## Supporting online material

## **Materials and Methods**

Generation of mice lacking XBP1 in the liver (Xbp1 $\Delta$ ). Xbp1<sup>flox</sup> mice harboring loxP sites in the first and second intron of the Xbp1 gene (S1) were crossed with Mx1-cre mice (S2) that express interferon-dependent cre recombinase. 5-6 weeks old mice were intraperitoneally injected 1 or 3 times with 250 µg of poly(I:C) each time with 2 days intervals to induce the cre expression. Mice were used for experiments at least 2-3 weeks after the final poly(I:C) injection. Cre-mediated recombination removes exon 2 of Xbp1 gene to induce alternative splicing between exon 1 and 3 of XBP1 mRNA, resulting in a reading frame shift and introduction of a translational termination codon. Intraperitoneal poly(I:C) injection efficiently deleted the floxed exon 2 in liver as determined by Southern blot (Fig. S1a). The XBP1 $\Delta$  mRNA was slightly smaller than the WT mRNA due to the lack of exon 2, as confirmed by Northern blot, RT-PCR and DNA sequencing analysis of the mutant transcript (Fig. S1b). Lack of XBP1 protein in Xbp1 $\Delta$  liver was confirmed by Western blot (Fig. S1c). Mice backcrossed for more than five generations onto C57BL/6 background were used in most experiments, except for those in Table S1, Figure 2a and 2b, where mice on a SV129 and C57BL/6 mixed background were used. Sex-matched Xbp1<sup>f/f</sup> littermates injected with poly(I:C) were used as WT controls throughout the study.

**Tunicamycin injection.** Tunicamycin diluted in 150 mM dextrose at 100 µg/ml was intraperitoneally injected at 1g/Kg body weight.

**Diet studies.** Mice were housed in a specific pathogen free facility at the Harvard School of Public Health on a 12h light/dark cycle and had free access to standard rodent chow diet or 60% fructose diet (Harlan Teklad TD.8820).

**Northern blot and real time PCR analysis.** Total RNA isolation, Northern blot and real time PCR analysis were performed as described previously (*S3, S4*). Primers for the real time PCR analysis are described in supplementary table 2 or elsewhere (*S4*). Probes for Northern blot were generated with PCR amplified cDNA pieces for each gene by using primers shown in supplementary table 3. IRE1 splicing of XBP-1 mRNA was measured by RT-PCR analysis as described previously (*S5*).

**Nuclear extracts and Western blot**. Nuclear extracts from the liver were prepared as described with modifications (*S6*). Briefly, pieces of the liver (~0.5 g) were homogenized in 3 ml homogenization buffer (10 mM Hepes, pH 7.9, 10 mM KCl, 0.1 mM EDTA, 0.74 mM Spermidine, 1 mM DTT, 0.3 M sucrose, protease inhibitor mix (Roche)) with Polytron, mixed with 6 ml of the cushion buffer (10 mM Hepes, pH 7.9, 0.1 mM EDTA, 0.74 mM Spermidine, 1 mM DTT, 2.2 M sucrose, 2  $\mu$ g/ml aprotinin, 2  $\mu$ g/ml leupeptin) and then overlayed on 2 ml cushion buffer. Nuclei were precipitated by 60 min centrifugation at 77,000g, and lysed in RIPA buffer (50 mM Tris pH 7.4, 150 mM NaCl, 1 mM EDTA, 1% Triton X-100, 1% sodium deoxycholate, 0.1% SDS). Lysates were briefly sonicated and cleared by centrifugation for 5 min. Nuclear extracts from cultured hepatocytes were prepared as described previously (*S7*). Western blot analyses on nuclear extracts were performed with rabbit polyclonal anti-XBP-1, ATF6 $\alpha$  (gift of Dr. K. Mori),

Sp1 (Santa cruz), SREBP-1 and SREBP-2 antibodies (gift of Dr. J. Goldstein). IRE1 $\alpha$  proteins in the liver were detected by Western blot with rabbit polyclonal anti-IRE1 $\alpha$  antibody (gift of the Mannkind Corp.) following immunoprecipitation with the same antibody from 500 µg of the liver lysates prepared in a lysis buffer (1% NP-40, 30 mM Tris, pH 7.5, 150 mM NaCl, 50 mM sodium fluoride, 10 mM sodium orthophosphate, 1 µg/ml aprotinin, 2 µg/ml leupeptin). In some experiments, immunoprecipitation products were resuspended in a buffer for  $\lambda$  phosphatase (NEB) treatment for 30 min before Western blot analysis. Whole liver lysates prepared in 1% NP-40 lysis buffer were used for the western blot of total JNK with specific antibody (Cell signaling). JNK kinase activity in liver lysates was measured using the SAPK/JNK kinase assay kit (Cell Signaling). ApoB-100 protein species in plasma were detected by using monoclonal ApoB-100 antibody (*S8*).

**Histology and TEM.** Pieces of the liver fixed in 10% neutral buffered formalin were embedded in paraffin and stained with hematoxylin and eosin. Frozen sections were stained with oil Red O. TEM was performed as described previously (*S4*).

**Blood chemistries and lipid analysis.** Plasma triglyceride and cholesterol levels in the fed state were measured by using commercial kits (Sigma, TR0100; Roche Diagnostics; Molecular probes, A12216). Blood glucose concentrations were measured by using ACCU-Check glucometer (Roche). Serum ALT and albumin levels were measured by using commercial reagents (Bioquant). For VLDL secretion assays, mice were fasted for 4 hrs, and retro-orbitally injected with 0.5 mg/Kg Tyloxapol (Sigma). Tail bleedings were performed at indicated time points for plasma triglyceride measurements. The distribution of cholesterol in plasma was determined by fast performance liquid chromatography (FPLC) separation followed by TG and cholesterol assays of each fraction as described previously (*S9*). Lipid composition in the liver was determined by TrueMass Lipomics analysis (Lipomics) after pooling liver pieces from 4 mice/group.

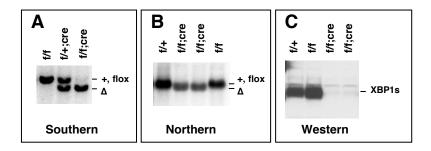
**Mouse primary hepatocytes and pulse-chase experiments.** Mouse primary hepatocytes were isolated by perfusion followed by collagenase digestion by using commercial reagents (Invitrogen). Cells were resuspended in M199 media supplemented with 5% fetal bovine serum, plated at a density of  $1.2 \times 10^6$  cells per 60 mm positively-charged Primaria<sup>®</sup> dish (Becton Dickinson) and allowed to attach for 6~7 hrs. Cells were washed and cultured for 30 min in methionine and cysteine-free DMEM supplemented with 10% dialysed fetal bovine serum, and then labeled with the same media containing 100 µCi/ml <sup>35</sup>S-methionine/cysteine for 30 min. Media was changed with M199 containing both methionine and cysteine and 5% fetal bovine serum. Media and cells were harvested at the indicated times for immunoprecipitation. Cells were lysed in a buffer containing 1% NP-40, 30 mM Tris, pH 7.5, 150 mM NaCl. ApoB protein species were immunoprecipitated with goat anti-ApoB antibody (Chemicon), washed three times with lysis buffer, and run on 5% SDS-PAGE gels. Gels were treated with Amplify<sup>®</sup> (Amersham), dried and exposed to a phosphorimager screen.

**Lipid synthesis.** The rates of fatty acids and sterol synthesis were measured as described previously (*S10*). Primary hepatocytes plated in 60 mm dishes were cultured in the presence of 1.5  $\mu$ l of [1-<sup>14</sup>C]acetate (57.5 mCi/mmol, Sigma) for 17 h. Cells were washed

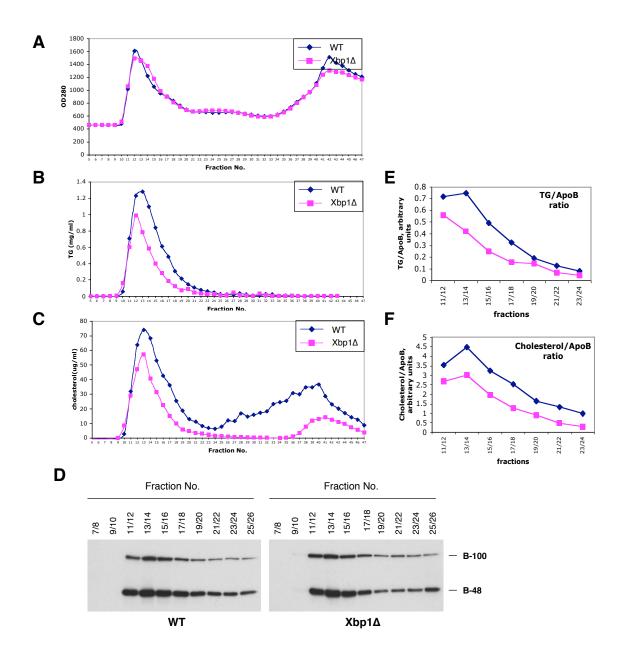
twice with PBS, resuspended in 1 ml PBS and mixed with 2.5 ml of 7% potassium hydroxide in 70% methanol. After incubation for 3h at 95 °C, sterols were extracted three times with 3.5 ml petroleum ether. The remaining aqueous phase was mixed with 0.47 ml of sulfuric acid and extracted three times with 3.5 ml petroleum ether for fatty acids. The organic phase was dried under low heat, and measured for  $[^{14}C]$  level using a liquid scintillation counter.

**Recombinant adenoviruses.** XBP-1s cDNA was cloned into pAdTRACK-cmv shuttle vector (*S11*). Recombinant adenoviral DNA was generated by homologous recombination by transforming BJ5183-AD1 competent cells (Stratagene) with the shuttle vector. Adenoviral DNAs were linearized using PacI and then transfected into HEK-293 cells with Lipofectamine 2000 reagents (Invitrogen) to produce recombinant viruses. Infected cells were lysed by three cycles of freezing and thawing and then centrifuged. Viral titer was determined by infecting HEK-293 cells with serially diluted viral stock and counting GFP positive cells 24 hrs after infection. Primary hepatocytes were infected with recombinant adenoviruses at 2 or 10 pfu per cell. Total RNAs were prepared from virus-infected hepatocytes 24 hrs later by using Trizol reagent (Invitrogen).

