

Supplemental Data

Supplemental table 1 Genes down-regulated in livers of hepatic HNF4 α -null mice

Description	Accession Number	Average fold change (2 ⁿ)
major urinary protein 1	AK011413	-8.3
hydroxysteroid dehydrogenase-5, delta<5>-3-beta	NM_008295	-8.0
apolipoprotein A-IV *	BC010769	-7.9
serine (or cysteine) proteinase inhibitor, clade A, member 3K	BF234005	-7.9
solute carrier organic anion transporter family, member 1a1	AB031813	-7.6
serine (or cysteine) proteinase inhibitor, clade A, member 4, pseudogene 1	BF383739	-7.5
elongation of very long chain fatty acids (FEN1/Elo2, SUR4/Elo3, yeast)-like 3	BC016468	-7.2
ESTs	BI329779	-7.1
complement component 8, alpha polypeptide **	BC027748	-7.0
hydroxysteroid dehydrogenase-2, delta<5>-3-beta **	BC026757	-6.5
RIKEN cDNA 1100001G20 gene	AV006463	-6.3
apolipoprotein M **	NM_018816	-6.2
cis-retinol/3alpha hydroxysterol short-chain dehydrogenase-like	BC018263	-6.1
0610012Dio14Rik **	BC019451	-6.0
cytidine monophospho-N-acetylneuraminic acid hydroxylase	AB061276	-6.0
Retinoic acid receptor responder (tazarotene induced) 1	BB035017	-6.0
esterase 31-like	BC019147	-5.8

cytochrome P450, 2c37 (Cyp2c37)	AI256046	-5.8
major urinary protein 3	M16359	-5.6
kidney expressed gene 1	NM_029550	-5.6
3-hydroxyanthranilate 3,4-dioxygenase **	AK002295	-5.6
Interleukin 1 receptor accessory protein **	BB653614	-5.4
ectonucleotide pyrophosphatase/phosphodiesterase 3	AV224446	-5.3
deiodinase, iodothyronine, type I	NM_007860	-5.3
cytochrome P450, family 2, subfamily a, polypeptide 12	NM_133657	-5.2
UDP glycosyltransferases 3 family, polypeptide A2	BC022134	-5.2
cytochrome P450, family 7, subfamily b, polypeptide 1	NM_007825	-5.1
Rho GTPase activating protein 9	AU043488	-5.1
NADPH oxidase 4	BC021378	-5.1
hydroxyacid oxidase 1, liver **	NM_010403	-5.1
ESTs	AI527293	-5.1
cytochrome P450, family 2, subfamily c, polypeptide 50	NM_134144	-5.0
bile acid-Coenzyme A: amino acid N-acyltransferase *	NM_007519	-4.9
ESTs	BM245957	-4.8
hydroxysteroid dehydrogenase-2, delta<5>-3-beta ///	NM_013821	-4.7
hydroxysteroid dehydrogenase-6, delta<5>-3-beta **		
PERP, TP53 apoptosis effector	NM_022032	-4.6

RNA from control (FLOX) or hepatic HNF4 α -null (H4LivKO) mice liver (n = 3) were hybridized onto Affymetrix oligonucleotide arrays and quantified. The average fold change (2ⁿ-fold) is expressed relative to FLOX mice. A gene was classified as down-regulated if the following three criteria were met: 1) the corresponding ratio was

less than $2^{-4.4}$; 2) the average difference of gene in FLOX mice liver was greater than 100; and 3) all samples in FLOX mice liver represented as 'presence'. Using the Mann-Whitney ranking feature of the Affymetrix software as criteria for statistical significance, we identified 45 probe sets (36 genes) as decreased in H4LivKO mice liver. * Genes previously characterized as directly regulated by HNF4 α . ** Genes previously reported to be down-regulated in HNF4 α null embryonic livers (4).

