetical protein 9530028C05
angio-associated, migratory cell protein
ATP-binding cassette, sub-family A (ABC1), member 9
ATP-binding cassette, sub-family B (MDR/TAP), member 10
ATP-binding cassette, sub-family C (CFTR/MRP), member 5
ATP-binding cassette, sub-family C (CFTR/MRP), member 9
ATP-binding cassette, sub-family C (CFTR/MRP), member 9
acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain
acetyl-Coenzyme A acetyltransferase 1
acyl-Coenzyme A binding domain containing 3
actin, alpha, cardiac muscle 1
actin, gamma 2, smooth muscle, enteric
adenosine deaminase-like
ADAM metallopeptidase with thrombospondin type 1 motif, 9
acireductone dioxygenase 1
acireductone dioxygenase 1
ADP-ribosylarginine hydrolase
1-acylglycerol-3-phosphate O-acyltransferase 6 (lysophosphatidic acid acyltransferase, zeta)
axin interactor, dorsalization associated
adenylate kinase 1
adenylate kinase 3
adenylate kinase 3-like 1
A kinase (PRKA) anchor protein 10
aldo-keto reductase family 1, member C-like 2
aldehyde dehydrogenase 4 family, member A1
asparagine-linked glycosylation 13 homolog (S. cerevisiae)
alkaline phosphatase, liver/bone/kidney
adenosylmethionine decarboxylase 1
anaphase promoting complex subunit 1
ankyrin 1, erythrocytic
ankylosis, progressive homolog (mouse)

ankyrin repeat domain 23
ankyrin repeat domain 40
ankyrin repeat domain 40
ankyrin repeat domain 45
anoctamin 8
anthrax toxin receptor 2
annexin A2
annexin A6
annexin A7
adaptor-related protein complex 1, sigma 1 subunit
adaptor-related protein complex 3, mu 1 subunit
amyloid beta (A4) precursor protein-binding, family A, member 3
apelin receptor
apelin receptor
amyloid beta (A4) precursor-like protein 2
apolipoprotein A-I binding protein
apolipoprotein L 9b
apolipoprotein O-like
ArfGAP with RhoGAP domain, ankyrin repeat and PH domain 1
ADP-ribosylation factor 4
ADP-ribosylation factor 4
ariadne homolog, ubiquitin-conjugating enzyme E2 binding protein, 1 (Drosophila)
ADP-ribosylation factor-like 6 interacting protein 1
ADP-ribosylation-like factor 6 interacting protein 5
armadillo repeat containing, X-linked 3
cAMP-regulated phosphoprotein, 19kDa
ankyrin repeat and SOCS box-containing 10
ankyrin repeat and SOCS box-containing 2
aspartoacylase (Canavan disease)
aspartate beta-hydroxylase
asporin
ATG4 autophagy related 4 homolog D (S. cerevisiae)
atlastin GTPase 2
ATPase, Na+/K+ transporting, alpha 1 polypeptide
ATPase, H+ transporting, lysosomal V0 subunit a2
ataxin 2
ataxin 2-like
expressed sequence AW112010
antizyme inhibitor 1
RIKEN cDNA B230220N19 gene
RIKEN cDNA B230308N11 gene
beta-1,3-N-acetylgalactosaminyltransferase 2
RIKEN cDNA B430203I24 gene
BCL2-antagonist/killer 1
bromodomain adjacent to zinc finger domain, 1B
beclin 1, autophagy related
bicaudal D homolog 2 (Drosophila)
bicaudal D homolog 2 (Drosophila)
basic leucine zipper nuclear factor 1
bone morphogenetic protein 1
BCL2/adenovirus E1B 19kDa interacting protein 2

BCL2/adenovirus E1B 19kDa interacting protein 2
bolA homolog 3 (E. coli)
chromosome 11 open reading frame 54
chromosome 11 open reading frame 84
chromosome 13 open reading frame 31
chromosome 14 open reading frame 180
chromosome 14 open reading frame 37
chromosome 16 open reading frame 61
chromosome 16 open reading frame 7
chromosome 17 open reading frame 39
chromosome 17 open reading frame 39
chromosome 17 open reading frame 95
chromosome 18 open reading frame 10
chromosome 18 open reading frame 19
chromosome 18 open reading frame 19
chromosome 19 open reading frame 12
chromosome 19 open reading frame 12
chromosome 19 open reading frame 22
chromosome 19 open reading frame 52
chromosome 1 open reading frame 123
chromosome 1 open reading frame 63
chromosome 1 open reading frame 93
chromosome 20 open reading frame 194
chromosome 2 open reading frame 43
chromosome 5 open reading frame 13
chromosome 5 open reading frame 13
chromosome 6 open reading frame 182
expressed sequence C80171
chromosome 9 open reading frame 78
chromosome 9 open reading frame 86
calcium channel, voltage-dependent, T type, alpha 1G subunit
calcium channel, voltage-dependent, alpha 2/delta subunit 4
calcium channel, voltage-dependent, beta 2 subunit
calcium channel, voltage-dependent, beta 2 subunit
calcium channel, voltage-dependent, gamma subunit 2
calmodulin 1 (phosphorylase kinase, delta)
calcium/calmodulin-dependent protein kinase I
cullin-associated and neddylation-dissociated 2 (putative)
calnexin
CAP, adenylate cyclase-associated protein, 2 (yeast)
calpain 1, (mu/I) large subunit
calpain 3, (p94)
cell cycle associated protein 1
cell cycle associated protein 1
cysteinyl-tRNA synthetase 2, mitochondrial (putative)
caspase 3, apoptosis-related cysteine peptidase
caspase 8, apoptosis-related cysteine peptidase
calpastatin
caveolin 1, caveolae protein, 22kDa
coiled-coil domain containing 117
coiled-coil domain containing 21

coiled-coil domain containing 47
coiled-coil domain containing 56
coiled-coil domain containing 69
coiled-coil domain containing 91
coiled-coil domain containing 91
chemokine (C-C motif) ligand 21
cyclin D1
cyclin D1
cyclin D2
cyclin D2
cyclin D3
cyclin G1
chaperonin containing TCP1, subunit 3 (gamma)
CD34 molecule
CD59a antigen
CD93 molecule
CD93 molecule
CD97 molecule
CD99 molecule-like 2
CD99 molecule-like 2
CD99 molecule-like 2
cytidine and dCMP deaminase domain containing 1
CDC42 effector protein (Rho GTPase binding) 2
cyclin-dependent kinase 2 associated protein 2
CDP-diacylglycerol synthase (phosphatidate cytidylyltransferase) 2
centromere protein T
centrosomal protein 76kDa
carboxylesterase 1 (monocyte/macrophage serine esterase 1)
cofilin 1 (non-muscle)
CASP8 and FADD-like apoptosis regulator
chondroadherin-like
coiled-coil-helix-coiled-coil-helix domain containing 3
chitinase domain containing 1
chromatin modifying protein 4C
chimerin (chimaerin) 1
creatine kinase, brain
cytoplasmic linker associated protein 1
claudin domain containing 1
chloride intracellular channel 4
CAP-GLY domain containing linker protein 1
ClpB caseinolytic peptidase B homolog (E. coli)
chemokine-like receptor 1
cornichon homolog (Drosophila)
2',3'-cyclic nucleotide 3' phosphodiesterase
component of oligomeric golgi complex 8
collagen, type XIV, alpha 1
collagen, type XV, alpha 1
collagen, type I, alpha 1
collagen, type I, alpha 1
collagen, type I, alpha 2
collagen, type III, alpha 1

collagen, type IV, alpha 1
collagen, type IV, alpha 5
collagen, type V, alpha 2
collagen, type VI, alpha 1
collagen, type VI, alpha 2
collagen, type VI, alpha 2
collagen, type VI, alpha 3
collectin sub-family member 11
collectin sub-family member 11
coronin 7
COX16 cytochrome c oxidase assembly homolog (S. cerevisiae)
carboxypeptidase D
cytoplasmic polyadenylated homeobox
cleavage and polyadenylation specific factor 6, 68kDa
corticotropin releasing hormone receptor 1
v-crk sarcoma virus CT10 oncogene homolog (avian)
cartilage associated protein
crystallin, zeta (quinone reductase)-like 1
casein kinase 2, alpha 1 polypeptide
casein kinase 2, alpha 1 polypeptide
catenin (cadherin-associated protein), beta 1, 88kDa
cathepsin B
coxsackie virus and adenovirus receptor
cytochrome c, somatic
cytoplasmic FMR1 interacting protein 2
cytoplasmic FMR1 interacting protein 2
cytoglobin
cysteine/histidine-rich 1
cytochrome P450, family 7, subfamily A, polypeptide 1
DNA segment, Chr 14, ERATO Doi 668, expressed
disabled homolog 2, mitogen-responsive phosphoprotein (Drosophila)
defender against cell death 1
diacylglycerol lipase, alpha
death-associated protein
dual adaptor of phosphotyrosine and 3-phosphoinositides
drebrin-like
DDB1 and CUL4 associated factor 5
dephospho-CoA kinase domain containing
dynactin 5 (p25)
DCN1, defective in cullin neddylation 1, domain containing 1 (S. cerevisiae)
DCN1, defective in cullin neddylation 1, domain containing 2 (S. cerevisiae)
dimethylarginine dimethylaminohydrolase 1
DNA-damage-inducible transcript 3
degenerative spermatocyte homolog 1, lipid desaturase (Drosophila)
DNA fragmentation factor, 45kDa, alpha polypeptide
7-dehydrocholesterol reductase
dehydrogenase/reductase (SDR family) member 1
dehydrogenase/reductase (SDR family) member 4
DnaJ (Hsp40) homolog, subfamily A, member 1
DnaJ (Hsp40) homolog, subfamily A, member 3
DnaJ (Hsp40) homolog, subfamily A, member 4