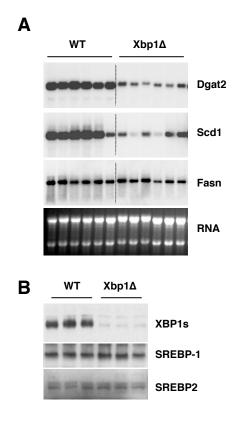
**Chromatin immunoprecipitation (CHIP) assay.** Nuclei were isolated from ~0.5g of liver tissue by centrifugation on 2.2 M sucrose cushion as described above. CHIP assays were performed as described previously (*S12*) with some modifications. Briefly, purified nuclei were resuspended in 1 ml PBS containing 1.4% formaldehyde and incubated at room temperature for 15 min to cross-link protein to DNA. Cross-linked nuclei were washed twice with PBS and once with IP buffer (1% NP-40, 30 mM Tris, pH 7.5, 150 mM NaCl, 1 µg/ml aprotinin, 2 µg/ml leupeptin). Lysates were sonicated and immunoprecipitated with rabbit polyclonal anti-XBP-1 antibody or control rabbit serum. Immune complexes were precipitated by using protein A-agarose (Roche) and washed 5 times with IP buffer. Immunoprecipitated genomic DNA was eluted by boiling for 10 min in 10% Chlex 100 beads (Bio-Rad) and then used for real time PCR with primers designed to amplify proximal promoter regions (Supplementary Table 4). Acc2 promoter II was predicted by aligning the mouse genomic DNA sequences with the reported human Acc2 promoter sequences (*S13*).



**Fig. S1. Characterization of Xbp1** $\Delta$  mice. (A) Southern blot analysis of the genomic DNA from liver. Xbp1<sup>f/f</sup>, Xbp1<sup>f/+</sup>;Mx1-cre and Xbp1<sup>f/f</sup>;Mx1-cre mice were injected three times with poly(I:C) and genomic DNA was prepared two weeks later. Bands representing the floxed, WT (+), and deleted allele of the Xbp1 gene by cre-mediated recombination are indicated. (B) Northern blot analysis of the RNA from mice with indicated genotypes. Total liver RNAs were prepared two weeks after poly(I:C) injections. The mutant XBP-1 mRNA from the Xbp1 $\Delta$  allele is smaller than the WT due to the lack of the floxed exon 2 sequences (97 nt). (C) Liver nuclear extracts were prepared from poly(I:C) injected mice as in (B) and subjected to a western blot analysis with anti-XBP1 antibody.



**Fig. S2. FPLC analysis of lipoprotein particles.** Mice were fasted overnight and injected with Tyloxapol 3h prior to sacrifice to enrich plasma VLDL. Plasma pooled from two mice was fractionated by FPLC. Concentrations of total protein (A), TG (B) and cholesterol (C) in each fraction were determined. (D) Levels of apoB protein species were measured by western blot after combining neighboring two fractions as indicated. Concentrations of TG (E) and cholesterol (F) in each pooled fraction were plotted against total apoB content.



**Fig. S3. Expression of lipogenic genes and SREBP1 in the XBP1 deficient liver.** Total RNAs were prepared from livers of mice fed a standard rodent chow diet. (A) Northern blot analysis was performed to measure the expression of Dgat2, Scd1 and Fasn genes. Ethidium bromide staining of the gel is shown as a loading control. (B) Liver nuclear extracts were subjected to western blot analysis with anti-XBP1 and anti-SREBP-1 antibodies.

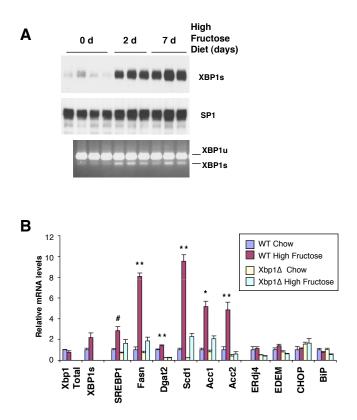


Figure S4. XBP1 activated by high fructose diet feeding, directly induces lipogenic genes in the liver. (A) XBP1s protein in the liver of mice fed high fructose diet was measured by Western blot. IRE1 splicing of XBP1 mRNA was measured by RT-PCR. (B) Expression of lipogenic genes was measured in the liver of mice fed standard chow or high fructose diet for 7 days. Values represent the abundance of each mRNA relative to WT mice fed chow diet. N=3-6. T tests were performed between high fructose diet-fed WT and Xbp1 $\Delta$  mice #, p=0.05.

	Before	poly(I:C)	After poly(I:C)		
	Xbp1ff	Xbp1ff;Mxcre	Xbp1ff	Xbp1ff;Mxcre	
Body weight (g)	ND	ND	42.0±1.1	39.7±0.8	
Liver weight (g)	ND	ND	2.07±0.14	1.97±0.11	
Liver/body	ND	ND	0.051±0.002	0.050±0.002	
Serum ALT (IU/L)	ND	ND	53±6	57±5	
Plasma insulin, fed (ng/ml)	ND	ND	1.1±0.06	$1.0 \pm 0.18$	
Blood glucose, fed (mg/dl)	ND	ND	124±4	128±4	
Serum protein (mg/ml)	39.8±0.6	39.5±0.7	40.7±1.3	$34.5\pm0.5^{a}$	
Serum albumin (mg/ml)	28.5±0.4	28.6±0.3	29.4±0.7	23.6±0.4 <sup>b</sup>	

Table S1. Changes in physiologic parameters by poly(I:C) treatment in WT and Xbp1 $\Delta$  mice

Male mice (5~6 weeks old, n=6~12) were injected with poly(I:C) three times, and fed a chow diet ad libitum. Experiments were performed three weeks after the last injection of poly(I:C). Values represent mean  $\pm$  SEM. Statistical significances of differences between WT and Xbp1 $\Delta$  were determined by student T tests. a, p=0.0003; b, p=0.00001.