Supplemental Table 2 Genes Down regulated in hepatic HNF4a-null (H4LivKO) mice liver

Probe set	fold change (2 ⁿ)	Accession No.	Description
1430893_at	-8.3	AK011413	major urinary protein 1
1420531_at	-8.0	NM_008295	hydroxysteroid dehydrogenase-5, delta<5>-3-beta
1417761_at	-7.9	BC010769	apolipoprotein A-IV
1423867_at	-7.9	BF234005	serine (or cysteine) proteinase inhibitor, clade A, member 3K
1420379_at	-7.6	AB031813	solute carrier organic anion transporter family, member 1a1
1444297_at	-7.5	BF383739	serine (or cysteine) proteinase inhibitor, clade A, member 4, pseudogene 1
1444296_a_at	-7.3	BF383739	serine (or cysteine) proteinase inhibitor, clade A, member 4, pseudogene 1
1420722_at	-7.2	BC016468	elongation of very long chain fatty acids (FEN1/Elo2, SUR4/Elo3, yeast)-like 3
1457263_at	-7.1	BI329779	ESTs
1439260_a_at	-7.1	BB039510	ectonucleotide pyrophosphatase/phosphodiesterase 3
1428012_at	-7.0	BC027748	complement component 8, alpha polypeptide
1449844_at	-7.0	AB031813	solute carrier organic anion transporter family, member 1a1
1436504_x_at	-6.6	AV027367	apolipoprotein A-IV
1425127_at	-6.5	BC026757	hydroxysteroid dehydrogenase-2, delta<5>-3-beta
1448092_x_at	-6.5	AA267743	serine (or cysteine) proteinase inhibitor, clade A, member 4, pseudogene 1
1419001_at	-6.4	NM_007519	bile acid-Coenzyme A: amino acid N-acyltransferase
1434484_at	-6.3	AV006463	RIKEN cDNA 1100001G20 gene
1419095_a_at	-6.2	NM_018816	apolipoprotein M
1451681_at	-6.1	BC018263	cis-retinol/3alpha hydroxysterol short-chain dehydrogenase-like
1425117_at	-6.0	BC019451	RIKEN cDNA 0610012D14 gene
1428043_a_at	-6.0	AB061276	cytidine monophospho-N-acetylneuraminic acid hydroxylase
1438055_at	-6.0	BB035017	retinoic acid receptor responder (tazarotene induced) 1
1421214_at	-5.9	NM_007717	cytidine monophospho-N-acetylneuraminic acid hydroxylase
1451600_s_at	-5.8	BC019147	esterase 31-like
1455457_at	-5.8	AI256046	cytochrome P450, 2c37
1434110_x_at	-5.8	BF322785	major urinary protein 1
1427631_x_at	-5.6	M16359	major urinary protein 3
1416833_at	-5.6	NM_029550	kidney expressed gene 1

1432492_a_at	-5.6	AK002295	3-hydroxyanthranilate 3,4-dioxygenase
1419096_at	-5.5	NM_018816	apolipoprotein M
1426154_s_at	-5.5	M27608	major urinary protein 3 /// major urinary protein 1
1457601_at	-5.4	BB653614	interleukin 1 receptor accessory protein
1448792_a_at	-5.3	NM_007817	cytochrome P450, family 2, subfamily f, polypeptide 2
1417991_at	-5.3	NM_007860	deiodinase, iodothyronine, type 1
1427302_at	-5.3	AV224446	ectonucleotide pyrophosphatase/phosphodiesterase 3
1422815_at	-5.3	NM_013485	complement component 9
1418821_at	-5.2	NM_133657	cytochrome P450, family 2, subfamily a, polypeptide 12
1423397_at	-5.2	AI118428	RIKEN cDNA 9430041C03 gene
1425365_a_at	-5.2	BC018344	cytochrome P450, family 2, subfamily d, polypeptide 13
1419094_at	-5.2	NM_010001	cytochrome P450, 2c37 (Cyp2c37)
1423968_at	-5.2	BC022134	expressed sequence AI313915
1421075_s_at	-5.1	NM_007825	cytochrome P450, family 7, subfamily b, polypeptide 1
1449619_s_at	-5.1	AU043488	Rho GTPase activating protein 9
1451827_a_at	-5.1	BC021378	NADPH oxidase 4
1420420_at	-5.1	NM_010403	hydroxyacid oxidase 1, liver
1451488_at	-5.1	AB054000	RIKEN cDNA 1110028A07 gene
1440921_at	-5.1	AI527293	ESTs
1424576_s_at	-5.0	BC025819	cDNA sequence BC034834
1437932_a_at	-5.0	AV227581	claudin 1
1418653_at	-5.0	NM_134144	expressed sequence AI266900 (AI266900)
1419002_s_at	-4.9	NM_007519	bile acid-Coenzyme A: amino acid N-acyltransferase
1421074_at	-4.8	NM_007825	cytochrome P450, family 7, subfamily b, polypeptide 1
1418998_at	-4.8	NM_133809	kynurenine 3-monooxygenase (kynurenine 3-hydroxylase)
1436039_at	-4.8	BM245957	ESTs
1427137_at	-4.8	BC022148	carboxylesterase 5
1436109_at	-4.8	BE980249	expressed sequence AI317395
1460232_s_at	-4.7	NM_013821	hydroxysteroid dehydrogenase-2, delta<5>-3-beta /// hydroxysteroid dehydrogenase-6, delta<5>-3-beta
1418438_at	-4.7	NM_007980	fatty acid binding protein 2, intestinal
1449309_at	-4.7	BC010973	cytochrome P450, family 8, subfamily b, polypeptide 1
1425712_at	-4.7	BC025446	cDNA sequence BC025446
1418766_s_at	-4.7	BC028829	T-cell immunoglobulin and mucin domain containing 2