DnaJ (Hsp40) homolog, subfamily A, member 4
DnaJ (Hsp40) homolog, subfamily B, member 4
double C2-like domains, beta
dolichol kinase
DPH3, KTI11 homolog (S. cerevisiae)
desmocollin 2
dystrobrevin, alpha
deoxythymidylate kinase (thymidylate kinase)
dual specificity phosphatase 19
dynein, cytoplasmic 1, light intermediate chain 2
dynein, light chain, Tctex-type 3
dysferlin, limb girdle muscular dystrophy 2B (autosomal recessive)
EF-hand calcium binding domain 2
EF-hand domain family, member D1
predicted gene, EG214403
EGF-like-domain, multiple 7
EGF-like-domain, multiple 7
egl nine homolog 3 (C. elegans)
egl nine homolog 3 (C. elegans)
EH domain binding protein 1-like 1
eukaryotic translation initiation factor 2C, 4
eukaryotic translation initiation factor 3, subunit A
eukaryotic translation initiation factor 4B
eukaryotic translation initiation factor 4E
eukaryotic translation initiation factor 4E
elaC homolog 1 (E. coli)
ectonucleotide pyrophosphatase/phosphodiesterase 5 (putative function)
ectonucleoside triphosphate diphosphohydrolase 5
erythrocyte membrane protein band 4.1-like 2
ELKS/RAB6-interacting/CAST family member 1
endoplasmic reticulum-golgi intermediate compartment (ERGIC) 1
ERGIC and golgi 3
esterase D/formylglutathione hydrolase
ethylmalonic encephalopathy 1
v-ets erythroblastosis virus E26 oncogene homolog 1 (avian)
fatty acid binding protein 3, muscle and heart (mammary-derived growth inhibitor)
fatty acid binding protein 5 (psoriasis-associated)
fumarylacetoacetate hydrolase domain containing 1
family with sequence similarity 101, member B
family with sequence similarity 101, member B
family with sequence similarity 111, member A
family with sequence similarity 120A
family with sequence similarity 63, member B
family with sequence similarity 81, member A
filamin binding LIM protein 1
fibrillin 1
F-box protein 3
fibroblast growth factor 1 (acidic)
FGFR1 oncogene partner 2
four and a half LIM domains 2

FK506 binding protein 1A, 12kDa
FK506 binding protein 1A, 12kDa
FK506 binding protein 4, 59kDa
FAD1 flavin adenine dinucleotide synthetase homolog (S. cerevisiae)
filamin B, beta
filamin C, gamma
flotillin 1
fascin homolog 1, actin-bundling protein (Strongylocentrotus purpuratus)
fascin homolog 1, actin-bundling protein (Strongylocentrotus purpuratus)
follistatin-like 1
FUN14 domain containing 1
FYN oncogene related to SRC, FGR, YES
G2/M-phase specific E3 ubiquitin ligase
GA binding protein transcription factor, alpha subunit 60kDa
UDP-N-acetyl-alpha-D-galactosamine:polypeptide N-acetylgalactosaminyltransferase 11 (GalNAc-T11)
guanidinoacetate N-methyltransferase
glyceraldehyde-3-phosphate dehydrogenase, spermatogenic
GTPase activating Rap/RanGAP domain-like 1
golgi-specific brefeldin A resistant guanine nucleotide exchange factor 1
glucokinase (hexokinase 4)
glycerophosphodiester phosphodiesterase domain containing 1
G elongation factor, mitochondrial 2
growth hormone inducible transmembrane protein
GTPase, IMAP family member 4
glutaminase
glutamate dehydrogenase 1
predicted gene 3426
predicted gene 4076
glia maturation factor, beta
guanine nucleotide binding protein (G protein), alpha activating activity polypeptide, olfactory type
GNAS complex locus
guanine nucleotide binding protein (G protein), beta polypeptide 4
guanine nucleotide binding protein (G protein), beta polypeptide 4
guanine nucleotide binding protein (G protein), gamma 11
guanine nucleotide binding protein (G protein), gamma 4
GC-rich promoter binding protein 1
glycoprotein M6B
G protein-coupled receptor 153
glutamic-pyruvate transaminase (alanine aminotransferase)
glutamic pyruvate transaminase (alanine aminotransferase) 2
glutamic pyruvate transaminase (alanine aminotransferase) 2
growth factor receptor-bound protein 10
growth factor receptor-bound protein 2
glutathione S-transferase alpha 5
general transcription factor IIH, polypeptide 4, 52kDa
HCLS1 associated protein X-1
holocytochrome c synthase (cytochrome c heme-lyase)
HEAT repeat containing 6
HEAT repeat containing 7B1
homeodomain interacting protein kinase 2

histone cluster 1, H1e
histone cluster 1, H2bl
histone cluster 3, H2a
histone cluster 3, H2a
histone cluster 3, H3
human immunodeficiency virus type I enhancer binding protein 2
Holliday junction recognition protein
HOP homeobox
HOP homeobox
HRAS-like suppressor
HRAS-like suppressor
heat shock factor binding protein 1
hydroxysteroid (17-beta) dehydrogenase 12
heat shock protein 90kDa alpha (cytosolic), class A member 1
heat shock protein 90kDa alpha (cytosolic), class B member 1
heat shock 70kDa protein 12A
heat shock 70kDa protein 4
heat shock 70kDa protein 4-like
heat shock 70kDa protein 8
heat shock 27kDa protein 3
heat shock protein, alpha-crystallin-related, B6
heat shock 60kDa protein 1 (chaperonin)
hyaluronoglucosaminidase 2
intercellular adhesion molecule 2
interferon activated gene 203
interferon gamma receptor 2 (interferon gamma transducer 1)
intraflagellar transport 122 homolog (Chlamydomonas)
intraflagellar transport 122 homolog (Chlamydomonas)
insulin-like growth factor binding protein 7
immunoglobulin superfamily, member 1
interleukin 13 receptor, alpha 1
interleukin 13 receptor, alpha 1
interleukin 2 receptor, gamma (severe combined immunodeficiency)
inhibitor of growth family, member 4
inositol polyphosphate phosphatase-like 1
insulin induced gene 2
integrator complex subunit 7
IQ motif and Sec7 domain 2
iron-sulfur cluster assembly 1 homolog (S. cerevisiae)-like
immunoglobulin superfamily containing leucine-rich repeat
isochorismatase domain containing 1
isochorismatase domain containing 1
integrin alpha FG-GAP repeat containing 1
integrin, alpha 1
integrin, alpha 6
integrin, alpha 6
integrin, alpha 9
integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)
integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)
integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)

inositol 1,4,5-triphosphate receptor, type 2
intersectin 1 (SH3 domain protein)
intersectin 2
izumo sperm-egg fusion 1
Janus kinase 3
Josephin domain containing 2
jun oncogene
potassium voltage-gated channel, Shal-related subfamily, member 2
potassium voltage-gated channel, subfamily G, member 2
potassium inwardly-rectifying channel, subfamily J, member 3
potassium inwardly-rectifying channel, subfamily J, member 3
potassium channel tetramerisation domain containing 10
KIAA0226
KIAA0427
KIAA1033
KIT ligand
kinesin light chain 1
kinesin light chain 4
kelch-like 6 (Drosophila)
karyopherin alpha 1 (importin alpha 5)
karyopherin alpha 1 (importin alpha 5)
karyopherin alpha 3 (importin alpha 4)
karyopherin (importin) beta 1
laminin, alpha 4
lysosomal protein transmembrane 4 alpha
limb bud and heart development homolog (mouse)
lysocardiolipin acyltransferase 1
lactate dehydrogenase D
lactate dehydrogenase D
leucine zipper-EF-hand containing transmembrane protein 2
lectin, galactoside-binding, soluble, 1
lectin, galactoside-binding, soluble, 7
lectin, galactoside-binding, soluble, 9B
LIM and senescent cell antigen-like domains 1
lectin, mannose-binding, 1
lectin, mannose-binding 2
lipase maturation factor 1
similar to mCG115122
hepatocellular carcinoma-associated gene TD26
cell division cycle 42 pseudogene
loricrin
lysyl oxidase-like 1
lysyl oxidase-like 2
lysophosphatidic acid receptor 6
lysophosphatidylcholine acyltransferase 2
lysophosphatidylglycerol acyltransferase 1
leucine rich repeat containing 27
leucine rich repeat containing 39
leucine-rich repeats and transmembrane domains 1
limbic system-associated membrane protein