Proce     WT     Kbp11     Folg     Ofference     Gene     Cene Title       1417191     1460  P     4623  P     0.5  D     Onagl (5.404) honolog, sublamity 6, member 3       1417191     1461  P     455  P     0.5  D     Onagl (5.404) honolog, sublamity 6, member 3       1419162     561  P     555  P     0.7  D     Onagl (5.404) honolog, sublamity 6, member 3       1419163     561  P     555  P     0.7  D     Onagl (5.404) honolog, sublamity 6, member 3       1449163     101  P     451  P     0.5  D     Draid (5.404) honolog, sublamity 6, member 3       1449763     144  A     154 HM     1.1 (NO. Odd3     Draid (5.404) honolog, sublamity 6, member 3       1428246     366  P     2859  P     0.6  D     Heyas     Heat shock 70kD protein 5 (glucose-regulated protein)       142844     287  P     277  P     0.8  D     Edemt 1 Heat shock 70kD protein 5 (glucose-regulated protein)       143844     127  P     277  P     0.8  D     Edemt 1 Heat shock 70kD protein 5 (glucose-regulated protein)       143844     127  P     0.8  D     Edemt 1 Heat shock 70kD protein 5 (glucose-regulated protein)	microarra	iy analys	es by us	sing Any	meuxm	louse 43	UA Chip.	. Data we	ere analyzed by GCOS1.4 software (Affymetrix).
Set ID     Segnal     Detection     Segnal     Detection     Call     Symbol     Detection       1419121     4091P     423     PM     0.6     Dnayl (Hsp40) homolog, subfamily C, member 3       1419123     5611P     5531P     0.7     Dnayl (Hsp40) homolog, subfamily C, member 3       143388     1617P     1759     6661P     0.6     Dnayl (Hsp40) homolog, subfamily C, member 3       14439373     1075P     6661P     0.6     Dnayl (Hsp40) homolog, subfamily C, member 3       1448373     3031P     1571P     0.5     Dnayl (Hsp40) homolog, subfamily C, member 3       1448353     0.001P     3981P     0.6     Dnayl (Hsp40) homolog, subfamily C, member 3       1448453     1044P     7051P     0.8     ArtA     activating transcription factor 4       1438928     6001P     3981P     0.8     ArtA     activating transcription factor 4       1438928     1034P     0.8     DE     Edmil ER degradation enhancer, mannosidase alpha-like 1       1438928     1034P     0.8     DE     Edmil ER degradation enhancer, mannosidase alpha-like 1	Probe	W	т	Xhr	<u>1</u> ۸		Differece	Gene	
1417910     7460     P     0.6 SD     Dng/b     Dnal/ (Hsp40) homolog, subfamily C, member 3       1419162     691     7.0 D     Dng/c     Dnal/ (Hsp40) homolog, subfamily C, member 3       1419163     591     535     P     0.7 D     Dng/c3     Dnal/ (Hsp40) homolog, subfamily C, member 3       1419162     696     0.6 D     Dng/c3     Dnal/ (Hsp40) homolog, subfamily C, member 3       1443573     3031     H57     0.6 D     Dng/c3     Dnal/ (Hsp40) homolog, subfamily C, member 3       1418044     6013     P     0.6 D     Hsp35     heat shock 70kD protein 5 (glucose regulated protein)       1428256     94     7.4     1.4 NC     Ark4     activating transcripton factor 4       1438382     1044     P     705 P     0.8 D     Ark4     activating transcripton factor 4       144335     1044     P     705 P     0.8 D     Edemt     ER degradation enhancer, mannosidase alpha-like 1       1424065     95 P     1034 P     0.8 D     Edemt     ER degradation enhancer, mannosidase alpha-like 1       1424042     703 P     0.8 D						change			Gene Title
1419162     601 P     409 P     0.6 D     Dnagl, (Hsp40) homolog, subtamity C, member 3       1419163     651 P     653 P     0.7 D     Dnagl, S     Dnagl, (Hsp40) homolog, subtamity C, member 3       143362     1677 P     165 P     0.7 D     Dnagl, S     Dnagl, (Hsp40) homolog, subtamity C, member 3       143362     1677 P     66 P     0.6 D     Dnagl, S     Dnagl, Hsp40) homolog, subtamity C, member 3       144804     031 P     151 P     0.6 D     Hsp43 P     Dnagl, S     Dnagl,								-	
1419163     601 P     635 P     0.7 D     Dnajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1449372     1075 P     666 P     0.6 D     Dnajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1449372     1075 P     666 P     0.6 D     Dnajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1416046     6019 P     4514 P     0.8 D     Hsp35     Hset Abox 70kD proteins 5 (ducces-regulated protein)       1416046     6019 P     4514 P     0.8 D     Atf4     achivating transcription factor 4       14389268     94     7.6 D     1.8 NC     Atf4     achivating transcription factor 4       1438443     2051 P     0.8 D     Atf6     activating transcription factor 4       1438443     1044 P     705 P     0.8 D     Edem1 ER degradation enhancer, mannosidase alpha-like 1       1424052     2938 P     105 P     1.1 NC     Protein disulfiel isomerase associated 3       1424047     173 P     0.8 D     Edem1 ER degradation enhancer, mannosidase alpha-like 1       1424048     162 P     1.1 NC     Protein disulfiel isomerase associdated 3       1424149 </td <td>1417191</td> <td>1460</td> <td>Р</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	1417191	1460	Р						
143387     1617 P     1159 P     0.7 D     Dnajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1449373     303 P     157 P     0.60 P     0.5 D     Dnajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1440373     303 P     157 P     0.6 D     Dhajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1416064     500 P     4514 P     0.6 D     Hspa5     heat shock 70kD protein 5 (glucose-regulated protein)       1427464     3469 P     2650 P     0.6 D     Andia     activating transcription factor 4       143882     600 P     277 P     0.9 NC     Andia     activating transcription factor 4       143844     267 P     277 P     0.9 NC     Andia     activating transcription factor 4       143242     303 P     301 P     0.8 D     Edemt     ER degradation enhancer, mannosidase alpha-like 1       143242     142405     160 P     1.5 I     P diad     protein disulfide isomerase associated 3       1416497     579 P     286 P     1.5 I     P diad     protein disulfide isomerase associated 4       1424560     160 P	1419162	691	P	409	Р	0.6	D	Dnajc3	DnaJ (Hsp40) homolog, subfamily C, member 3
143387     1617 P     1159 P     0.7 D     Dnajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1449373     303 P     157 P     0.60 P     0.5 D     Dnajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1440373     303 P     157 P     0.6 D     Dhajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1416064     500 P     4514 P     0.6 D     Hspa5     heat shock 70kD protein 5 (glucose-regulated protein)       1427464     3469 P     2650 P     0.6 D     Andia     activating transcription factor 4       143882     600 P     277 P     0.9 NC     Andia     activating transcription factor 4       143844     267 P     277 P     0.9 NC     Andia     activating transcription factor 4       143242     303 P     301 P     0.8 D     Edemt     ER degradation enhancer, mannosidase alpha-like 1       143242     142405     160 P     1.5 I     P diad     protein disulfide isomerase associated 3       1416497     579 P     286 P     1.5 I     P diad     protein disulfide isomerase associated 4       1424560     160 P	1419163	591	P	535	Р	0.7	D	Dnaic3	DnaJ (Hsp40) homolog, subfamily C, member 3
144927     1075 P     66 D     Dnajc3     Dnaj (Hsp40) homolog, subfamily C, member 3       1449373     303 P     157 P     0.6 D     Hspa5     heat shock 70kD protein 5 (glucose-regulated protein)       1416044     5019 P     4514 P     0.6 D     Hspa5     heat shock 70kD protein 5 (glucose-regulated protein)       1417516     144 A     154 M     1.1 NC     DdtA activating transcription factor 4       1439802     600 P     398 P     0.8 D     At4 activating transcription factor 4       1449315     1044 P     70 P     0.8 D     At4 activating transcription factor 4       1439802     806 P     707 P     0.8 D     At4 activating transcription factor 4       1439305     286 P     707 P     0.8 D     At4 activating transcription factor 4       1439305     286 P     1.5 D     P (tab) activating transcription factor 4       1439305     286 P     1.5 D     P (tab) activating transcription factor 4       1439405     1664 P     1.5 D     P (tab) activating transcription factor 4       1439405     1664 P     1.5 D     P (tab) activating transcription factor 4									
144927     303 P     157 P     0.5 D     Dnajc3     Dnajc3     Dnajc43     Dnajc43     Dnajc43     Dnajc43     Dnajc44     Net									
141604     5019 P     4514 P     0.8 D     Hspa5     heat shock 70kD protein 5 (glucose-regulated protein)       1417516     1444 A     154 M     1.1 NC     DotA damage indubite transcript 1       1417516     1444 A     154 M     1.1 NC     DotA damage indubite transcript 1       143892     600 P     388 P     0.8 D     Af4     activating transcription factor 4       143892     600 P     388 P     0.8 D     Af4     activating transcription factor 4       143928     604 P     705 P     0.8 D     Af4     activating transcription factor 4       143924     286 P     1.0 NC     Pd6     Af4     activating transcription factor 4       143944     287 PIP     2.8 D     Pd6     Pd6<									
1427464     3969     P     2659     P     0.6 D     Hespa5     heat shock 70kD protein 5 (glucose-regulated protein)       1438925     600 P     398     P     0.8 D     Aif4     activating transcription factor 4       1438925     9A     7A     1.4 NC     Aif4     activating transcription factor 4       1438144     2C7 P     277 P     0.8 D     Edem1 ER degradation enhancer, mannosidase alpha-like 1       1427065     995 P     1034 P     0.8 D     Edem1 ER degradation enhancer, mannosidase alpha-like 1       1427046     365 P     703 P     0.8 D     Edem1 ER degradation enhancer, mannosidase alpha-like 1       1427046     1462 P     271 P     0.7 D     Patida     protein disulfide isomerase associated 3       142846     1462 P     1942 P     1.0 NC     Wist     Wortraw syndome 1 homolog (human)       142848     1694 P     1316 P     0.7 D     Patida     Protein disulfe isomerase associated 6       143845     3521 P     452 P     1.1 NC     Wist     Wortram syndome 1 homolog (human)       1418274     1.1 SIC     Wist <td< td=""><td></td><td></td><td></td><td></td><td></td><td>0.5</td><td></td><td></td><td></td></td<>						0.5			
1417516     144     154     M     11.1     NC     Dolt3     DNA-damage inducible transcription factor 4       1438952     600     P     398     P     0.8     D     Att4     activating transcription factor 4       1438258     9A     7A     1.4     NC     Att4     activating transcription factor 4       1438444     267     P     277     P     0.9     NC     Att6     activating transcription factor 4       1432403     2930     P     0.8     D     Edem1     ER degradation enhancer, mannosidase ajpha-like 1       1423424     2930     P     0.8     D     Edem1     ER degradation enhancer, mannosidase ajpha-like 1       1423425     1649     P     1.5     I     Pdia4     protein disulf4e isomerase associated 5       1423464     14622     1942     0.7     D     Pdia5     protein disulf4e isomerase associated 6       143527     1955     1368     0.6     D     Doldaci DNA segment, Chr 3, University of California at Los Angeles 1       1415221     14364     24612									
133892     600 P     998 P     7A     14 NC     Artf     activating transcription factor 4       1448355     1044 P     705 P     0.8 D     Artf     activating transcription factor 4       1448155     1044 P     705 P     0.8 D     Edem1 ER degradation enhancer, mannosidase alpha-like 1       1424065     995 P     1034 P     0.8 D     Edem1 ER degradation enhancer, mannosidase alpha-like 1       1424051     866 P     703 P     0.8 D     Edem1 ER degradation enhancer, mannosidase alpha-like 1       1423423     2938 P     3015 P     1.1 NC     Pdias     protein disulfde isomerase associated 3       1424565     1654 P     1571 P     1.0 NC     Pdia6     protein disulfde isomerase associated 5       1437465     3727 P     4989 P     0.7 D     Pdia6     protein disulfde isomerase associated 5       1437456     3727 P     1368 P     0.8 D     D3/dat 1DNA segment, Chr 3. University of Calfornia at Los Angeles 1       145828     1644 P     1368 P     0.7 D     Pdia6     protein disulfde isomerase associate 6       1423514     462 P     352 P     0.8 D									