1416271_at	-4.6	NM_022032	PERP, TP53 apoptosis effector
1449242_s_at	-4.6	NM_053176	histidine-rich glycoprotein
1451460_a_at	-4.6	BC026598	solute carrier family 22 (organic anion transporter), member 7
1418765_at	-4.6	BC028829	T-cell immunoglobulin and mucin domain containing 2
1449321_x_at	-4.6	NM_009246	serine (or cysteine) proteinase inhibitor, clade A, member 1b /// serine (or cysteine) proteinase inhibitor, clade A, member 1d /// serine (or cysteine) proteinase inhibitor, clade A, member 1a /// serine (or cysteine) proteinase inhibitor, clade A, member 1
1436615_a_at	-4.6	AI786408	ornithine transcarbamylase
1418940_at	-4.5	NM_019878	sulfotransferase family 1B, member 1
1431701_a_at	-4.5	AK006269	PDZ domain containing 1
1451373_at	-4.5	BC025940	expressed sequence AI746432
1420525_a_at	-4.5	NM_008769	ornithine transcarbamylase
1425596_at	-4.5	BC018406	similar to RIKEN cDNA 2010001E11 gene
1451788_at	-4.5	AF356627	coagulation factor XI
1417828_at	-4.5	NM_007474	aquaporin 8
1421092_at	-4.4	AK014346	serine (or cysteine) proteinase inhibitor, clade A (alpha-1 antiproteinase, antitrypsin), member 12
1454777_at	-4.4	BB553107	solute carrier organic anion transporter family, member 2b1
1433408_a_at	-4.4	AK010648	minichromosome maintenance deficient 10 (S. cerevisiae)
1456074_at	-4.4	BB143568	orphan short chain dehydrogenase/reductase
1422070_at	-4.4	NM_011996	alcohol dehydrogenase 4 (class II), pi polypeptide
1430785_at	-4.4	BB150587	orphan short chain dehydrogenase/reductase
1420553_x_at	-4.4	NM_009243	serine (or cysteine) proteinase inhibitor, clade A, member 1a
1418923_at	-4.4	NM_134069	solute carrier family 17 (sodium phosphate), member 3
1431803_at	-4.3	AK004933	cytochrome P450, family 2, subfamily d, polypeptide 13
1417231_at	-4.3	NM_016675	claudin 2
1425300_at	-4.3	BC021917	cDNA sequence BC021917
1438751_at	-4.3	BB736474	RIKEN cDNA 130106K10 gene
1460509_at	-4.3	AK018190	RIKEN cDNA 6330417G03 gene
1419319_at	-4.3	NM_011316	serum amyloid A 4
1433933_s_at	-4.3	BB553107	solute carrier organic anion transporter family, member 2b1
1441396_at	-4.2	AV328619	ESTs
1419614_at	-4.2	BC021592	phospholipase A2, group XIIB