lumican
latexin
Ly6/neurotoxin 1
microtubule-actin crosslinking factor 1
MAK10 homolog, amino-acid N-acetyltransferase subunit (S. cerevisiae)
microtubule-associated protein 4
MAP7 domain containing 1
microtubule-associated protein, RP/EB family, member 2
microtubule-associated protein tau
myristoylated alanine-rich protein kinase C substrate
myristoylated alanine-rich protein kinase C substrate
myristoylated alanine-rich protein kinase C substrate
myristoylated alanine-rich protein kinase C substrate
Mdm2 p53 binding protein homolog (mouse)
malic enzyme 1, NADP(+)-dependent, cytosolic
male-enhanced antigen 1
male-enhanced antigen 1
mediator complex subunit 11
mediator complex subunit 19
mediator complex subunit 20
maternally expressed 3
mesenchyme homeobox 1
methyltransferase 10 domain containing
microfibrillar associated protein 5
mannosyl (alpha-1,6-)-glycoprotein beta-1,2-N-acetylglucosaminyltransferase
mannosyl (alpha-1,6-)-glycoprotein beta-1,6-N-acetyl-glucosaminyltransferase
O-6-methylguanine-DNA methyltransferase
MYC induced nuclear antigen
malectin
myeloid leukemia factor 2
monocyte to macrophage differentiation-associated
matrix metallopeptidase 2 (gelatinase A, 72kDa gelatinase, 72kDa type IV collagenase)
MOB1, Mps One Binder kinase activator-like 1B (yeast)
mannosyl-oligosaccharide glucosidase
mitochondrial ribosomal protein L19
mitochondrial ribosomal protein L34
mitochondrial ribosomal protein L42
mitochondrial ribosomal protein L50
mitochondrial ribosomal protein L51
membrane-spanning 4-domains, subfamily A, member 4B
msh homeobox 1
mitochondrial carrier homolog 1 (C. elegans)
myotubularin related protein 6
mitochondrial protein 18 kDa
myotrophin
mitochondrial tumor suppressor 1
mitochondrial tumor suppressor 1
MUS81 endonuclease homolog (S. cerevisiae)
myeloid-associated differentiation marker
myeloid-associated differentiation marker

myosin, heavy chain 9, non-muscle
myosin XVIIIA
nucleosome assembly protein 1-like 1
nuclear prelamin A recognition factor
nuclear prelamin A recognition factor
N-acetyltransferase 12 (GCN5-related, putative)
neighbor of BRCA1 gene 1
neutral cholesterol ester hydrolase 1
NCK adaptor protein 1
nuclear receptor co-repressor 2
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3, 9kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3, 9kDa
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 4-like 2
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, assembly factor 2
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, assembly factor 3
NADH dehydrogenase (ubiquinone) Fe-S protein 5, 15kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 8, 23kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) Fe-S protein 8, 23kDa (NADH-coenzyme Q reductase)
NADH dehydrogenase (ubiquinone) flavoprotein 2, 24kDa
nestin
nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 2
nuclear transcription factor Y, alpha
non imprinted in Prader-Willi/Angelman syndrome 2
Na+/K+ transporting ATPase interacting 1
Na+/K+ transporting ATPase interacting 1
nicotinamide nucleotide adenylyltransferase 1
non-POU domain containing, octamer-binding
Notch homolog 4 (Drosophila)
neuropilin 2
neuropilin 2
nudix (nucleoside diphosphate linked moiety X)-type motif 19
nudix (nucleoside diphosphate linked moiety X)-type motif 3
nudix (nucleoside diphosphate linked moiety X)-type motif 4
nudix (nucleoside diphosphate linked moiety X)-type motif 8
nuclear protein, transcriptional regulator, 1
2'-5'-oligoadenylate synthetase 2, 69/71kDa
ornithine decarboxylase antizyme 2
osteoglycin
O-linked N-acetylglucosamine (GlcNAc) transferase (UDP-N-acetylglucosamine:polypeptide-
O-linked N-acetylglucosamine (GlcNAc) transferase (UDP-N-acetylglucosamine:polypeptide-
O-linked N-acetylglucosamine (GlcNAc) transferase (UDP-N-acetylglucosamine:polypeptide-
O-sialoglycoprotein endopeptidase-like 1
oligosaccharyltransferase complex subunit
oxidase (cytochrome c) assembly 1-like
3-oxoacid CoA transferase 1
oxidation resistance 1
prolyl 4-hydroxylase, alpha polypeptide I
prolyl 4-hydroxylase, alpha polypeptide II
poly(A) binding protein, cytoplasmic 4 (inducible form)
platelet-activating factor acetylhydrolase, isoform Ib, subunit 1 (45kDa)

propionyl Coenzyme A carboxylase, beta polypeptide
protocadherin 12
protocadherin beta 14
proprotein convertase subtilisin/kexin type 6
prenylcysteine oxidase 1
phosphodiesterase 7B
platelet derived growth factor D
platelet derived growth factor D
protein disulfide isomerase family A, member 3
PDZ and LIM domain 7 (enigma)
PDS5, regulator of cohesion maintenance, homolog B (S. cerevisiae)
phosphoprotein enriched in astrocytes 15
phosphoprotein enriched in astrocytes 15
phosphofructokinase, liver
phosphofructokinase, liver
profilin 2
phosphoglycerate mutase 2 (muscle)
post-GPI attachment to proteins 2
phosphoglucomutase 5
prohibitin
PHD finger protein 10
pleckstrin homology-like domain, family A, member 3
phosphatase, orphan 2
putative homeodomain transcription factor 2
phosphatidylinositol glycan anchor biosynthesis, class Y-like
phosphatidylserine decarboxylase
phosphatidylinositol transfer protein, alpha
protein kinase (cAMP-dependent, catalytic) inhibitor alpha
pyruvate kinase, muscle
phospholipase A2, group V
phospholipase D family, member 3
plectin 1, intermediate filament binding protein 500kDa
procollagen-lysine 1, 2-oxoglutarate 5-dioxygenase 1
plexin D1
prostate transmembrane protein, androgen induced 1
polymerase (DNA-directed), epsilon 4 (p12 subunit)
polymerase (DNA-directed), epsilon 4 (p12 subunit)
periostin, osteoblast specific factor
phosphatidic acid phosphatase type 2 domain containing 3
protein phosphatase 1, regulatory (inhibitor) subunit 12A
protein phosphatase 1, regulatory (inhibitor) subunit 14C
protein phosphatase 1, regulatory (inhibitor) subunit 14C
protein phosphatase 1, regulatory (inhibitor) subunit 16B
protein phosphatase 1, regulatory (inhibitor) subunit 3C
protein phosphatase 2 (formerly 2A), regulatory subunit B, alpha isoform
protein phosphatase 2 (formerly 2A), regulatory subunit B'', alpha
protein phosphatase 2 (formerly 2A), regulatory subunit B'', alpha
protein phosphatase 2, regulatory subunit B', gamma isoform
palmitoyl-protein thioesterase 1

PRELI domain containing 1
proline/arginine-rich end leucine-rich repeat protein
protein-kinase, interferon-inducible double stranded RNA dependent inhibitor, repressor of
protein kinase, X-linked
protein arginine methyltransferase 2
protein arginine methyltransferase 5
prion protein
proline rich Gla (G-carboxyglutamic acid) 3 (transmembrane)
prune homolog 2 (Drosophila)
proteasome (prosome, macropain) subunit, alpha type, 4
proteasome (prosome, macropain) 26S subunit, non-ATPase, 7
proteasome (prosome, macropain) activator subunit 3 (PA28 gamma; Ki)
proteasome (prosome, macropain) activator subunit 4
phosphatase and tensin homolog
phosphatase and tensin homolog
prostaglandin reductase 2
prostaglandin reductase 2
PTK2B protein tyrosine kinase 2 beta
protein tyrosine phosphatase type IVA, member 2
protein tyrosine phosphatase-like (proline instead of catalytic arginine), member A
pituitary tumor-transforming 1
pituitary tumor-transforming 1
pumilio homolog 2 (Drosophila)
quaking homolog, KH domain RNA binding (mouse)
RAB11 family interacting protein 3 (class II)
RAB2A, member RAS oncogene family
RAB38, member RAS oncogene family
RAB8A, member RAS oncogene family
rabaptin, RAB GTPase binding effector protein 1
RAB guanine nucleotide exchange factor (GEF) 1
RAD21 homolog (S. pombe)
v-ral simian leukemia viral oncogene homolog A (ras related)
receptor-associated protein of the synapse
RAS guanyl releasing protein 2 (calcium and DAG-regulated)
Ras association (RalGDS/AF-6) domain family member 3
Ras association (RalGDS/AF-6) domain family member 3
RNA binding motif protein 10
RNA binding motif protein 18
RNA binding motif protein 5
RNA binding motif protein 6
regulator of chromosome condensation (RCC1) and BTB (POZ) domain containing protein 2
receptor accessory protein 5
riboflavin kinase
ring finger and WD repeat domain 2
regulator of G-protein signaling 4
Rho family GTPase 3
ring finger protein 11
ring finger protein 11
ring finger protein 121