143258     9A     7A     14 NC     Att4     activating transcription factor 4       1436135     1044P     705P     0.8 D     Att6     activating transcription factor 4       1435444     267 P     277 P     0.9 NC     Att6     activating transcription factor 4       1435444     267 P     703 P     0.8 D     Edem1     Eft degradation enhancer, mannosidase alpha-like 1       1432432     2398 P     3015 P     1.1 NC     Pdias     protein disulfde isomerase associated 3       1416497     579 P     286 P     1.0 NC     Pdias     protein disulfde isomerase associated 5       1423605     1694 P     1571 P     0.7 D     Pdias     protein disulfde isomerase associated 6       1432465     1694 P     1316 P     0.7 D     Pdiae     protein disulfde isomerase associated 6       143252     1694 P     1316 P     0.7 D     D     Adde     protein disulfde isomerase associated 6       143254     1694 P     1361 P     0.7 D     D     Ddiad DNA segment. Chr 3. University of California at Los Angeles 1       143525     1321 P     451 P	1417516			154	М	1.1	NC	Ddit3	DNA-damage inducible transcript 3
1448135     1044     P     705     P     0.9     NC     Art6     activating transcription factor 6       1424065     995     P     1034     P     0.8     D     Edem1     ER degradation enhancer, mannosidase alpha-like 1       1424023     2938     P     3015     P     1.1     NC     Pdias     protein disulfide isomerase associated 3       1424263     1434462     P     1942     P     0.7     D     Pdias     protein disulfide isomerase associated 6       1425464     1462     P     1942     P     0.7     D     Pdias     protein disulfide isomerase associated 6       1437665     3727     P     4989     P     0.7     D     Pdias     protein disulfide isomerase associated 6       1437653     316     P     0.8     D     D304a1     DNA segment, Chr 3.     University of California at Los Angeles 1       1415828     1694     P     1366     P     0.8     D     D304a1     DNA segment; Chr 3.     University of Califoromia at Los Angeles 1       142581	1438992	600	P	398	Р	0.8	D	Atf4	activating transcription factor 4
1448135     1044     P     705     P     0.9     NC     Art6     activating transcription factor 6       1424065     995     P     1034     P     0.8     D     Edem1     ER degradation enhancer, mannosidase alpha-like 1       1424023     2938     P     3015     P     1.1     NC     Pdias     protein disulfide isomerase associated 3       1424263     1434462     P     1942     P     0.7     D     Pdias     protein disulfide isomerase associated 6       1425464     1462     P     1942     P     0.7     D     Pdias     protein disulfide isomerase associated 6       1437665     3727     P     4989     P     0.7     D     Pdias     protein disulfide isomerase associated 6       1437653     316     P     0.8     D     D304a1     DNA segment, Chr 3.     University of California at Los Angeles 1       1415828     1694     P     1366     P     0.8     D     D304a1     DNA segment; Chr 3.     University of Califoromia at Los Angeles 1       142581	1439258	9	A	7	А	1.4	NC	Atf4	activating transcription factor 4
1435444     267     P     0.9,NC     Aff6     activating transcription factor 6       14324055     996/P     1034     P     0.8,D     Edem1     ER degradation enhancer, mannosidase alpha-like 1       1432423     2383/P     2015/P     1.1,NC     Pdia3     protein disufide isomerase associated 3       1416497     579     P     286     P     0.7,D     Pdia5     protein disufide isomerase associated 5       1423648     1462     P     0.7,D     Pdia5     protein disufide isomerase associated 6       1437465     3727     P     4989     P     0.7,D     Pdia5     protein disufide isomerase associated 6       143848     1462     P     1.1,NC     Wfs1     Woffam syndrome 1 homolog (human)       1448513     1556     P     356     P     0.8,D     Datal DNA segment, Chr 3, University of California at Los Angeles 1       1435264     1442     P     4.512     P     0.8,D     Datal DNA segment, Chr 3, University of California at Los Angeles 1       1435264     142     P     1.1,NC     Herpud1 homocysteine-inductibe, endoplasmi									
122065     995     P     1034     P     0.81D     Edem1     ER degradation enhancer, manosidase alpha-like 1       1421218     856     P     3015     P     1.11NC     Pdia4     protein disufide isomerase associated 3       1424243     2938     P     3015     P     1.01NC     Pdia4     protein disufide isomerase associated 5       1424545     1757     P     286     P     1.01NC     Pdia6     protein disufide isomerase associated 5       1437465     3727     P     4989     P     0.71D     Pdia6     protein disufide isomerase associated 6       1437465     3727     P     4989     P     0.71D     Pdia6     protein disufide isomerase associated 6       143828     1984     P     1366     P     0.31D     Datala1DNA segment, Chr 3. University of California at Los Angeles 1       1428245     1462     P     0.71D     Pdia6     protein disufide isomerase associated 6       1428248     1442     P     1.11NC     West     Woffmanneritide isomerase associated 6       1428245     1650 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
1451218     666     P     703     P     0.8     D     Edem1     ER degradation enhancer, mannocidase alpha-like 1       1416497     579     P     286     P     1.5     I     Protein disulfide isomerase associated 4       1416497     579     P     286     P     1.5     I     Protein disulfide isomerase associated 5       1423648     1462     P     1942     P     0.7D     Pdia5     protein disulfide isomerase associated 6       1437465     3727     P     4989     P     0.7D     Pdia5     protein disulfide isomerase associated 6       1448411     95     P     1420     P     1.1NC     Wfs1     Voltamerase associated 6       1435263     1694     P     1316     P     0.7D     D3Ucla1 DNA segment, Chr.3. University of California at Los Angeles 1       1435263     1642     P     44512     P     1.1NC     Herpud1 homoxysteine-inductible, endoplasmic reticulum stress-inductible, ubiquith-1       1435263     2491     P     4512     P     1.1NC     Herpud1 homoxysteine-inductible, endopl									
1423423     2938     2915     P     111     NC     Poten disuffice isomerase associated 3       1414697     579     P     286     P     151     Poten disuffice isomerase associated 4       1424680     1664     P     1571     P     100     Poten disuffice isomerase associated 5       1434645     3727     P     4989     P     0.7     D     Poten disuffice isomerase associated 5       1434645     3727     P     4989     P     0.7     D     Poten disuffice isomerase associated 3       1434827     1955     P     1368     P     0.7     D     Disulcal IDAA segment, Chr.3. University of California at Los Angeles 1       1438281     1462     P     1429     0.7     D     Disulcal IDAA segment, Chr.3. University of California at Los Angeles 1       1438284     1942     1452     P     0.7     D     Disulcal IDAA segment, Chr.3. University of California at Los Angeles 1       1438285     4291     451     P     0.8     NC     GaddStagrowth arest and DNA damage-inducible disubitin-1       1438285 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>									
1416497     579     P     286     P     1.5     Poten disuffice isomerase associated 4       1424650     1694     P     1571     P     10 NC     Poten disuffice isomerase associated 5       1424640     1462     P     1942     P     1942     P     1942       1434451     372     P     4969     P     10 NC     Pethol provid +hydroxylase, beta polypeptide       1444411     95     P     1422     P     11 NC     Wist     Wolfram syndrome 1 homolog (human)       1418527     1586     P     1616     P     2.0.1000     11 NA Segment, Chr.3. University of California at Los Angeles 1       1418528     1684     192     1422     P     10 NA Segment, Chr.3. University of California at Los Angeles 1       1428548     1642     P     14512     10 NA Segment, Chr.3. University of California at Los Angeles 1       143858     1642     P     1.1 NC     Henpud 1 homocystem-inducible, endoplasmic reliculum stress-inducible, ubiquitin-1       1438542     254     P     1.0 NC     Cali002671140002618 gene     Initelast inducible, induci									
142460     1694 P     1571 P     1.0 NC     Poise     protein disulfice isomerase associated 5       1437465     3727 P     4989 P     0.7 D     PAtb     projet - Adjustance     associated 5       1437465     3727 P     4989 P     0.7 D     PAtb     projet - Adjustance     the associated 5       143827     1955 P     1388 P     0.8 D     D3Udat DNA segment, Chr 3, University of California at Los Angeles 1       145828     1644 P     1316 P     0.7 D     D3Udat DNA segment, Chr 3, University of California at Los Angeles 1       145828     1642 P     352 P     0.8 D     Drajudat DNA segment, Chr 3, University of California at Los Angeles 1       143626     4291 P     4512 P     1.1 INC     Herpud1 homocystein-inducible, endoplasmic reticulum stress-inducible, ubiquitin-1       143626     4291 P     4512 P     1.1 INC     Gadd45agrowth arrest and DNA-damage-inducible 45 alpha       143625     550 P     4911 P     0.8 NC     2210026 IRKEN cDNA 2810026P18 gene       1428112     1381 P     138 P     1.0 NC     Erot1     ERO1-like (S. cerevisiae)       1419030     1381 P     1.3 NC									
142848     1482 P     1942 P     0.7 D     Pdia6     protein isuifide isomerae associated 6       1437465     3727 P     4989 P     0.7 D     PdiAb     protyl 4-hydroxylase, beta polypeptide       1448411     95 P     142 P     1.1 NC     Wfs1     Wolfram syndrome 1 homolog (human)       1418827     1985 P     1368 P     0.8 D     D3Uda1 DNA segment, Chr 3. University of California at Los Angeles 1       1418284     1942 P     1368 P     0.7 D     D3Uda1 DNA segment, Chr 3. University of California at Los Angeles 1       1423848     1942 P     352 P     0.8 D     Drotein disulfide isomerase associated 6       1423847     1942 P     352 P     0.8 D     Drotein disulfide isomerase associated 6       1423848     1942 P     138 P     0.8 D     Drotein disulfide isomerase associated 6       1423847     146 P     138 P     0.8 NC     ZetoXy Rev Angeles 1     LisXitian       142859     21 A     10 A     0.3 NC     Eard4458 growth arrest and DIA-Admage-inducible 45 apha       142859     23 P     1.6 NC     Errol 1     ERO1-Irik(S. Screrevisiae)       1418025 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
1437465     3727 P     4999 P     0.7 D     P4hb     prolyl 4-hydroxylase, beta polypeptide       141827     1955 P     1368 P     0.8 D     D3Uda1 DNA segment, Chr.3. University of California at Los Angeles 1       1418282     1955 P     1368 P     0.8 D     D3Uda1 DNA segment, Chr.3. University of California at Los Angeles 1       142844     1942 P     1462 P     0.7 D     Pdia6     protein disulfide isomerase associated 6       1428151     462 P     332 P     0.8 D     Danaj011 Drna/ (ftsp40) homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-1448155       1436264     4291 P     4512 P     1.1 NC     Herpud1 homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-144815       1448519     21 A     10 A     0.3 NC     Cade/45 growth arest and DNA-damage-inducible, 45 ajha       142812     1938 P     0.5 ID     Armet     raginine-rich, mutated in early stage tumors       1419020     146 P     139 P     1.0 NC     Errol1 I. ERO1-Inke (S. cerevisiae)       1419030     133 P     0.7 ID     S11     Errol1 umor rejection antigen gp66       143804     7294 P     2270 P     0.9 NC	1424650	1694	P	1571	P	1.0	NC	Pdia5	protein disulfide isomerase associated 5
1437465     3727 P     4999 P     0.7 D     P4hb     prolyl 4-hydroxylase, beta polypeptide       141827     1955 P     1368 P     0.8 D     D3Uda1 DNA segment, Chr.3. University of California at Los Angeles 1       1418282     1955 P     1368 P     0.8 D     D3Uda1 DNA segment, Chr.3. University of California at Los Angeles 1       142844     1942 P     1462 P     0.7 D     Pdia6     protein disulfide isomerase associated 6       1428151     462 P     332 P     0.8 D     Danaj011 Drna/ (ftsp40) homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-1448155       1436264     4291 P     4512 P     1.1 NC     Herpud1 homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-144815       1448519     21 A     10 A     0.3 NC     Cade/45 growth arest and DNA-damage-inducible, 45 ajha       142812     1938 P     0.5 ID     Armet     raginine-rich, mutated in early stage tumors       1419020     146 P     139 P     1.0 NC     Errol1 I. ERO1-Inke (S. cerevisiae)       1419030     133 P     0.7 ID     S11     Errol1 umor rejection antigen gp66       143804     7294 P     2270 P     0.9 NC	1423648	1462	P	1942	Р	0.7	D	Pdia6	protein disulfide isomerase associated 6