1418395_at	-4.2	NM_026183	RIKEN cDNA 1300013J15 gene
1431721_a_at	-4.2	BC024104	protein Z, vitamin K-dependent plasma glycoprotein
1448741_at	-4.2	NM_009205	solute carrier family 3, member 1
1428223_at	-4.2	AK006096	RIKEN cDNA 1700018O18 gene
1452384_at	-4.1	AV224446	ectonucleotide pyrophosphatase/phosphodiesterase 3
1426166_at	-4.1	M16360	major urinary protein 5
1424867_a_at	-4.1	BC010799	glycine-N-acyltransferase
1429642_at	-4.1	AK012639	AN1, ubiquitin-like, homolog (<i>Xenopus laevis</i>)
1436162_at	-4.1	BB667865	RIKEN cDNA C730048C13 gene
1418804_at	-4.1	NM_032400	succinate receptor 1
1451625_a_at	-4.1	BC019967	RIKEN cDNA 1700013L23 gene
1421912_at	-4.0	AA276202	solute carrier family 23 (nucleobase transporters), member 1
1428538_s_at	-4.0	BI328146	retinoic acid receptor responder (tazarotene induced) 2
1449585_at	-4.0	NM_134103	interleukin 1 receptor accessory protein
1419510_at	-4.0	NM_133660	esterase 22
1427377_x_at	-4.0	M77015	hydroxysteroid dehydrogenase-3, delta⁵-3-beta
1449112_at	-4.0	NM_009512	solute carrier family 27 (fatty acid transporter), member 5
1424934_at	-4.0	BC027200	RIKEN cDNA 1300012D20 gene
1430130_at	-4.0	BB212004	RIKEN cDNA 1300015B04 gene
1428981_at	-4.0	AK012685	RIKEN cDNA 2810007J24 gene
1450201_at	-4.0	NM_025834	RIKEN cDNA 1300015B06 gene
1418916_a_at	-3.9	NM_029269	secreted phosphoprotein 2
1421921_at	-3.9	BC011158	serine (or cysteine) proteinase inhibitor, clade A, member 3M
1424352_at	-3.9	BC025936	similar to cytochrome P450, 4a10
1419349_a_at	-3.9	BC010593	cytochrome P450, family 2, subfamily d, polypeptide 9
1432099_a_at	-3.9	AK011039	proline dehydrogenase (oxidase) 2
1424722_at	-3.8	BC021390	RIKEN cDNA 1300017J02 gene
1437902_s_at	-3.8	AV012073	retinoic acid receptor responder (tazarotene induced) 2
1460420_a_at	-3.8	AF277898	epidermal growth factor receptor
1450014_at	-3.7	NM_016674	claudin 1
1420496_at	-3.7	NM_021489	coagulation factor XII (Hageman factor)
1427337_at	-3.7	BC013511	aldehyde dehydrogenase 8 family, member A1
1421944_a_at	-3.7	U09362	asialoglycoprotein receptor 1
1417070_at	-3.7	NM_133969	cytochrome P450, family 4, subfamily v, polypeptide 3

1428739_at	-3.7	BB772205	RIKEN cDNA 2310040A07 gene
1437156_at	-3.7	BB392041	EF hand calcium binding protein 1
1426959_at	-3.7	BF322712	3-hydroxybutyrate dehydrogenase (heart, mitochondrial)
1419318_at	-3.6	NM_011316	serum amyloid A 4
1435750_at	-3.6	BB610454	GTP cyclohydrolase I feedback regulator
1444691_at	-3.6	BB667397	protein kinase C, nu
1451515_s_at	-3.6	BC010799	glycine-N-acyltransferase
1417071_s_at	-3.6	NM_133969	cytochrome P450, family 4, subfamily v, polypeptide 3
1427336_at	-3.6	BC013511	aldehyde dehydrogenase 8 family, member A1
1424493_s_at	-3.6	BC025940	expressed sequence AI746432
1448683_at	-3.6	NM_029562	cytochrome P450, family 2, subfamily d, polypeptide 26
1426215_at	-3.6	AF071068	aromatic-L-amino-acid decarboxylase
1423866_at	-3.6	BF234005	serine (or cysteine) proteinase inhibitor, clade A, member 3K
1450127_a_at	-3.6	NM_008101	glucagon receptor
1419436_at	-3.6	NM_015780	complement component factor h-like 1
1418976_s_at	-3.6	NM_009894	cell death-inducing DNA fragmentation factor, alpha subunit-like effector B
1424245_at	-3.6	BC015290	carboxylesterase 2
1424932_at	-3.6	U03425	epidermal growth factor receptor
1451547_at	-3.6	BC023358	0610009A07Rik
1433579_at	-3.5	BG068678	transmembrane protein 30B
1452893_s_at	-3.5	BB772205	RIKEN cDNA 2310040A07 gene /// RIKEN cDNA 1110065P19 gene
1425392_a_at	-3.5	AF009328	nuclear receptor subfamily 1, group I, member 3
1449308_at	-3.5	NM_016704	complement component 6
1434091_at	-3.5	BB189927	fatty acid amide hydrolase
1418853_at	-3.5	NM_133996	DNA segment, Chr 10, University of California at Los Angeles 2
1419560_at	-3.4	NM_008280	lipase, hepatic
1416762_at	-3.4	NM_009112	S100 calcium binding protein A10 (calpactin)
1429550_at	-3.4	AK008590	ectonucleoside triphosphate diphosphohydrolase 8
1449375_at	-3.4	NM_133960	carboxylesterase 6
1452257_at	-3.4	BF322712	3-hydroxybutyrate dehydrogenase (heart, mitochondrial)
1442537_at	-3.4	BB771206	Adult male aorta and vein cDNA, RIKEN full-length enriched library, clone:A530016B22 product:unknown EST, full insert sequence
1419131_at	-3.4	NM_031164	coagulation factor XIII, beta subunit