ring finger protein 213
ring finger protein 214
ring finger protein 5
RNA guanylyltransferase and 5'-phosphatase
Rho-associated, coiled-coil containing protein kinase 2
retinitis pigmentosa 2 (X-linked recessive)
retinitis pigmentosa GTPase regulator interacting protein 1
ribosomal protein S6 kinase, 90kDa, polypeptide 2
ribosomal protein S6 kinase, 90kDa, polypeptide 2
ribonucleotide reductase M1
radical S-adenosyl methionine domain containing 1
radical S-adenosyl methionine domain containing 2
Ras suppressor protein 1
reticulon 4
reticulon 4 interacting protein 1
reticulon 4 receptor
receptor (chemosensory) transporter protein 4
ryanodine receptor 1 (skeletal)
S100 calcium binding protein A10
S100 calcium binding protein A16
spastic ataxia of Charlevoix-Saguenay (sacsin)
sterile alpha motif domain containing 4A
secretory carrier membrane protein 4
sodium channel, voltage-gated, type IV, beta
syndecan 3
succinate dehydrogenase complex assembly factor 2
succinate dehydrogenase complex, subunit C, integral membrane protein, 15kDa
serum deprivation response (phosphatidylserine binding protein)
Sec23 homolog A (S. cerevisiae)
selenoprotein T
septin 11
septin 8
small EDRK-rich factor 2
serine incorporator 1
serpin peptidase inhibitor, clade F (alpha-2 antiplasmin, pigment epithelium derived factor), member 1
serpin peptidase inhibitor, clade H (heat shock protein 47), member 1, (collagen binding protein 1)
serpin peptidase inhibitor, clade H (heat shock protein 47), member 1, (collagen binding protein 1)
SET domain and mariner transposase fusion gene
splicing factor, arginine/serine-rich 1
SH3 domain binding glutamic acid-rich protein
SH3 domain containing 19
SH3-domain GRB2-like endophilin B2
SH3-domain kinase binding protein 1
SH3-domain kinase binding protein 1
sialic acid acetylesterase
SIN3 homolog B, transcription regulator (yeast)
sirtuin (silent mating type information regulation 2 homolog) 5 (S. cerevisiae)
v-ski sarcoma viral oncogene homolog (avian)
SLAIN motif family, member 2

solute carrier family 25, member 26
solute carrier family 25, member 26
solute carrier family 25, member 44
solute carrier family 31 (copper transporters), member 2
solute carrier family 8 (sodium/calcium exchanger), member 1
solute carrier family 8 (sodium/calcium exchanger), member 1
solute carrier organic anion transporter family, member 5A1
schlafen family member 5
STE20-like kinase (yeast)
sarcolemma associated protein
small ArfGAP2
SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily b, member 1
SPARC related modular calcium binding 2
SPARC related modular calcium binding 2
smoothelin
smoothelin-like 2
SMAD specific E3 ubiquitin protein ligase 2
SMAD specific E3 ubiquitin protein ligase 2
synaptosomal-associated protein, 23kDa
SNAP-associated protein
small nuclear ribonucleoprotein D3 polypeptide 18kDa
sorting nexin family member 27
sorting nexin 9
SP100 nuclear antigen
secreted protein, acidic, cysteine-rich (osteonectin)
secreted protein, acidic, cysteine-rich (osteonectin)
SPARC-like 1 (hevin)
sprouty-related, EVH1 domain containing 1
serum response factor (c-fos serum response element-binding transcription factor)
sarcalumenin
SFRS protein kinase 2
SFRS protein kinase 3
single stranded DNA binding protein 3
sarcospan (Kras oncogene-associated gene)
signal sequence receptor, beta (translocon-associated protein beta)
ST3 beta-galactoside alpha-2,3-sialyltransferase 2
steroidogenic acute regulatory protein
signal transducer and activator of transcription 2, 113kDa
STEAP family member 3
stress-induced-phosphoprotein 1
serine/threonine kinase 16
stomatin
striatin, calmodulin binding protein 3
suppressor of Ty 3 homolog (S. cerevisiae)
surfeit 4
synaptopodin 2
synaptophysin-like 1
transgelin 2
TAO kinase 1

transcription elongation factor A (SII), 3
Treacher Collins-Franceschetti syndrome 1
t-complex-associated-testis-expressed 1
trans-2,3-enoyl-CoA reductase
trans-2,3-enoyl-CoA reductase
tescalcin
transferrin receptor (p90, CD71)
transforming growth factor beta 1 induced transcript 1
thymocyte nuclear protein 1
TIA1 cytotoxic granule-associated RNA binding protein
translocase of inner mitochondrial membrane 50 homolog (S. cerevisiae)
transmembrane 9 superfamily member 2
transmembrane 9 superfamily member 3
transmembrane channel-like 7
transmembrane and coiled-coil domain family 1
transmembrane and coiled-coil domain family 2
transmembrane protein 106A
transmembrane protein 126B
transmembrane protein 132A
transmembrane protein 134
transmembrane protein 141
transmembrane protein 183A
transmembrane protein 41B
thymosin beta 10
thymosin beta 10
thymosin beta 4, X-linked
thioredoxin-related transmembrane protein 2
tumor necrosis factor, alpha-induced protein 1 (endothelial)
translocase of outer mitochondrial membrane 40 homolog (yeast)-like
tumor protein p53
tumor protein p53 inducible protein 11
tumor protein p53 inducible nuclear protein 2
tropomyosin 1 (alpha)
tropomyosin 3
tropomyosin 4
trafficking protein, kinesin binding 1
tripartite motif-containing 34
tripartite motif-containing 5
tetraspanin 2
tetraspanin 7
tetraspanin 9
tetratricopeptide repeat domain 14
tetratricopeptide repeat domain 3
tetratricopeptide repeat domain 3
tetratricopeptide repeat domain 8
titin
titin
tubulin, alpha 1a
tubulin, alpha 8

twisted gastrulation homolog 1 (Drosophila)
twisted gastrulation homolog 1 (Drosophila)
thioredoxin reductase 2
U2 small nuclear RNA auxiliary factor 1-like 4
ubiquitin-like modifier activating enzyme 3
ubiquitin-conjugating enzyme E2D 3 (UBC4/5 homolog, yeast)
ubiquitin-conjugating enzyme E2F (putative)
ubiquitin-conjugating enzyme E2L 3
ubiquitin-conjugating enzyme E2L 3
ubiquitin-conjugating enzyme E2N (UBC13 homolog, yeast)
ubiquitin-like domain containing CTD phosphatase 1
ubiquitin-like with PHD and ring finger domains 2
unc-51-like kinase 2 (C. elegans)
unc-51-like kinase 2 (C. elegans)
ubiquinol-cytochrome c reductase complex chaperone
ubiquinol-cytochrome c reductase, Rieske iron-sulfur polypeptide 1
ubiquitin specific peptidase 15
ubiquitin specific peptidase 15
ubiquitin specific peptidase 24
vasohibin 1
vasodilator-stimulated phosphoprotein
vascular cell adhesion molecule 1
versican
vimentin
vacuolar protein sorting 13 homolog A (S. cerevisiae)
vacuolar protein sorting 29 homolog (S. cerevisiae)
vacuolar protein sorting 39 homolog (S. cerevisiae)
vacuolar protein sorting 41 homolog (S. cerevisiae)
von Willebrand factor A domain containing 1
WW domain binding protein 1
WD repeat domain 41
WEE1 homolog (S. pombe)
WAS/WASL interacting protein family, member 1
WAS/WASL interacting protein family, member 1
WD repeat domain, phosphoinositide interacting 1
WD repeat domain, phosphoinositide interacting 1
WNK lysine deficient protein kinase 1
XIAP associated factor 1
X-linked Kx blood group (McLeod syndrome)
YY1 associated factor 2
Yip1 interacting factor homolog A (S. cerevisiae)
yippee-like 2 (Drosophila)
tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, theta polypeptide
zinc finger, BED-type containing 4
zinc finger and BTB domain containing 20
zinc finger, AN1-type domain 6
zinc finger protein 101
zinc finger protein 161 homolog (mouse)
zinc finger protein 386 (Kruppel-like)

zinc finger protein 239
zinc finger protein 24
zinc finger protein 24
zinc finger protein 260
zinc finger protein 260
zinc finger protein 770
zinc and ring finger 2

mTERC heart increased
908 probe sets increased

Entrez Gene Name
RIKEN cDNA 1110003O08 gene
RIKEN cDNA 1700093J21 gene
RIKEN cDNA 1810026B05 gene
RIKEN cDNA 1810032O08 gene
RIKEN cDNA 2310033F14 gene
RIKEN cDNA 2310050B05 gene
RIKEN cDNA 2310050B05 gene
RIKEN cDNA 2410017P09 gene
RIKEN cDNA 2810416G20 gene
RIKEN cDNA 4633401B06 gene
RIKEN cDNA 4833417J20 gene
RIKEN cDNA 4921504P13 gene
RIKEN cDNA 4930556L07 gene
RIKEN cDNA 4932415G12 gene
RIKEN cDNA 6330531I01 gene
RIKEN cDNA 6430510B20 gene
RIKEN cDNA 6720469N11 gene
RIKEN cDNA 7120426M23 gene
RIKEN cDNA 9430006E15 gene
RIKEN cDNA 9430011C21 gene
RIKEN cDNA 9430098F02 gene
RIKEN cDNA 9530006C21 gene
RIKEN cDNA 9630025H16 gene
RIKEN cDNA A230048O21 gene
RIKEN cDNA A230107N01 gene
RIKEN cDNA A330048O09 gene
RIKEN cDNA A930004J17 gene
expressed sequence AA617406
alanyl-tRNA synthetase
ATP-binding cassette, sub-family A (ABC1), member 1
ATP-binding cassette, sub-family A (ABC1), member 3
ATP-binding cassette, sub-family A (ABC1), member 5
ATP-binding cassette, sub-family A (ABC1), member 6
ATP-binding cassette, sub-family C (CFTR/MRP), member 1
ATP-binding cassette, sub-family F (GCN20), member 1
ATP-binding cassette, sub-family G (WHITE), member 2
actin binding LIM protein 1