1448411     95/P     142 P     11.1 NC     Wisit     Wolfram syndrome 1 homolog (human)       1415827     195/P     1368 P     0.8 D     D3Uda1 DNA segment, Chr 3. University of California at Los Angeles 1       1415828     1694 P     136 P     0.7 D     D3Uda1 DNA segment, Chr 3. University of California at Los Angeles 1       1423648     1942 P     1462 P     0.7 D     Databilit DNA segment, Chr 3. University of California at Los Angeles 1       1423654     429 P     352 P     0.8 D     Dnajb11 Dna (Hsp40) homolog, subfamily B, member 11       1438626     4291 P     4512 P     1.1 NC     Herpud1 homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiguitin-1448165       1428529     21 A     10 A     0.3 NC     Gadd452 growth arrest and DNA-damage-inducible 45 apha       1428529     22 AP     178 P     0.8 NC     Ero11 ERO1-like (S. cerevisiae)       1419020     183 P     233 P     1.4 NC     Ero11 ERO1-like (S. cerevisiae)       1419030     183 P     233 P     0.9 NC     Tra1     tumor rejection antigen gab6       1438940     2704 P     2270 P     0.9 NC     Tra1     tumor rejectio									
1415827     1955 P     1368 P     0.8 D     D3Ucla1 DNA segment. Chr 3, University of California at Los Angeles 1       142828     1694 P     1462 P     0.7 D     D4lical DNA segment. Chr 3, University of California at Los Angeles 1       142848     1942 P     1462 P     0.7 D     Dalat1 DNA segment. Chr 3, University of California at Los Angeles 1       143626     4291 P     14512 P     0.8 D     Dnajh11 Dna, (htsp40) homologies, subfamily B, member 11       1436264     4291 P     4512 P     0.1 NC     Herpud1 homocystein-inducible, endoplasmic reticulum stress-inducible, ubiquithri       1448519     2550 P     4911 P     0.9 NC     Herpud1 homocystein-inducible, at alpha       142812     1938 P     0.8 NC     C30006 (RIKEN cDNA 2810026/RIKEN cDNA 2810026/RIK		95	P						
1418282     (feq4)     1316     P     0.7     D     D3Ucla1     DNA segment. Chr 3. University of Catifornia at Los Angeles 1       1423648     1942 P     352 P     0.8     D     Dnajb11     Dna, (Hsp40)     Homolog, subfamily B, member 11       1435626     4231 P     4512 P     1.1     NC     Herpud1 homocysteine-inducible, endoplasmic refloutum stress-inducible, ubiquitin-1449519       1448165     5550 P     4911 P     0.9     NC     Herpud1 homocysteine-inducible, endoplasmic refloutum stress-inducible, ubiquitin-1449519       1428529     254 P     178 P     0.8 NC     2810026 [RIKE NDNA 2810026P18 gene       1428512     1938 P     0.5 D     Armet     arginine-rich, mutated in early stage tumors       1419029     146 P     139 P     1.0 NC     Ero11     ERO1-like (S. cerevisiae)       1419030     183 P     233 P     0.4 NC     Ero11     Ero11 sumor rejection antigen gp96       1438804     2794 P     2270 P     0.9 NC     Tra1     tumor rejection antigen gp96       1432461     113 P     73 P     0.7 NC     Ero11     endoplasmic reticulum (ER) to nucleus signa								-	
142848     1942     P     1442     P     147       1423151     462     P     352     P     0.8     Donajb11     Danade Manual Standard S									
1423151     462     P     352     P     0.8     D     Dnajb11     Dnay Ltsp40) homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-1448165       1435626     4291     P     1.1     NC     Herpud1 homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-1448519     21     A     10     A     0.3     NC     Gadd45a growth arrest and DNA-damage-inducible 45 alpha       1428529     254     P     176     P     0.8     NC     2810026718 gene       1419030     183     P     1.0     NC     Erot1     ERO1-like (S. cerevisiae)       1419030     183     P     2370     P     0.9     NC     Tra1     tumor rejection antigen gp96       1438040     2734     P     2270     P     0.9     NC     Tra1     tumor rejection antigen gp96       141734     571     P     337     P     0.7     NC     Tra1     tumor rejection antigen gp96       1421240     41     A     55     A     1.2     NC     Ero1     endoplasmic reticulum (haptenore signalli									
143662     4291     P     4512     P     1.1 INC     Herpud1 homocrysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin- 1449151       1448165     5560     P     178     P     0.3 INC     Gadd45growth arrest and DNA-damage-inducible 45 alpha       1428529     254     P     178     P     0.8 INC     Z810026 RIKEN cDNA 2810026P18 gene       1428112     1938     P     0.5 ID     Armet     arginine-rich, mutated in early stage tumors       1419030     146     P     139     P     1.0 INC     Ero11     ERO1-like (S. cerevisiae)       1419030     1483     P     3855     P     0.9 INC     Tra1     tumor rejection antigen gp96       1417543     571     P     337     P     0.7 INC     Txndc4     thioredoxin domain containing 4 (endoplasmic reticulum)       1422260     41     A     555     A     1.2 INC     Txndc4     thioredoxin domain containing 4 (endoplasmic reticulum)       1423240     41     A     5.2 INC     Txndc4     thioredoxin domain containing 4 (endoplasmic reticulum)       1423247									
1448185   5550   P   4911   P   0.9 NC   Herpud1 [homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-     1449519   211 A   10 A   0.3 NC   2840026 [RIKEN cDNA 2810026P18 gene     142812   1938 P   933 P   0.5 D   Armet   arginine-rich, mutted in early stage tumors     1419020   1481 P   133 P   0.5 D   Armet   arginine-rich, mutted in early stage tumors     1419030   183 P   233 P   1.4 NC   Erc11   ERO1-like (S. cerevisiae)     1419030   183 P   233 P   1.4 NC   Erc11   time rejection antigen gp66     1418080   2794 P   2270 P   0.9 NC   Tra1   tumor rejection antigen gp66     1417354   571 P   337 P   0.7 NC   Tra1   endoplasmic reticulum chaperone SIL1 homolog (S. cerevisiae)     142240   41 A   55 A   1.2 NC   Txndc4 thioredoxin domain containing 4 (endoplasmic reticulum)     1423247   113 P   73 P   0.7 NC   Txndc4 thioredoxin domain containing 4 (endoplasmic reticulum)     1423246   113 P   726 P   1.2 NC   Txndc4 thioredoxin domain containing 4 (endoplasmic reticulum)									
1449519   21 A   10 A   0.3 NC   Gadd45agrowth arrest and DNA-damage-inducible 45 alpha     1428529   254 P   178 P   0.8 NC   2810026 RIKEN cDNA 2810026P18 gene     1428112   1938 P   933 P   0.5 D   Armet   arginine-rich, mutated in early stage tumors     1419020   146 P   139 P   1.0 NC   Erc11   ERO1-like (S. cerevisiae)     1418884   4739 P   3855 P   0.9 NC   Tra1   tumor rejection antigen gp96     1438040   2794 P   2270 P   0.9 NC   Tra1   tumor rejection antigen gp96     1438040   2794 P   2270 P   0.9 NC   Tra1   tumor rejection antigen gp96     1442140   41 A   55 A   1.2 NC   Erm1   endoplasmic reticulum (ER) to nucleus signalling 1     1423246   113 P   73 P   0.7 NC   Txmdo4   thioredoxin domain containing 4 (endoplasmic reticulum)     1423247   102 P   488 P   0.5 D   Txmdo41   thioredoxin domain containing 4 (endoplasmic reticulum)     1424674   71 P   102 P   1.3 NC   SiC39a6 solute carrier family 39 (metal ion transporter), member 6     1424675   29 A   <	1435626	4291	P	4512	Р	1.1	NC	Herpud1	homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiquitin-l
1449519   21 A   10 A   0.3 NC   Gadd45agrowth arrest and DNA-damage-inducible 45 alpha     1428529   254 P   178 P   0.8 NC   2810026 RIKEN cDNA 2810026P18 gene     1428112   1938 P   933 P   0.5 D   Armet   arginine-rich, mutated in early stage tumors     1419020   146 P   139 P   1.0 NC   Erc11   ERO1-like (S. cerevisiae)     1418884   4739 P   3855 P   0.9 NC   Tra1   tumor rejection antigen gp96     1438040   2794 P   2270 P   0.9 NC   Tra1   tumor rejection antigen gp96     1438040   2794 P   2270 P   0.9 NC   Tra1   tumor rejection antigen gp96     1442140   41 A   55 A   1.2 NC   Erm1   endoplasmic reticulum (ER) to nucleus signalling 1     1423246   113 P   73 P   0.7 NC   Txmdo4   thioredoxin domain containing 4 (endoplasmic reticulum)     1423247   102 P   488 P   0.5 D   Txmdo41   thioredoxin domain containing 4 (endoplasmic reticulum)     1424674   71 P   102 P   1.3 NC   SiC39a6 solute carrier family 39 (metal ion transporter), member 6     1424675   29 A   <	1448185	5550	Р	4911	Р	0.9	NC	Herpud1	homocysteine-inducible, endoplasmic reticulum stress-inducible, ubiguitin-l
1428529     254 P     178 P     0.8 NC     2810026[RtKEN cDNA 2810026P18 gene       1428112     1938 P     933 P     0.5 D     Armet     arginine-rich, mutated in early stage tumors       1419029     146 P     139 P     1.0 NC     Ero11     ERO1-like (S. cerevisiae)       1419030     183 P     233 P     0.9 NC     Tra1     tumor rejection antigen gp96       1413689     4739 P     2270 P     0.9 NC     Tra1     tumor rejection antigen gp96       1417354     571 P     337 P     0.7 D     Sil1     endoplasmic reticulum (ER) to nucleus signalling 1       142240     41 A     55 A     1.2 NC     Erm1 endoplasmic reticulum (ER) to nucleus signalling 1       1423247     1022 P     488 P     0.5 D     Txmdc4     thioredoxin domain containing 4 (endoplasmic reticulum)       1424675     29 A     48 A     1.2 NC     Txmdc4     thioredoxin domain containing 1 (andoplasmic reticulum)       1424675     29 A     48 A     1.2 NC     Sic39a6 solute carrier family 39 (metal ion transporter), member 6       1431886     2A     4A     1.3 NC     Ero39a6 solute carri	1449519			10	A	0.3			
1428112   1938 P   933 P   0.5 D   Armet   arginine-rich, mutated in early stage tumors     1419020   146 P   138 P   1.0 NC   Ero11   ERO1-like (S. cerevisiae)     1419030   183 P   233 P   1.4 NC   Ero11   ERO1-like (S. cerevisiae)     1415880   4739 P   3855 P   0.9 NC   Tra1   tumor rejection antigen gp96     1417354   571 P   337 P   0.7 D   Sil1   endoplasmic reticulum chaperone SIL1 homolog (S. cerevisiae)     1421240   41 A   55 A   1.2 NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1423247   1022 P   488 P   0.5 D   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1425748   683 P   726 P   1.2 NC   Txndc12 thioredoxin domain containing 4 (endoplasmic reticulum)     142675   29 A   48 A   1.2 NC   Sic39a6 solute carrier family 39 (metal ion transporter), member 6     143788   2 A   4 A   1.3 NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1445075   29 A   48 A   1.2 NC   Ern2   endoplasmic reticulum (ER) to nucleus signalling 1									
1419029   146   P   1.0   NC   Ero11   ERO1-like (S. cerevisiae)     1419030   183   P   233   P   1.4   NC   Ero11   ERO1-like (S. cerevisiae)     1415889   4739   P   3355   P   0.9   NC   Tra1   tumor rejection antigen gp96     1413544   571   P   2.70   P   0.9   NC   Tra1   tumor rejection antigen gp96     1417354   571   P   0.7   D   Sil1   endoplasmic reticulum chaperone SIL1 homolog (S. cerevisiae)     1422247   1022   P   488   P   0.5   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1423247   71   P   102   P   1.3   NC   Sic39a6 solute carrier family 39 (metal ion transporter), member 6     1431886   2A   4A   1.3   NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   239   A   48   1.2   NC   Ern2   endoplasmic reticulum (ER) to nucleus signalling 1     1424675   29   A   48   1.2   NC									
1419030   183   P   233   P   1.4   NC   Ero11   ERO1-like (S. cerevisiae)     1415880   4739   P   3855   P   0.9   NC   Tra1   tumor rejection antigen gp96     1417354   571   P   337   P   0.7   D   Sil1   endoplasmic reticulum certication certication antigen gp96     1417354   571   P   337   P   0.7   D   Sil1   endoplasmic reticulum certication certication     1423240   41   A   55   A   1.2   NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1423247   1022   P   488   P   0.5   D   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1424674   71   P   102   P   1.3   NC   Sic39a6   solute carrier family 39 (metal ion transporter), member 6     1424675   29A   48   A   1.2   NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23   P   76   P   1.6   NC   Ern1   endoplasmic ret									