1418668_at	-3.4	NM_054094	butyryl Coenzyme A synthetase 1
1453724_a_at	-3.3	AK012411	serine (or cysteine) proteinase inhibitor, clade F, member 1
1418664_at	-3.3	AK019164	multiple PDZ domain protein
1418547_at	-3.3	NM_009364	tissue factor pathway inhibitor 2
1435888_at	-3.3	AV369812	RIKEN cDNA 9030024J15 gene
1451530_at	-3.3	U03425	epidermal growth factor receptor
1450133_at	-3.3	NM_028094	RIKEN cDNA 2010321J07 gene
1427472_a_at	-3.3	BC022129	complement component 8, beta subunit
1416168_at	-3.3	NM_011340	serine (or cysteine) proteinase inhibitor, clade F, member 1
1460722_at	-3.3	BC025931	sterol O-acyltransferase 2
1457403_at	-3.2	AV378018	ESTs
1427369_at	-3.2	BB071996	NACHT, leucine rich repeat and PYD containing 6
1451675_a_at	-3.2	M63244	aminolevulinic acid synthase 2, erythroid
1438359_at	-3.2	AV066542	RIKEN cDNA 2010003K15 gene
1418113_at	-3.2	BC010989	cytochrome P450, family 2, subfamily d, polypeptide 10
1456642_x_at	-3.2	AV295650	S100 calcium binding protein A10 (calpactin)
1418724_at	-3.2	NM_007686	complement component factor i
1434906_at	-3.2	AI182092	RIKEN cDNA 0610005C13 gene
1451760_s_at	-3.2	BC018406	expressed sequence AI317395
1419121_at	-3.2	NM_016785	thiopurine methyltransferase
1421969_a_at	-3.2	U82536	fatty acid amide hydrolase
1421212_at	-3.1	NM_018795	ATP-binding cassette, sub-family C (CFTR/MRP), member 6
1448927_at	-3.1	NM_080465	potassium intermediate/small conductance calcium-activated channel, subfamily N, member 2
1427459_at	-3.1	BC025836	RIKEN cDNA 1300018K11 gene
1440327_at	-3.1	AA985897	expressed sequence AI195470
1424811_at	-3.1	BC024605	camello-like 5
1439934_at	-3.1	BB540543	RIKEN cDNA 130106K10 gene
1417232_at	-3.1	NM_016675	claudin 2
1449125_at	-3.1	NM_025566	RIKEN cDNA 2600017J23 gene
1418037_at	-3.1	NM_007576	complement component 4 binding protein
1428338_at	-3.0	AK019166	RIKEN cDNA 2610039E05 gene
1418519_at	-3.0	BC012637	aminoadipate aminotransferase
1431916_at	-3.0	AK018558	RIKEN cDNA 9030618K22 gene