acyl-Coenzyme A binding domain containing 4
aconitase 2, mitochondrial
acyl-CoA thioesterase 1
acyl-CoA thioesterase 2
activin A receptor, type IB
ADAM metallopeptidase with thrombospondin type 1 motif, 3
ArfGAP with dual PH domains 2
adenylate cyclase 6
adenylate cyclase 9
alcohol dehydrogenase, iron containing, 1
adiponectin receptor 2
ADNP homeobox 2
ArfGAP with FG repeats 2
AHNAK nucleoprotein
expressed sequence AI314604
A kinase (PRKA) anchor protein 8-like
alkB, alkylation repair homolog 3 (E. coli)
alkB, alkylation repair homolog 3 (E. coli)
ankyrin repeat and KH domain containing 1
ankyrin repeat domain 33B
adaptor-related protein complex 2, alpha 2 subunit
adaptor-related protein complex 3, beta 1 subunit
APEX nuclease (multifunctional DNA repair enzyme) 1
apoptosis inhibitor 5
apolipoprotein A-IV
arginine and glutamate rich 1
Rho GTPase activating protein 21
Rho guanine nucleotide exchange factor (GEF) 17
ariadne homolog 2 (Drosophila)
ariadne homolog 2 (Drosophila)
ADP-ribosylation factor-like 4A
ADP-ribosylation-like factor 6 interacting protein 4
ADP-ribosylation factor-like 8A
arrestin domain containing 4
ADP-ribosyltransferase 3
ATPase family, AAA domain containing 3A
ATPase, class V, type 10D
ATPase type 13A1
ATPase type 13A3
ATPase, Na+/K+ transporting, alpha 2 (+) polypeptide
ATP synthase, H+ transporting, mitochondrial F1 complex, alpha subunit 1, cardiac muscle
ATP synthase, H+ transporting, mitochondrial F1 complex, gamma polypeptide 1
ATPase, H+ transporting, lysosomal V0 subunit a1
ATPase, H+ transporting, lysosomal 13kDa, V1 subunit G1
ATPase, H+ transporting, lysosomal 50/57kDa, V1 subunit H
ATR interacting protein
expressed sequence AU014973
expressed sequence AW555355

BCL2-like 11 (apoptosis facilitator)
BCL2-like 13 (apoptosis facilitator)
B-cell CLL/lymphoma 7A
BCL2-associated transcription factor 1
v-raf murine sarcoma viral oncogene homolog B1
v-raf murine sarcoma viral oncogene homolog B1
BRCA1 associated protein
bromodomain containing 2
bromodomain containing 8
bromodomain and PHD finger containing, 1
basic transcription factor 3
BTG family, member 3
BUD31 homolog (yeast)
chromosome 10 open reading frame 119
chromosome 11 open reading frame 30
chromosome 11 open reading frame 52
chromosome 11 open reading frame 60
chromosome 12 open reading frame 45
chromosome 12 open reading frame 5
chromosome 12 open reading frame 72
chromosome 14 open reading frame 126
chromosome 15 open reading frame 24
chromosome 16 open reading frame 70
chromosome 17 open reading frame 103
chromosome 17 open reading frame 75
chromosome 19 open reading frame 2
chromosome 19 open reading frame 2
chromosome 19 open reading frame 50
chromosome 19 open reading frame 53
chromosome 1 open reading frame 107
chromosome 1 open reading frame 107
chromosome 1 open reading frame 128
chromosome 1 open reading frame 131
chromosome 1 open reading frame 151
chromosome 20 open reading frame 108
chromosome 21 open reading frame 91
chromosome 22 open reading frame 25
chromosome 22 open reading frame 40
complement component 3
chromosome 3 open reading frame 59
chromosome 5 open reading frame 41
chromosome 6 open reading frame 89
chromosome 7 open reading frame 64
chromosome 8 open reading frame 41
RIKEN cDNA C920008N22 gene
chromosome 9 open reading frame 114
chromosome 9 open reading frame 5
chromosome 9 open reading frame 75

calcium binding and coiled-coil domain 1
calcium/calmodulin-dependent protein kinase kinase 2, beta
calcium/calmodulin-dependent protein kinase kinase 2, beta
cancer susceptibility candidate 3
CASK interacting protein 2
castor zinc finger 1
cystathionine-beta-synthase
chromobox homolog 3 (HP1 gamma homolog, Drosophila)
chromobox homolog 7
coiled-coil domain containing 82
coiled-coil domain containing 86
coiled-coil alpha-helical rod protein 1
CD2-associated protein
CD302 molecule
CDC42 small effector 2
cyclin-dependent kinase inhibitor 1A (p21, Cip1)
cyclin-dependent kinase inhibitor 1A (p21, Cip1)
cyclin-dependent kinase inhibitor 2C (p18, inhibits CDK4)
CDP-diacylglycerol synthase (phosphatidate cytidylyltransferase) 2
complement factor H
complement factor H
complement factor H-related 2
chromodomain helicase DNA binding protein 2
chromodomain helicase DNA binding protein 7
chromodomain helicase DNA binding protein 8
choline kinase beta
carbohydrate (chondroitin 6) sulfotransferase 3
corepressor interacting with RBPJ, 1
cold inducible RNA binding protein
cirrhosis, autosomal recessive 1A (cirhin)
cytokine inducible SH2-containing protein
cardiotrophin-like cytokine factor 1
claudin 1
C-type lectin domain family 16, member A
ceroid-lipofuscinosis, neuronal 6, late infantile, variant
ClpX caseinolytic peptidase X homolog (E. coli)
clathrin, light chain (Lca)
clusterin
cyclic nucleotide gated channel alpha 2
connector enhancer of kinase suppressor of Ras 1
catechol-O-methyltransferase
catechol-O-methyltransferase
coronin 6
cleavage and polyadenylation specific factor 6, 68kDa
carnitine palmitoyltransferase 1A (liver)
carnitine acetyltransferase
cereblon
CREB regulated transcription coactivator 2

cold shock domain containing C2, RNA binding
cold shock domain containing C2, RNA binding
casein kinase 1, alpha 1
casein kinase 1, epsilon
casein kinase 2, beta polypeptide
cleavage stimulation factor, 3' pre-RNA, subunit 1, 50kDa
CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) phosphatase, subunit 1
CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) small phosphatase 2
cathepsin L2
CUE domain containing 1
CUE domain containing 1
cutC copper transporter homolog (E. coli)
chemokine (C-X-C motif) ligand 12 (stromal cell-derived factor 1)
cytochrome P450, family 1, subfamily B, polypeptide 1
cytochrome P450, family 2, subfamily D, polypeptide 6
RIKEN cDNA D330005C11 gene
death-domain associated protein
DAZ associated protein 2
dodecenoyl-Coenzyme A delta isomerase (3,2 trans-enoyl-Coenzyme A isomerase)
dynactin 4 (p62)
dopa decarboxylase (aromatic L-amino acid decarboxylase)
DDHD domain containing 1
DDRGK domain containing 1
DEAD (Asp-Glu-Ala-Asp) box polypeptide 1
DEAD (Asp-Glu-Ala-Asp) box polypeptide 1
DEAD (Asp-Glu-Ala-Asp) box polypeptide 24
DEAD (Asp-Glu-Ala-Asp) box polypeptide 24
death effector domain containing 2
diablo homolog (Drosophila)
death inducer-obliterator 1
discs, large (Drosophila) homolog-associated protein 4
DNA (cytosine-5-)-methyltransferase 3 beta
desmoglein 2
desmoglein 2
desmoglein 2
desmoglein 2
dystrobrevin binding protein 1
dihydrouridine synthase 3-like (S. cerevisiae)
dual specificity phosphatase 4
dynein, cytoplasmic 1, light intermediate chain 1
E4F transcription factor 1
early B-cell factor 1
enhancer of mRNA decapping 4
EF-hand calcium binding domain 3
elongation factor Tu GTP binding domain containing 2
epidermal growth factor receptor (erythroblastic leukemia viral (v-erb-b) oncogene homolog, avian)
EH-domain containing 4
eukaryotic translation initiation factor 1