1415889   4739   P   3855   P   0.9   NC   Tra1   tumor rejection antigen gp96     1438040   2794   P   2270   P   0.9   NC   Tra1   tumor rejection antigen gp96     1417354   571   P   337   P   0.7   D   Sil1   endoplasmic reticulum (ER) to nucleus signalling 1     1423246   113   P   73   P   0.7   NC   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1423247   1022   P   488   P   0.5   D   Txndc4   thioredoxin domain containing 12 (endoplasmic reticulum)     1424674   71   P   102   P   1.3   NC   Sic39a6   solute carrier family 39 (metal ion transporter), member 6     1430765   29   A   48   A   1.2   NC   Errol   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23   P   76   P   1.6   NC   Errol   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4A   5A   2.1   NC   Cherp   calcium homeostasis e									
1438040     2794     P     2270     P     0.9     NC     Tra1     tumor rejection antigen gp96       1417354     571     P     337     P     0.7     D     Sil1     endoplasmic reticulum (ER) to nucleus signalling 1       1421240     41     A     55     A     1.2     NC     Errol     endoplasmic reticulum (ER) to nucleus signalling 1       1423247     1022     P     488     P     0.5     D     Txndo4     thioredoxin domain containing 4 (endoplasmic reticulum)       1423247     1022     P     488     D     Sil39a6     solute carrier family 39 (metal ion transporter), member 6       1424675     29     A     48     1.2     NC     Sic39a6     solute carrier family 39 (metal ion transporter), member 6       1431886     2     A     4     A     1.3     NC     Errol     endoplasmic reticulum (ER) to nucleus signalling 1       1450176     23     P     76     P     1.6     NC     Errol     endoplasmic reticulum (ER) to nucleus signalling 1       1450139     4     <									
1417354     571     P     337     P     0.7     D     Sil1     endoplasmic reticulum chaperone SIL1 homolog (S. cerevisiae)       1421240     41     A     55     A     1.2     NC     Em1     endoplasmic reticulum (ER) to nucleus signalling 1       1423246     113     P     73     P     0.7     NC     Txndc4     thioredoxin domain containing 4 (endoplasmic reticulum)       1423247     1022     P     488     P     0.5     D     Txndc4     thioredoxin domain containing 4 (endoplasmic reticulum)       1424674     71     P     102     P     1.8     NC     Sto39a6     solute carrier family 39 (metal ion transporter), member 6       1424675     29     A     48     A     1.2     NC     Sto39a6     solute carrier family 39 (metal ion transporter), member 6       1431886     2A     4A     A     1.3     NC     Ern1     endoplasmic reticulum (ER) to nucleus signalling 1       1450139     4     A     5     A     2.1     NC     Ern2     endoplasmic reticulum protein 29								Tra1	tumor rejection antigen gp96
1421240   411A   55 A   1.2 NC   Em1   endoplasmic reticulum (ER) to nucleus signalling 1     1423246   113 P   73 P   0.7 NC   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1423247   1022 P   488 P   0.5 D   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1415738   863 P   726 P   1.2 NC   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1424674   71 P   102 P   1.3 NC   Sic39a6 solute carrier family 39 (metal ion transporter), member 6     1424675   29 A   48 A   1.2 NC   Erro1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23 P   76 P   1.6 NC   Erro1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Erro1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Erro1   endoplasmic reticulum (ER) to nucleus signalling 1     1450130   4 A   5 A   2.1 NC   Erro1   endoplasmic reticulum protein     1450130   4 A   5 A   2.1 NC   Erro2   endoplasmic	1438040	2794	P	2270	Р	0.9	NC	Tra1	tumor rejection antigen gp96
1421240   411A   55 A   1.2 NC   Em1   endoplasmic reticulum (ER) to nucleus signalling 1     1423246   113 P   73 P   0.7 NC   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1423247   1022 P   488 P   0.5 D   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1415738   863 P   726 P   1.2 NC   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1424674   71 P   102 P   1.3 NC   Sic39a6 solute carrier family 39 (metal ion transporter), member 6     1424675   29 A   48 A   1.2 NC   Erro1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23 P   76 P   1.6 NC   Erro1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Erro1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Erro1   endoplasmic reticulum (ER) to nucleus signalling 1     1450130   4 A   5 A   2.1 NC   Erro1   endoplasmic reticulum protein     1450130   4 A   5 A   2.1 NC   Erro2   endoplasmic	1417354	571	Р	337	Р	0.7	D	Sil1	endoplasmic reticulum chaperone SIL1 homolog (S. cerevisiae)
1423246   113 P   73 P   0.7 NC   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1423247   1022 P   488 P   0.5 D   Txndc4   thioredoxin domain containing 12 (endoplasmic reticulum)     1415738   863 P   726 P   1.2 NC   Txndc12 thioredoxin domain containing 12 (endoplasmic reticulum)     1424674   71 P   102 P   1.3 NC   Sic39a6 solute carrier family 39 (metal ion transporter), member 6     1424675   29 A   48 A   1.2 NC   Ern1 endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23 P   76 P   1.6 NC   Ern1 endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4A   5A   2.1 NC   Ern2 endoplasmic reticulum protein signalling 1     145084   323 P   357 P   0.9 NC   Erp2 endoplasmic reticulum protein 29     1458363   323 P   357 P   0.9 NC   NE Erp29 endoplasmic reticulum protein 29     1416932   291 P   253 P   0.9 NC   NG Sec23b (S. cerevisiae)     141693   1634 P   1028 P   0.6 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416189   1634 P   1028 P   0.8 D   Sec61a1	1421240	41	A	55	Α	12	NC		
1423247   1022   P   488   P   0.5   D   Txndc4   thioredoxin domain containing 4 (endoplasmic reticulum)     1415738   863   P   726   P   1.2   NC   Txndc12   thioredoxin domain containing 12 (endoplasmic reticulum)     1424674   71   P   102   P   1.3   NC   Slc39a6   solute carrier family 39 (metal ion transporter), member 6     1424674   71   P   102   P   1.8   NC   Slc39a6   solute carrier family 39 (metal ion transporter), member 6     1431866   2   A   4.A   1.3   NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23   P   76   P   1.6   NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450189   147   P   142   P   1.2   NC   Cherp   calcium homeostasis endoplasmic reticulum protein     1453634   323   P   357   P   0.9   NC   Mira   nuclear factor, interleukin 3, regulated     1416189   1634   P   1028   P   0.6 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>									
1415738   863 P   726 P   1.2 INC   Txndc12 Hioredoxin domain containing 12 (endoplasmic reticulum)     1424674   71 P   102 P   1.3 INC   Slc39a6 solute carrier family 39 (metal ion transporter), member 6     1424675   29 A   48 A   1.2 INC   Slc39a6 solute carrier family 39 (metal ion transporter), member 6     1431886   2 A   4 A   1.3 INC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23 P   76 P   1.6 INC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 INC   Ern2   endoplasmic reticulum protein signalling 2     1451866   147 P   142 P   1.2 INC   Cherp calcium homeostasis endoplasmic reticulum protein     145383   323 P   357 P   0.9 INC   Erp29   endoplasmic reticulum protein 29     1418932   291 P   253 P   0.9 INC   Sec33b SEC23B (S. cerevisiae)   1416190     1416190   310 P   212 P   0.8 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)   1416191     1416190   310 P   212 P   0.8 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)   1416191 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>									
1424674   71 P   102 P   1.3 NC   Slc39a6   solute carrier family 39 (metal ion transporter), member 6     1424675   29 A   48 A   1.2 NC   Slc39a6   solute carrier family 39 (metal ion transporter), member 6     1431886   2 A   4 A   1.3 NC   Err1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23 P   76 P   1.6 NC   Err1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Err1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Err1   endoplasmic reticulum protein 29     1450634   323 P   357 P   0.9 NC   Kerp29   endoplasmic reticulum protein 29     1418059   671 P   585 P   0.9 NC   Sec3a1   Sec61al pha 1 subunit (S. cerevisiae)     14161059   671 P   585 P   0.9 NC   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416189   1634 P   1028 P   0.6 D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469 P   372 P   0.8 D   Sec61a sec61 alpha 1 subunit (S. cerevisiae) <tr< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr<>									
1424675   29 A   48 A   1.2 NC   SIc39a6   solute carrier family 39 (metal ion transporter), member 6     1431886   2 A   4 A   1.3 NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23 P   76 P   1.6 NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Ern2   endoplasmic reticulum (ER) to nucleus signalling 2     1451896   147 P   142 P   1.2 NC   Cherp   calcium homeostasis endoplasmic reticulum protein 29     1453034   323 P   357 P   0.9 NC   Erp29   endoplasmic reticulum protein 29     1418032   291 P   253 P   0.9 NC   NT   Sec3ab   SEC23b (S. cerevisiae)     1416189   671 P   585 P   0.9 NC   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310 P   212 P   0.8 D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469 P   372 P   0.8 D   Sec61a1   Sec61 beta subunit     1423090   1584 P   653 P   0.5 D   Sec61 geta subunit   Sece61 beta subunit									
1431886   2 A   4 A   1.3 NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450176   23 P   76 P   1.6 NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Ern2   endoplasmic reticulum (ER) to nucleus signalling 2     1451896   147 P   142 P   1.2 NC   Cherp   calcium homeostasis endoplasmic reticulum protein     1453634   323 P   357 P   0.9 NC   Erp29   endoplasmic reticulum protein 29     1416059   671 P   585 P   0.9 NC   Sec23b SEC23B (S. cerevisiae)     1416189   1634 P   1028 P   0.6 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310 P   212 P   0.8 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469 P   372 P   0.8 D   Sec61a Sec61 alpha 1 subunit (S. cerevisiae)     14424924   638 P   653 P   0.5 D   Sec63 SEC63-like (S. cerevisiae)     1424924   638 P   463 P   0.8 D   Sec63 SEC63-like (S. cerevisiae)     1424925   293 P   229 P   0.7 D   Sec63 SEC63-like (S. cerevisiae)									
1450176   23 P   76 P   1.6 NC   Ern1   endoplasmic reticulum (ER) to nucleus signalling 1     1450139   4 A   5 A   2.1 NC   Ern2   endoplasmic reticulum (ER) to nucleus signalling 2     1451896   147 P   142 P   1.2 NC   Cherp   calcium homeostasis endoplasmic reticulum protein     1453634   323 P   357 P   0.9 NC   Erp29   endoplasmic reticulum protein 29     1418092   291 P   253 P   0.9 NC   Sec23b   SEC23B (S. cerevisiae)     1416059   671 P   585 P   0.9 NC   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416189   1634 P   1028 P   0.6 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310 P   212 P   0.8 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469 P   372 P   0.8 D   Sec61g SEC61, gamma subunit     1423090   1584 P   653 P   0.5 D   Sec63 SEC63-like (S. cerevisiae)     1424924   638 P   463 P   0.8 D   Sec63 SEC63-like (S. cerevisiae)     1424925   293 P   229 P   0.7 D   Sec63 SEC63-like (S. cerevisiae)									
1450139   4 A   5 A   2.1 NC   Ern2   endoplasmic reticulum (ER) to nucleus signalling 2     1451896   147 P   142 P   1.2 NC   Cherp   calcium homeostasis endoplasmic reticulum protein     1453634   323 P   357 P   0.9 NC   Erp29   endoplasmic reticulum protein 29     1418932   291 P   253 P   0.9 NC   Erp29   endoplasmic reticulum grotein 29     1416059   671 P   585 P   0.9 NC   Sec23b   SEC23B (S. cerevisiae)     1416189   1634 P   1028 P   0.6 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310 P   212 P   0.8 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469 P   372 P   0.8 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1417083   1724 P   1134 P   0.7 D   Sec61g SEC61, gamma subunit     1423090   1584 P   653 P   0.8 D   Sec63 SEC63-like (S. cerevisiae)     1424924   638 P   463 P   0.8 D   Sec63 SEC63-like (S. cerevisiae)     1424925   293 P   229 P   0.7 D   Sec63 SEC63-like (S. cerevisiae)     1424926 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Ern1</td> <td>endoplasmic reticulum (ER) to nucleus signalling 1</td>								Ern1	endoplasmic reticulum (ER) to nucleus signalling 1