1451361_a_at	-3.0	BC027342	cDNA sequence BC027342
1416968_a_at	-3.0	NM_133943	hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 7
1435691_at	-3.0	BB209207	ES cells cDNA, RIKEN full-length enriched library, clone:C330021102 product:unknown EST, full insert sequence
1423271_at	-3.0	AV239646	gap junction membrane channel protein beta 2
1424273_at	-3.0	BC025822	cytochrome P450, family 2, subfamily c, polypeptide 70
1448898_at	-3.0	AF128196	chemokine (C-C motif) ligand 9
1419400_at	-2.9	AW553649	microsomal triglyceride transfer protein
1417936_at	-2.9	AF128196	small inducible cytokine A9
1417835_at	-2.9	NM_008645	murinoglobulin 1
1418282_x_at	-2.9	NM_009244	serine protease inhibitor 1-2 (Spi-2)
1419677_at	-2.9	NM_008555	mannan-binding lectin serine protease 1
1456981_at	-2.9	BB428982	transmembrane channel-like gene family 7
1427711_a_at	-2.9	X15351	CEA-related cell adhesion molecule 1
1432282_a_at	-2.9	AK008522	RIKEN cDNA 2010305C02 gene
1459030_at	-2.9	AI874739	expressed sequence AI874739
1451513_x_at	-2.9	BC012874	serine (or cysteine) proteinase inhibitor, clade A, member 1b
1434606_at	-2.9	BF140685	V-erb-b2 erythroblastic leukemia viral oncogene homolog 3 (avian)
1425107_a_at	-2.8	D17444	leukemia inhibitory factor receptor
1426706_s_at	-2.8	BB431728	xylulokinase homolog (H. influenzae)
1418787_at	-2.8	NM_010776	mannose binding lectin, serum (C)
1453259_at	-2.8	BB667513	RIKEN cDNA 3830422K02 gene
1426223_at	-2.8	BC020021	RIKEN cDNA 2810439F02 gene
1455084_x_at	-2.8	BB758291	serine hydroxymethyl transferase 2 (mitochondrial)
1425675_s_at	-2.8	M77196	CEA-related cell adhesion molecule 1
1433855_at	-2.8	BF462185	4-aminobutyrate aminotransferase
1425538_x_at	-2.7	BC016891	CEA-related cell adhesion molecule 1
1453043_at	-2.7	AK002603	RIKEN cDNA 0610012H03 gene
1417203_at	-2.7	BC010592	ethylmalonic encephalopathy 1
1427630_x_at	-2.7	X67278	CEA-related cell adhesion molecule 1
1426663_s_at	-2.7	BC024519	RIKEN cDNA 2210413P12 gene
1419399_at	-2.7	AW553649	microsomal triglyceride transfer protein
1422183_a_at	-2.7	NM_007416	adrenergic receptor, alpha 1b

1426664_x_at	-2.7	BC024519	RIKEN cDNA 2210413P12 gene
1418069_at	-2.7	NM_009695	apolipoprotein C-II
1450494_x_at	-2.7	NM_011926	CEA-related cell adhesion molecule 1
1418352_at	-2.7	BC012682	hydroxysteroid (17-beta) dehydrogenase 2
1426423_at	-2.7	BM222403	serine hydroxymethyl transferase 2 (mitochondrial)
1448426_at	-2.7	BI217574	sarcosine dehydrogenase
1416662_at	-2.7	BI217574	sarcosine dehydrogenase
1416893_at	-2.6	BC021353	RIKEN cDNA 3110001A13 gene
1452532_x_at	-2.6	M61907	CEA-related cell adhesion molecule 1
1420515_a_at	-2.6	NM_021319	peptidoglycan recognition protein 2
1430896_s_at	-2.5	AK008824	nudix (nucleoside diphosphate linked moiety X)-type motif 7
1431609_a_at	-2.5	AK008391	acid phosphatase 5, tartrate resistant
1431302_a_at	-2.5	AK011172	nudix (nucleoside diphosphate linked moiety X)-type motif 7
1429254_at	-2.5	BF472491	aquaporin 11
1459994_x_at	-2.4	AV027486	transferrin receptor 2
1420493_a_at	-2.4	NM_024229	phosphate cytidylyltransferase 2, ethanolamine
1448813_at	-2.4	NM_023383	arylacetamide deacetylase (esterase)
1419525_at	-2.4	NM_007608	carbonic anhydrase 5a, mitochondrial
1454649_at	-2.4	AV003635	RIKEN cDNA 4930435F02 gene
1460682_s_at	-2.3	BC024320	CEA-related cell adhesion molecule 2
1428851_at	-2.3	AK005003	RIKEN cDNA 1300014I06 gene
1425381_a_at	-2.3	BC013654	transferrin receptor 2
1418808_at	-2.3	NM_134006	retinol dehydrogenase 5
1418836_at	-2.3	AI195046	quinolinate phosphoribosyltransferase
1460681_at	-2.3	BC024320	CEA-related cell adhesion molecule 2
1418365_at	-2.3	NM_007801	cathepsin H
1434520_at	-2.3	AU067703	sterol-C5-desaturase (fungal ERG3, delta-5-desaturase) homolog (S. cerevisiae)
1419578_at	-2.2	NM_010775	mannose binding lectin, liver (A)
1418172_at	-2.2	AF117613	heme binding protein 1
1437654_at	-2.2	BE630700	RIKEN cDNA 3110001K24 gene
1427214_at	-2.2	AK017155	agmatine ureohydrolase (agmatinase)
1428151_x_at	-2.2	AK008165	cysteine conjugate-beta lyase
1448854_s_at	-2.2	NM_008645	murinoglobulin 1 /// murinoglobulin 4 /// murinoglobulin, pseudogene