eukaryotic translation initiation factor 3, subunit C
eukaryotic translation initiation factor 3, subunit C
eukaryotic translation initiation factor 3, subunit C
eukaryotic translation initiation factor 3, subunit F
eukaryotic translation initiation factor 3, subunit G
eukaryotic translation initiation factor 3, subunit I
eukaryotic translation initiation factor 3, subunit I
eukaryotic translation initiation factor 4A, isoform 1
eukaryotic translation initiation factor 4E binding protein 1
eukaryotic translation initiation factor 4E binding protein 1
eukaryotic translation initiation factor 6
ELK4, ETS-domain protein (SRF accessory protein 1)
elongation factor RNA polymerase II
elastin
ectodermal-neural cortex (with BTB-like domain)
ectonucleoside triphosphate diphosphohydrolase 4
ectonucleoside triphosphate diphosphohydrolase 4
erythrocyte membrane protein band 4.1 (elliptocytosis 1, RH-linked)
erythrocyte membrane protein band 4.1 like 5
EPH receptor A10
epsin 2
erbb2 interacting protein
ERO1-like (S. cerevisiae)
ERO1-like (S. cerevisiae)
endothelial cell adhesion molecule
ets variant 3
ets variant 3
exosome component 1
coagulation factor X
fatty acid binding protein 4, adipocyte
Fas (TNFRSF6) associated factor 1
family with sequence similarity 100, member B
family with sequence similarity 126, member A
family with sequence similarity 128, member B
family with sequence similarity 134, member B
family with sequence similarity 134, member B
family with sequence similarity 135, member A
family with sequence similarity 178, member A
family with sequence similarity 21, member A
family with sequence similarity 63, member A
family with sequence similarity 76, member A
Finkel-Biskis-Reilly murine sarcoma virus (FBR-MuSV) ubiquitously expressed
fibrosin
F-box protein 3
F-box protein 31
fem-1 homolog c (C. elegans)
fibroblast growth factor receptor 1
fibroblast growth factor (acidic) intracellular binding protein

flavin containing monooxygenase 2 (non-functional)
formin binding protein 4
fibronectin type III domain containing 8
forkhead box C2 (MFH-1, mesenchyme forkhead 1)
forkhead box J2
forkhead box Q1
FRY-like
follistatin
follistatin-like 4
far upstream element (FUSE) binding protein 1
GRB2-associated binding protein 1
GRB2-associated binding protein 1
phosphoribosylglycinamide formyltransferase, phosphoribosylglycinamide synthetase,
GATA binding protein 2
GATA binding protein 6
GATA zinc finger domain containing 2B
glucosaminyl (N-acetyl) transferase 2, I-branching enzyme (I blood group)
glucosaminyl (N-acetyl) transferase 2, I-branching enzyme (I blood group)
ganglioside-induced differentiation-associated-protein 10
golgi associated, gamma adaptin ear containing, ARF binding protein 1
GLI family zinc finger 3
glyoxalase I
glyoxalase I
glyoxalase I
glutaminase
glutamate-ammonia ligase (glutamine synthetase)
predicted gene 9853
glucocorticoid modulatory element binding protein 2
GDP-mannose pyrophosphorylase A
guanine nucleotide binding protein (G protein), alpha 13
guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 1
guanine nucleotide binding protein (G protein), beta polypeptide 2-like 1
guanine nucleotide binding protein-like 3 (nucleolar)
gon-4-like (C. elegans)
glypican 4
glycerol-3-phosphate dehydrogenase 1 (soluble)
G protein-coupled receptor 116
G protein-coupled receptor 152
G protein-coupled receptor 19
G protein pathway suppressor 2
GRP1 (general receptor for phosphoinositides 1)-associated scaffold protein
G protein-coupled receptor kinase 6
GrpE-like 2, mitochondrial (E. coli)
glutathione S-transferase mu 5
glutathione S-transferase mu 5
glutathione S-transferase mu 5
glycosyltransferase-like domain containing 1
GTP binding protein 4

phosphoinositide-interacting regulator of transient receptor potential channels
ribosomal protein L36a pseudogene 8
headcase homolog (Drosophila)
HECT domain containing 1
histone cluster 1, H1c
histone cluster 1, H1c
heterogeneous nuclear ribonucleoprotein A1
heterogeneous nuclear ribonucleoprotein K
heterogeneous nuclear ribonucleoprotein K
heterogeneous nuclear ribonucleoprotein L
heterogeneous nuclear ribonucleoprotein D-like
heparan sulfate 6-O-sulfotransferase 1
hydroxysteroid (17-beta) dehydrogenase 7
galectin-related protein
HtrA serine peptidase 3
isocitrate dehydrogenase 1 (NADP+), soluble
isocitrate dehydrogenase 2 (NADP+), mitochondrial
isocitrate dehydrogenase 2 (NADP+), mitochondrial
intraflagellar transport 57 homolog (Chlamydomonas)
insulin-like growth factor 1 receptor
insulin-like growth factor 1 receptor
interleukin 1 receptor, type I
interleukin 6 receptor
inhibitor of growth family, member 1
inhibitor of growth family, member 5
INO80 complex subunit D
inositol polyphosphate-5-phosphatase K
insulin receptor
inositol hexakisphosphate kinase 1
interleukin-1 receptor-associated kinase 3
insulin receptor substrate 1
insulin receptor substrate 2
iroquois homeobox 3
iron-sulfur cluster scaffold homolog (E. coli)
integrin alpha FG-GAP repeat containing 2
integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)
integrin, beta 5
integrin, beta 5
integrin, beta 5
inter-alpha (globulin) inhibitor H3
inositol 1,4,5-triphosphate receptor interacting protein
Janus kinase 1
junctophilin 1
potassium channel modulatory factor 1
potassium voltage-gated channel, Isk-related family, member 4
potassium voltage-gated channel, subfamily F, member 1
potassium voltage-gated channel, subfamily H (eag-related), member 2

KIAA0355
KIAA0415
KIAA0664
KIAA0774
KIAA0774
KIAA1704
kinesin family member 1B
kinesin family member 1B
Kruppel-like factor 9
Kruppel-like factor 9
Kruppel-like factor 9
Kruppel-like factor 9
kelch-like 24 (Drosophila)
kelch-like 7 (Drosophila)
kelch-like 7 (Drosophila)
KRAB-A domain containing 1
KRI1 homolog (S. cerevisiae)
kinectin 1 (kinesin receptor)
lactate dehydrogenase B
lactate dehydrogenase B
lactate dehydrogenase B
lectin, galactoside-binding, soluble, 7
lipoic acid synthetase
LIM domains containing 1
LIM domains containing 1
lipopolysaccharide-induced TNF factor
LMBR1 domain containing 1
similar to hCG2036949
ribosomal protein S18 pseudogene 5
ribosomal protein S18 pseudogene 5
hypothetical protein LOC255783
ribosomal protein L10 pseudogene 16
ribosomal protein L13 pseudogene 12
ribosomal protein L13 pseudogene 12
ribosomal protein L13 pseudogene 12
lipoprotein lipase
leucine-rich alpha-2-glycoprotein 1
low density lipoprotein receptor-related protein 10
low density lipoprotein receptor-related protein 4
low density lipoprotein receptor-related protein associated protein 1
low density lipoprotein receptor-related protein associated protein 1
leucine rich repeat containing 8 family, member A
lanosterol synthase (2,3-oxidosqualene-lanosterol cyclase)
LYR motif containing 4
leucine zipper, putative tumor suppressor 2
MAF1 homolog (S. cerevisiae)
metastasis associated lung adenocarcinoma transcript 1 (non-protein coding)

mitogen-activated protein kinase kinase 3
microtubule-associated protein 7
membrane-associated ring finger (C3HC4) 7
membrane-associated ring finger (C3HC4) 7
MAP/microtubule affinity-regulating kinase 4
matrin 3
methylcrotonoyl-Coenzyme A carboxylase 1 (alpha)
minichromosome maintenance complex component 3
minichromosome maintenance complex component 7
mast cell protease 8
microspherule protein 1
MyoD family inhibitor
mediator complex subunit 1
mediator complex subunit 15
mediator complex subunit 15
mediator complex subunit 16
myocyte enhancer factor 2D
Meis homeobox 2
methionyl aminopeptidase 2
methyltransferase like 1
MAP kinase interacting serine/threonine kinase 2
makorin ring finger protein 2
myeloid/lymphoid or mixed-lineage leukemia 4
myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 10
myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 6
MLX interacting protein
matrix metallopeptidase 14 (membrane-inserted)
matrix metallopeptidase 3 (stromelysin 1, progelatinase)
MOCO sulphurase C-terminal domain containing 2
MPV17 mitochondrial membrane protein-like 2
myelin protein zero-like 1
mitochondrial ribosomal protein S10
mitochondrial ribosomal protein S9
MSTP150
metallothionein 1F
methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 1, methenyltetrahydrofolate
myotubularin related protein 9
metastasis suppressor 1
myosin, heavy chain 6, cardiac muscle, alpha
myosin, heavy chain 6, cardiac muscle, alpha
myosin regulatory light chain interacting protein
myosin VA (heavy chain 12, myoxin)
myomesin (M-protein) 2, 165kDa
myomesin (M-protein) 2, 165kDa
N-6 adenine-specific DNA methyltransferase 1 (putative)
neural cell adhesion molecule 1
nuclear receptor co-repressor 1