1450139   4 A   5 A   2.1 NC   Ern2   endoplasmic reticulum (ER) to nucleus signalling 2     1451896   147 P   142 P   1.2 NC   Cherp   calcium homeostasis endoplasmic reticulum protein     1453634   323 P   357 P   0.9 NC   Erp29   endoplasmic reticulum protein 29     1418932   291 P   253 P   0.9 NC   Erp29   endoplasmic reticulum grotein 29     1416059   671 P   585 P   0.9 NC   Sec23b   SEC23B (S. cerevisiae)     1416189   1634 P   1028 P   0.6 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310 P   212 P   0.8 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469 P   372 P   0.8 D   Sec61a1 Sec61 alpha 1 subunit (S. cerevisiae)     1417083   1724 P   1134 P   0.7 D   Sec61g SEC61, gamma subunit     1423090   1584 P   653 P   0.8 D   Sec63 SEC63-like (S. cerevisiae)     1424924   638 P   463 P   0.8 D   Sec63 SEC63-like (S. cerevisiae)     1424925   293 P   229 P   0.7 D   Sec63 SEC63-like (S. cerevisiae)     1424926 </td <td>1450176</td> <td>23</td> <td>P</td> <td>76</td> <td>P</td> <td>1.6</td> <td>NC</td> <td>Ern1</td> <td>endoplasmic reticulum (ER) to nucleus signalling 1</td>	1450176	23	P	76	P	1.6	NC	Ern1	endoplasmic reticulum (ER) to nucleus signalling 1
1451896   147   P   142   P   1.2   NC   Cherp   calcium homeostasis endoplasmic reticulum protein     1453634   323   P   357   P   0.9   NC   Erp29   endoplasmic reticulum protein 29     1418932   291   P   253   P   0.9   NC   Krp29   endoplasmic reticulum protein 29     1416193   671   P   585   P   0.9   NC   Sec23b   SEC23B (S. cerevisiae)     1416199   1634   P   1028   P   0.6   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310   P   212   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469   P   372   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1417083   1724   P   1134   P   0.7   D   Sec61a1   Sec63   SEC63-gerevisiae)     1424924   638   P   635   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     14249				5	A				
1453634   323   P   357   P   0.9   NC   Erp29   endoplasmic reticulum protein 29     1418932   291   P   253   P   0.9   NC   Nfil3   nuclear factor, interleukin 3, regulated     1416059   671   P   585   P   0.9   NC   Sec23b   SEC23B (S. cerevisiae)     1416189   1634   P   1028   P   0.6   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310   P   212   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469   P   372   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1417083   1724   P   1134   P   0.7   D   Sec61b   Sec61 beta subunit     1423090   1584   P   653   P   0.5   D   Sec63   SEC63-like (S. cerevisiae)     1424924   638   P   463   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>									
1418932   291   P   253   P   0.9   NC   Nfil3   nuclear factor, interleukin 3, regulated     1416059   671   P   585   P   0.9   NC   Sec23b   SEC23B (S. cerevisiae)     1416189   1634   P   1028   P   0.6   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310   P   212   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469   P   372   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1417083   1724   P   1134   P   0.7   D   Sec61g   SEC61, gamma subunit     1423090   1584   P   653   P   0.5   D   Sec613   SEC63-like (S. cerevisiae)     1424924   638   P   463   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293   P   229   P   0.7   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293   P </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
1416059     671     P     585     P     0.9     NC     Sec23b     SEC23B (S. cerevisiae)       1416189     1634     P     1028     P     0.6     D     Sec61a1     Sec61 alpha 1 subunit (S. cerevisiae)       1416190     310     P     212     P     0.8     D     Sec61a1     Sec61 alpha 1 subunit (S. cerevisiae)       1416191     469     P     372     P     0.8     D     Sec61a1     Sec61 alpha 1 subunit (S. cerevisiae)       1417083     1724     P     1134     P     0.7     D     Sec61g     SEC61, gamma subunit       1423090     1584     P     653     P     0.8     D     Sec61g     SEC61, gamma subunit       1424924     638     P     463     P     0.8     D     Sec63     SEC63-like (S. cerevisiae)       1424925     293     P     229     P     0.7     D     Sec63     SEC63-like (S. cerevisiae)       1424926     303 P     212 P     0.9     NC     Sec63     SEC63-li									
1416189   1634   P   1028   P   0.6   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416190   310   P   212   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469   P   372   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1417083   1724   P   1134   P   0.7   D   Sec61b   Sec61 beta subunit     1423090   1584   P   653   P   0.5   D   Sec61g   SEC63-like (S. cerevisiae)     1419819   612   P   549   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424924   638   P   463   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293   P   229   P   0.7   D   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1412692   2926   P <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>									
1416190   310   P   212   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1416191   469   P   372   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1417083   1724   P   1134   P   0.7   D   Sec61b   Sec61 beta subunit     1423090   1584   P   653   P   0.5   D   Sec61b   Sec61-sec63-sece0-sece-sece-sece-sece-sece-sece-sec	4 4 4 9 4 9 9	1001	(	1000	1		_	0 04 4	
1416191   469   P   372   P   0.8   D   Sec61a1   Sec61 alpha 1 subunit (S. cerevisiae)     1417083   1724   P   1134   P   0.7   D   Sec61b   Sec61 beta subunit     1423090   1584   P   653   P   0.5   D   Sec61g   SEC61, gamma subunit     1419819   612   P   549   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424924   638   P   463   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293   P   229   P   0.7   D   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Canx   calnexin     14258925   1234   P   10.0   NC   Canx									· · · · · · · · · · · · · · · · · · ·
1417083   1724   P   1134   P   0.7   D   Sec61b   Sec61 beta subunit     1423090   1584   P   653   P   0.5   D   Sec61g   SEC61, gamma subunit     1419819   612   P   549   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424924   638   P   463   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293   P   229   P   0.7   D   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1426926   2926   P   3060   P   1.0   NC   Canx   calnexin     1422845   1234   P   1034   P   0.9   D   Canx   calnexin     1428935   140   P   198   P   1.1   NC   Canx </td <td>1416190</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Sec61a1</td> <td>Sec61 alpha 1 subunit (S. cerevisiae)</td>	1416190							Sec61a1	Sec61 alpha 1 subunit (S. cerevisiae)
1417083   1724   P   1134   P   0.7   D   Sec61b   Sec61 beta subunit     1423090   1584   P   653   P   0.5   D   Sec61g   SEC61, gamma subunit     1419819   612   P   549   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424924   638   P   463   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293   P   229   P   0.7   D   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1426926   2926   P   3060   P   1.0   NC   Canx   calnexin     1422845   1234   P   1034   P   0.9   D   Canx   calnexin     1428935   140   P   198   P   1.1   NC   Canx </td <td>1416191</td> <td>469</td> <td>P</td> <td>372</td> <td>P</td> <td>0.8</td> <td>D</td> <td>Sec61a1</td> <td>Sec61 alpha 1 subunit (S. cerevisiae)</td>	1416191	469	P	372	P	0.8	D	Sec61a1	Sec61 alpha 1 subunit (S. cerevisiae)
1423090   1584   P   653   P   0.5   D   Sec61g   SEC61, gamma subunit     1419819   612   P   549   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424924   638   P   463   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293   P   229   P   0.7   D   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     14252   2926   P   3060   P   1.0   NC   Canx   calnexin     1428452   1234   P   1034   P   0.9   D   Canx   calnexin     1428455   140   P   198   P   1.1   NC   Canx   calnexin     1428935   140   P   198   P   1.3   Calr   calreticulin     1433806   2476   P   3117   P   1.3   Calr   calreticulin									
1419819     612     P     549     P     0.8     D     Sec63     SEC63-like (S. cerevisiae)       1424924     638     P     463     P     0.8     D     Sec63     SEC63-like (S. cerevisiae)       1424925     293     P     229     P     0.7     D     Sec63     SEC63-like (S. cerevisiae)       1424926     303     P     212     P     0.9     NC     Sec63     SEC63-like (S. cerevisiae)       1415692     2926     P     3060     P     1.0     NC     Canx     calnexin       1422845     1234     P     1034     P     0.9     D     Canx     calnexin       1428455     140     P     198     P     1.1     NC     Canx     calnexin       1428935     140     P     198     P     1.3     I     Calr     calreticulin       143806     2476     P     3117     P     1.3     I     Calr     calreticulin									
1424924   638   P   463   P   0.8   D   Sec63   SEC63-like (S. cerevisiae)     1424925   293   P   229   P   0.7   D   Sec63   SEC63-like (S. cerevisiae)     1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1415692   2926   P   3060   P   1.0   NC   Canx   calnexin     1422845   1234   P   1034   P   0.9   D   Canx   calnexin     1428935   140   P   198   P   1.1   NC   Canx   calnexin     1417606   3181   P   4327   P   1.3   Calr   calreticulin     1433806   2476   P   3117   P   1.3   Calr   calreticulin									
1424925   293 P   229 P   0.7 D   Sec63   SEC63-like (S. cerevisiae)     1424926   303 P   212 P   0.9 NC   Sec63   SEC63-like (S. cerevisiae)     1415692   2926 P   3060 P   1.0 NC   Canx   calnexin     1422845   1234 P   1034 P   0.9 D   Canx   calnexin     1428455   140 P   198 P   1.1 NC   Canx   calnexin     1417606   3181 P   4327 P   1.3 I   Calr   calreticulin     1433806   2476 P   3117 P   1.3 I   Calr   calreticulin									
1424926   303   P   212   P   0.9   NC   Sec63   SEC63-like (S. cerevisiae)     1415692   2926   P   3060   P   1.0   NC   Canx   calnexin     1422845   1234   P   1034   P   0.9   D   Canx   calnexin     1428935   140   P   198   P   1.1   NC   Canx   calnexin     1417606   3181   P   4327   P   1.3   I   Calr   calreticulin     1433806   2476   P   3117   P   1.3   I   Calr   calreticulin									
1415692     2926     P     3060     P     1.0     NC     Canx     calnexin       1422845     1234     P     1034     P     0.9     D     Canx     calnexin       1428935     140     P     198     P     1.1     NC     Canx     calnexin       1417606     3181     P     4327     P     1.3     I     Calr     calreticulin       1433806     2476     P     3117     P     1.3     I     Calr     calreticulin									
1422845     1234     P     1034     P     0.9     D     Canx     calnexin       1428935     140     P     198     P     1.1     NC     Canx     calnexin       1417606     3181     P     4327     P     1.3     I     Calr     calreticulin       1433806     2476     P     3117     P     1.3     I     Calr     calreticulin									SEC63-like (S. cerevisiae)
1422845     1234     P     1034     P     0.9     D     Canx     calnexin       1428935     140     P     198     P     1.1     NC     Canx     calnexin       1417606     3181     P     4327     P     1.3     I     Calr     calreticulin       1433806     2476     P     3117     P     1.3     I     Calr     calreticulin	1415692	2926	P	3060	P	1.0	NC	Canx	calnexin
1428935     140     P     198     P     1.1     NC     Canx     calnexin       1417606     3181     P     4327     P     1.3     I     Calr     calreticulin       1433806     2476     P     3117     P     1.3     I     Calr     calreticulin				1034	Р				
1417606     3181     P     4327     P     1.3     I     Calr     calreticulin       1433806     2476     P     3117     P     1.3     I     Calr     calreticulin									
1433806 2476 P 3117 P 1.3 Calr calreticulin		3181	P						
1433000     24701r     31171r     1.31     Call     Calleuculin       1456170     2387     P     3134     P     1.3     NC     Calr     calreticulin									
ן אסטרען 2387 איז 13134 איז 1.3 און 1.3									
	1456170	2387	٢	3134	۲	1.3	NC	Cair	careucuim