NIMA (never in mitosis gene a)-related kinase 7
nuclear factor (erythroid-derived 2)-like 2
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, beta
nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, zeta
nuclear factor related to kappaB binding protein
nerve growth factor receptor (TNFRSF16) associated protein 1
NHP2 ribonucleoprotein homolog (yeast)
nidogen 1
ninjurin 1
nischarin
nischarin
nischarin
NK2 transcription factor related, locus 5 (Drosophila)
N-myristoyltransferase 2
nicotinamide nucleotide transhydrogenase
NOP56 ribonucleoprotein homolog (yeast)
nucleoside phosphorylase
nucleoside phosphorylase
nuclear protein, ataxia-telangiectasia locus
neuronal pentraxin receptor
nuclear receptor subfamily 2, group C, member 2
nebulin-related anchoring protein
nuclear receptor binding protein 2
nurim (nuclear envelope membrane protein)
neurexin 2
nuclear receptor binding SET domain protein 1
netrin 1
negative regulator of ubiquitin-like proteins 1
nucleotide binding protein 2 (MinD homolog, E. coli)
ornithine decarboxylase antizyme 2
outer dense fiber of sperm tails 2
opioid receptor, mu 1
optineurin
origin recognition complex, subunit 6 like (yeast)
osteosarcoma amplified 9, endoplasmic reticulum lectin
osteosarcoma amplified 9, endoplasmic reticulum lectin
oxysterol binding protein
poly(A) binding protein, nuclear 1
poly(A)binding protein nuclear-like 1
PAN2 poly(A) specific ribonuclease subunit homolog (S. cerevisiae)
pantothenate kinase 1
pantothenate kinase 2
poly (ADP-ribose) polymerase family, member 4
POZ (BTB) and AT hook containing zinc finger 1

pre-B-cell leukemia homeobox interacting protein 1
poly(rC) binding protein 2
PDGFA associated protein 1
pyruvate dehydrogenase kinase, isozyme 1
pyruvate dehydrogenase kinase, isozyme 1
pyruvate dehydrogenase phosphatase regulatory subunit
pyruvate dehydrogenase phosphatase regulatory subunit
pyridoxal-dependent decarboxylase domain containing 1
PDZ domain containing 2
PDZ domain containing 2
period homolog 1 (Drosophila)
phosphoglycolate phosphatase
progesterone receptor membrane component 2
PHD finger protein 15
PHD finger protein 3
phosphorylase kinase, gamma 2 (testis)
phosphatase, orphan 2
phosphatidylinositol 4-kinase type 2 alpha
protein inhibitor of activated STAT, 2
progesterone immunomodulatory binding factor 1
phosphoinositide-3-kinase, regulatory subunit 2 (beta)
pim-3 oncogene
phosphatidylinositol-5-phosphate 4-kinase, type II, beta
phosphatidylinositol transfer protein, beta
phosphatidylinositol transfer protein, beta
PBX/knotted 1 homeobox 1
plakophilin 2
pleiomorphic adenoma gene-like 2
phospholipase C-like 2
pleckstrin homology domain containing, family G (with RhoGef domain) member 3
perilipin 3
perilipin 4
phospholipid scramblase 1
plexin B2
patatin-like phospholipase domain containing 2
patatin-like phospholipase domain containing 7
polymerase (DNA-directed), delta interacting protein 3
polymerase (RNA) I polypeptide D, 16kDa
polymerase (RNA) II (DNA directed) polypeptide A, 220kDa
polymerase (RNA) III (DNA directed) polypeptide A, 155kDa
P450 (cytochrome) oxidoreductase
periphilin 1
protein phosphatase 1, regulatory (inhibitor) subunit 13 like
protein phosphatase 1, regulatory (inhibitor) subunit 13 like
protein phosphatase 1, regulatory (inhibitor) subunit 13 like
protein phosphatase 2 (formerly 2A), catalytic subunit, alpha isoform
PQ loop repeat containing 1

protein kinase, AMP-activated, beta 1 non-catalytic subunit
protein kinase, AMP-activated, gamma 1 non-catalytic subunit
protein kinase C, eta
prominin 1
PRP19/PSO4 pre-mRNA processing factor 19 homolog (S. cerevisiae)
PRP19/PSO4 pre-mRNA processing factor 19 homolog (S. cerevisiae)
PRP40 pre-mRNA processing factor 40 homolog B (S. cerevisiae)
proline-rich coiled-coil 1
phosphoserine aminotransferase 1
pregnancy specific glycoprotein 16
proteasome (prosome, macropain) 26S subunit, non-ATPase, 4
pentatricopeptide repeat domain 1
prostaglandin-endoperoxide synthase 1 (prostaglandin G/H synthase and cyclooxygenase)
protein tyrosine phosphatase, receptor type, N polypeptide 2
PWP1 homolog (S. cerevisiae)
PWP2 periodic tryptophan protein homolog (yeast)
quaking homolog, KH domain RNA binding (mouse)
quaking homolog, KH domain RNA binding (mouse)
quaking homolog, KH domain RNA binding (mouse)
quaking homolog, KH domain RNA binding (mouse)
serine/threonine-protein kinase QSK
serine/threonine-protein kinase QSK
recombination activating gene 1 activating protein 1
RAN binding protein 3
Rap guanine nucleotide exchange factor (GEF) 3
RASD family, member 2
RASD family, member 2
RNA binding motif protein 20
RNA binding motif protein 25
RNA binding motif protein 33
RNA binding motif protein 39
RNA binding motif protein 42
RNA binding motif protein 43
RNA binding motif protein, X-linked
RNA binding protein with multiple splicing
RNA binding protein with multiple splicing
REST corepressor 3
v-rel reticuloendotheliosis viral oncogene homolog A (avian)
RALBP1 associated Eps domain containing 1
RE1-silencing transcription factor
RE1-silencing transcription factor
REV3-like, catalytic subunit of DNA polymerase zeta (yeast)
Ras homolog enriched in brain like 1
RAP1 interacting factor homolog (yeast)
RIO kinase 3 (yeast)
RIO kinase 3 (yeast)
Ras-like without CAAX 1

ring finger protein 166
ribonuclease/angiogenin inhibitor 1
RNA (guanine-7-) methyltransferase
RAR-related orphan receptor A
ribosomal protein L10A
ribosomal protein L12
ribosomal protein L13a
ribosomal protein L13a
ribosomal protein L13a
ribosomal protein L18a
ribosomal protein L19
ribosomal protein L27
ribosomal protein L27a
ribosomal protein L28
ribosomal protein L29
ribosomal protein L29
ribosomal protein L29
ribosomal protein L30
ribosomal protein L31
ribosomal protein L32
ribosomal protein L35
ribosomal protein L36
ribosomal protein L36
ribosomal protein L36
ribosomal protein L38
ribosomal protein L5
ribosomal protein L6
ribosomal protein L9
ribonuclease P/MRP 25kDa subunit
regulation of nuclear pre-mRNA domain containing 2
ribosomal protein S12
ribosomal protein S12
ribosomal protein S13
ribosomal protein S14
ribosomal protein S16
ribosomal protein S16
ribosomal protein S21
ribosomal protein S24
ribosomal protein S27
ribosomal protein S27
ribosomal protein S28
ribosomal protein S28
ribosomal protein S28
ribosomal protein S5
ribosomal protein S6
Ras-related GTP binding D

SET binding factor 2
strawberry notch homolog 2 (Drosophila)
suprabasin
sodium channel, voltage-gated, type VII, alpha
sodium channel, voltage-gated, type VII, alpha
syndecan 4
selenium binding protein 1
selenium binding protein 1
sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3G
serpin peptidase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 7
SEC14 and spectrin domains 1
SET domain containing 1B
SET domain containing 1B
SET domain containing 2
splicing factor 1
splicing factor 3b, subunit 2, 145kDa
splicing factor 4
Scm-like with four mbt domains 1
splicing factor, arginine/serine-rich 2, interacting protein
splicing factor, arginine/serine-rich 5
splicing factor, arginine/serine-rich 6
splicing factor, arginine/serine-rich 6
splicing factor, arginine/serine-rich 8 (suppressor-of-white-apricot homolog, Drosophila)
sideroflexin 2
SHANK-associated RH domain interactor
shroom family member 2
seven in absentia homolog 1 (Drosophila)
SID1 transmembrane family, member 2
sirtuin (silent mating type information regulation 2 homolog) 7 (S. cerevisiae)
solute carrier family 10 (sodium/bile acid cotransporter family), member 6
solute carrier family 25, member 28
solute carrier family 25 (mitochondrial carrier; phosphate carrier), member 3
solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 4
solute carrier family 2 (facilitated glucose transporter), member 8
solute carrier family 30, member 10
solute carrier family 38, member 1
solute carrier family 38, member 1
solute carrier family 3 (activators of dibasic and neutral amino acid transport), member 2
solute carrier family 41, member 1
solute carrier family 45, member 4
solute carrier family 6 (neurotransmitter transporter, creatine), member 8
solute carrier family 7 (cationic amino acid transporter, y+ system), member 5
solute carrier organic anion transporter family, member 2A1
SLU7 splicing factor homolog (S. cerevisiae)
SMAD family member 4
small ArfGAP 1