**Table S2.** Expression of UPR related genes in XBP1 deficient liver. Total RNAs from the WT and Xbp1∆ liver were subjected to microarray analyses by using Affymetrx mouse 430A Chip. Data were analyzed by GCOS1.4 software (Affymetrix).

A, absent; P; present; D, decreased; I, increased, NC, no change

Table S3. Sequences of real time PCR primers

Gene	Forward	Reverse	Source	
XBP1s	AAGAACACGCTTGGGAATGG	CTGCACCTGCTGCGGAC	This study	
Dgat2	TTCCTGGCATAAGGCCCTATT	AGTCTATGGTGTCTCGGTTGAC	This study	
Scd1	AGATCTCCAGTTCTTACACGACCAC	GACGGATGTCTTCTTCCAGGTG	Ref. S14	
Acc2	GGGCTCCCTGGATGACAAC	TTCCGGGAGGAGTTCTGGA	Ref. S14	
SREBP-1	CAGCTCAGAGCCGTGGTGA	TTGATAGAAGACCGGTAGCGC	Ref. S14	
ChREBP	CCAGCCTCAAGGTGAGCAAA	CATGTCCCGCATCTGGTCA	PrimerBank*	
Fasn	GGAGGTGGTGATAGCCGGTAT	TGGGTAATCCATAGAGCCCAG	PrimerBank	
PGC1a	TATGGAGTGACATAGAGTGTGCT	CCACTTCAATCCACCCAGAAAG	PrimerBank	
PGC1b	TCCTGTAAAAGCCCGGAGTAT	GCTCTGGTAGGGGCAGTGA	PrimerBank	
Acc1	ATTGGGCACCCCAGAGCTA	CCCGCTCCTTCAACTTGCT	Ref. S14	
Crat	AGGGTCAGCTTCGGTTTGCT	GCAGCGTCTCATTGTCAATCA	This study	
Gck	TGAGCCGGATGCAGAAGGA	GCAACATCTTTACACTGGCCT	PrimerBank	
Pklr	TCAAGGCAGGGATGAACATTG	CACGGGTCTGTAGCTGAGTG	PrimerBank	
PEPCK	GTCACCATCACTTCCTGGAAGA	GGTGCAGAATCGCGAGTTG	PrimerBank	
G6P	GACCTCAGGAACGCCTTCTATG	ATTGATGCCCACAGTCTCTTGA	PrimerBank	
Gys2	TTGCCTCCTGTGACCACTCA	CCGATTCGTCTAATGGTGCTG	PrimerBank	
Hmgcs	GTGGCACCGGATGTCTTTG	ACTCTGACCAGATACCACGTT	PrimerBank	
Hmgcr	AGCTTGCCCGAATTGTATGTG	TCTGTTGTGAACCATGTGACTTC	PrimerBank	

\*http://pga.mgh.harvard.edu/primerbank/

## Table S4. Sequences of primers for Nothern blot probes

Gene	Forward	Reverse	Amplicon
Dgat2	TTCCTGGCATAAGGCCCTATT	AACTTCTTCTGGACCCATCGG	0.35 kb
Scd1	CCAGTTCTTACACGACCAC	GACGGATGTCTTCTTCCAGGTG	0.1 kb
Fasn	TCTCTCCAAGTTCGACGCCT	GGCAATGCTTGGTCCTTTGA	0.3 kb

Table S5. Sequences of primers use for CHIP analysis

Gene	Forward	Reverse	Position*
Dgat2	TTTGGTGTTTGGAGACAGGGT	AGAGTTTGAAGCCAGCCCAG	0.8 kb
Acc2	GAACGGTTGCATGAGTGTGAA	GGCTTGCTACACGTCCGTACT	0.4 kb
Scd1	GCTAGAGGCAGAGGGAACAGC	CTGTGAAGCCCGTCTTGTCAT	0.5 kb
ERdj4	AGTGACGCAAGGACCAAACG	CTACACGAAACGCTTCCCCA	0.2 kb

\*Distance from the transcription start site

## **Supporting references**

- S1. C. Hetz et al., Proc. Natl. Acad. Sci. U.S.A. 105, 757 (2008).
- S2. R. Kuhn, F. Schwenk, M. Aguet, K. Rajewsky, Science 269, 1427 (1995).
- S3. A. H. Lee, N. N. Iwakoshi, L. H. Glimcher, *Mol. Cell. Biol.* 23, 7448 (2003).
- S4. A. H. Lee, G. C. Chu, N. N. Iwakoshi, L. H. Glimcher, *EMBO J.* 24, 4368 (2005).
- S5. A. H. Lee, N. N. Iwakoshi, K. C. Anderson, L. H. Glimcher, *Proc. Natl. Acad. Sci. U.S.A.* **100**, 9946 (Aug 19, 2003).
- S6. M. Hattori, A. Tugores, L. Veloz, M. Karin, D. A. Brenner, *DNA Cell Biol.* 9, 777 (1990).
- S7. E. Schreiber, P. Matthias, M. M. Muller, W. Schaffner, *Nucleic. Acids Res.* 17, 6419 (1989).
- S8. A. T. Nguyen et al., Biochim. Biophys. Acta 1761, 182 (2006).
- S9. M. K. Wu, D. E. Cohen, Am. J. Physiol. Gastrointest. Liver Physiol. 289, G1067 (2005).
- S10. G. Jiang et al., J. Clin. Invest. 115, 1030 (2005).
- S11. T. C. He et al., Proc. Natl. Acad. Sci. U.S.A. 95, 2509 (1998).
- S12. J. D. Nelson, O. Denisenko, K. Bomsztyk, Nat. Protoc. 1, 179 (2006).
- S13. S. Y. Oh et al., J. Biol. Chem. 278, 28410 (2003).
- S14. X. X. Yu et al., Hepatology 42, 362 (2005).