SET and MYND domain containing 4
snail homolog 1 (Drosophila)
small nuclear ribonucleoprotein 70kDa (U1)
small nuclear ribonucleoprotein polypeptide A'
small nuclear ribonucleoprotein polypeptide N
SNW domain containing 1
sorting nexin 33
suppressor of cytokine signaling 2
suppressor of cytokine signaling 2
superoxide dismutase 1, soluble
SON DNA binding protein
SON DNA binding protein
SRY (sex determining region Y)-box 10
spen homolog, transcriptional regulator (Drosophila)
spastic paraplegia 7 (pure and complicated autosomal recessive)
spinster homolog 2 (Drosophila)
steroid receptor RNA activator 1
sterol regulatory element binding transcription factor 1
sorcin
spermidine synthase
signal recognition particle 68kDa
serine/arginine repetitive matrix 1
slingshot homolog 3 (Drosophila)
ST3 beta-galactoside alpha-2,3-sialyltransferase 3
suppression of tumorigenicity 5
ST8 alpha-N-acetyl-neuraminide alpha-2,8-sialyltransferase 1
SH3 and cysteine rich domain
stromal antigen 1
suppressor of Ty 16 homolog (S. cerevisiae)
suppressor of Ty 5 homolog (S. cerevisiae)
suppressor of variegation 4-20 homolog 1 (Drosophila)
syncollin
synaptogyrin 1
SYS1 Golgi-localized integral membrane protein homolog (S. cerevisiae)
synaptotagmin XVII
TATA box binding protein (TBP)-associated factor, RNA polymerase I, C, 110kDa
TBC1 domain family, member 15
TBC1 domain family, member 20
TBC1 domain family, member 4
tubulin folding cofactor E-like
tubulin folding cofactor E-like
T-box 4
transcription elongation factor B (SIII), polypeptide 3 (110kDa, elongin A)
transcription factor 25 (basic helix-loop-helix)
transcription factor 25 (basic helix-loop-helix)
tensin like C1 domain containing phosphatase (tensin 2)

thymidine kinase 2, mitochondrial
tousled-like kinase 2
transmembrane 9 superfamily member 2
transmembrane and coiled-coil domains 4
transmembrane emp24 domain trafficking protein 2
transmembrane protein 159
transmembrane protein 203
transmembrane protein 5
transmembrane protein 71
thymopoietin
transmembrane and tetratricopeptide repeat containing 1
transmembrane and tetratricopeptide repeat containing 1
thioredoxin-related transmembrane protein 1
thioredoxin-related transmembrane protein 1
tankyrase, TRF1-interacting ankyrin-related ADP-ribose polymerase
troponin T type 2 (cardiac)
trinucleotide repeat containing 6A
trinucleotide repeat containing 6A
trinucleotide repeat containing 6A
trinucleotide repeat containing 6A
trinucleotide repeat containing 6A
trinucleotide repeat containing 6A
trinucleotide repeat containing 6A
tensin 1
transducer of ERBB2, 2
transducer of ERBB2, 2
target of EGR1, member 1 (nuclear)
target of myb1 (chicken)
tumor protein p53 inducible nuclear protein 1
tumor protein D52-like 1
tripartite motif-containing 28
thyroid hormone receptor interactor 10
TRM1 tRNA methyltransferase 1 homolog (S. cerevisiae)
TRM1 tRNA methyltransferase 1 homolog (S. cerevisiae)
tRNA methyltransferase 6 homolog (S. cerevisiae)
transient receptor potential cation channel, subfamily C, member 4 associated protein
tetraspanin 4
tetratricopeptide repeat domain 39B
tetratricopeptide repeat domain 5
tubulin tyrosine ligase-like family, member 11
titin
twinfilin, actin-binding protein, homolog 2 (Drosophila)
TWIST neighbor
thioredoxin-like 4A
ubiquitin A-52 residue ribosomal protein fusion product 1
ubiquitin A-52 residue ribosomal protein fusion product 1

upstream transcription factor 2, c-fos interacting
ubiquitin specific peptidase 2
ubiquitin specific peptidase 2
ubiquitin specific peptidase 30
ubiquitin specific peptidase 30
ubiquitin specific peptidase 36
ubiquitin specific peptidase 54
ubiquitin specific peptidase 7 (herpes virus-associated)
vascular endothelial zinc finger 1
vacuolar protein sorting 11 homolog (S. cerevisiae)
vacuolar protein sorting 13 homolog D (S. cerevisiae)
vacuolar protein sorting 26 homolog A (S. pombe)
vacuolar protein sorting 37 homolog C (S. cerevisiae)
WAS protein family homolog 1
WW domain binding protein 2
WD repeat domain 43
WD repeat domain 74
WD repeat domain 85
Wolf-Hirschhorn syndrome candidate 1
widely interspaced zinc finger motifs
wingless-type MMTV integration site family, member 11
Wilms tumor 1 interacting protein
WW and C2 domain containing 2
xeroderma pigmentosum, complementation group C
exportin 5
Yip1 domain family, member 1
Yip1 domain family, member 4
YjeF N-terminal domain containing 3
yrdC domain containing (E. coli)
zinc finger and BTB domain containing 22
zinc finger and BTB domain containing 33
zinc finger, CCHC domain containing 11
zinc finger, CCHC domain containing 14
zinc finger, CCHC domain containing 3
zinc finger, DHHC-type containing 4
zinc finger, FYVE domain containing 27
zinc finger with KRAB and SCAN domains 5
zinc finger, MYM-type 5
zinc finger protein 143
zinc finger protein 251
zinc finger protein 326
zinc finger protein 346
zinc finger protein 384
zinc finger protein 394
zinc finger protein 436
zinc finger protein 496

Supplemental Table 6

Locus Name	Primer Sequences
TATA-box-binding protein	forward - 5' CCCCACAACTCTTCCATTCT 3'
	reverse - 5' GCAGGAGTGATAGGGGTCAT 3'
β-Actin	forward - 5' GACATGGAGAAGATCTGGCA 3'
	reverse - 5' GGTCTCAAACATGATCTGGGT 3'
Cytochrome C (1st pair)	forward - 5' ACCAAATCTCCACGGTCTGTT 3'
	reverse - 5' GGATTCTCCAAATACTCCATCAG 3'
Cytochrome C (2nd pair)	forward - 5' CAACTTTCCAGGGCACATTT 3'
	reverse - 5' GCTGGCCTTGAACTCAGAAA 3'
ATP synthase (1st pair)	forward - 5' TCTCGGCCAGAGACTAGGAC 3'
	reverse - 5' GCACCTGCACCAATGAATTT 3'
ATP synthase (2nd pair)	forward - 5' CAGGTGCTGCAACAGTAGGA 3'
	reverse - 5' GCTTCAGACAAGGCAAATCC 3'
cytochrome c oxidase subunit 6 (1st pair)	forward - 5' GTAACGCTACTCCGGGACAA 3'
	reverse - 5' TCCAGGTAGTTCTGCCAACA 3'
cytochrome c oxidase subunit 6 (2nd pair)	forward - 5' AGTCCCTCTGTCCCGTGTC 3'
	reverse - 5' ATATGCTGAGGTCCCCCTTT 3'
cytochrome c oxidase subunit 5a	forward - 5' CTCGTCAGCCTCAGCCAGT 3'
	reverse - 5' TAGCAGCGAATGGAACAGAC 3'
PGC1α (1st pair)	forward - 5' CCCTGCCATTGTTAAGACC 3'
	reverse - 5' TGCTGCTGTTCCTGTTTTC 3'
PGC1α (2nd pair)	forward - 5' GAGTCTGAAAGGGCCAAACA 3'
	reverse - 5' TGCATTCCTCAATTTCACCA 3'
PGC1β (1st pair)	forward - 5' GGACGCCAGTGACTTTGACT 3'
	reverse - 5' TTCATCCAGTTCTGGGAAGG 3'
PGC1β (2nd pair)	forward - 5' GCTCTGATCACTGCCCCTAC 3'
	reverse - 5' TGTATACCACACGGCCTTCA 3'
ERRα	forward - 5' CCTCTTGAAGAAGGCTTTGCA 3'
	reverse - 5' GCAGGGCAGTGGGAAGCTA 3'
NRF-1	forward - 5' GAACTGCCAACCACAGTCAC 3'
	reverse - 5' TTTGTTCCACCTCTCCATCA 3'
TFAM	forward - 5' AATGTGGAGCGTGCTAAAAGC 3'
	reverse - 5' GCTGAACGAGGTCTTTTTGGT 3'

mitochondrial DNA quantification by qPCR

Mitochondrial primers	
COXIF	CTGAGCGGGAATAGTGGGTA
COXIR	TGGGGCTCCGATTATTAGTG
CytBF	ATTCCTTCATGTCGGACGAG
CytBR	ACTGAGAAGCCCCCTCAAAT
Genomic primers	
H19R	GTCCACGAGACCAATGACTG
H19F	GTACCCACCTGTCGTCC
B1globinF	GCACCTGACTGATGCTGAGAA
B1globinR	TTCATCGGCGTTCACCTTTCC

ChIP primers

PGC-1 α- -564
TCATGGATGTGCTGGGTTAG- forward
CAGATGGTTGCTTGCACTAGA- reverse

PGC-1 α- -954
CCACGGAAAGAATCATGAGG- forward
AACCGCCACATTTGTTTAGG- reverse

PGC-1β -1616
AACCGTCCAGCCTTTTCAGT- forward
TCAGCCTCCCTTGTACCTTG-reverse

PGC-1β -1030
GTGCCGGAACAAAAGGTAGT-forward
CCAGCACGCTTTTAAGGAAC- reverse