			1 /// murinoglobulin 2
1452678_a_at	-2.1	AK008165	cysteine conjugate-beta lyase

RNA from control (FLOX) or hepatic HNF4 α -null (H4LivKO) mice liver (n = 3) were hybridized onto Affymetrix oligonucleotide arrays and quantified. The average fold change (2ⁿ-fold) is expressed relative to FLOX mice. A gene was classified as down-regulated if the following two criteria were met: 1) the corresponding ratio was less than 2⁻²; and 2) the average difference of gene in Flox mice liver was greater than 100. Using the Mann-Whitney ranking feature of the Affymetrix software as criteria for statistical significance, we identified 256 probe sets (208 genes) as decreased in H4LivKO mice liver.

Supplemental Table 3 Genes Up- regulated in hepatic HNF4 α -null (H4LivKO) mice liver

Probe set	fold change (2 ⁿ)	Accession No.	Description
1443147_at	9.4	BB505010	ESTs
1416055_at	8.0	NM_009669	amylase 2, pancreatic
1420447_at	7.9	NM_023135	sulfotransferase family 1E, member 1
1419528_at	7.3	NM_009286	sulfotransferase family 2A, dehydroepiandrosterone (DHEA)-preferring, member 2
1418095_at	7.1	NM_025357	small muscle protein, X-linked
1419491_at	6.9	BC024380	defensin beta 1
1449525_at	6.4	NM_008030	flavin containing monooxygenase 3
1418654_at	6.3	NM_019545	hydroxyacid oxidase (glycolate oxidase) 3
1422925_s_at	6.3	NM_134246	peroxisomal acyl-CoA thioesterase 2A
1419590_at	6.2	NM_010000	cytochrome P450, family 2, subfamily b, polypeptide 9
1425752_at	5.8	AJ132857	cDNA sequence BC014805
1458442_at	5.4	AI266897	expressed sequence AI132709
1424524_at	5.3	BC021433	RIKEN cDNA 1200002N14 gene
1419492_s_at	5.3	BC024380	defensin beta 1
1434897_a_at	5.1	AV327862	solute carrier family 25 (mitochondrial carrier, adenine nucleotide translocator), member 4
1434465_x_at	5.0	AV333363	very low density lipoprotein receptor
1417900_a_at	4.9	NM_013703	very low density lipoprotein receptor
1418989_at	4.8	NM_007799	cathepsin E
1452913_at	4.8	AV337888	Purkinje cell protein 4-like 1
1424562_a_at	4.8	BC026925	solute carrier family 25 (mitochondrial carrier, adenine nucleotide translocator), member 4
1417273_at	4.7	NM_013743	pyruvate dehydrogenase kinase, isoenzyme 4
1436991_x_at	4.6	AV025559	gelsolin
1425751_at	4.6	AJ132857	cDNA sequence BC014805
1419748_at	4.6	NM_011994	ATP-binding cassette, sub-family D (ALD), member 2
1455069_x_at	4.5	BF225398	solute carrier family 25 (mitochondrial carrier, adenine nucleotide translocator), member 4
1437171_x_at	4.5	AV025667	gelsolin
1430584_s_at	4.4	BB213876	carbonic anhydrase 3
1448975_s_at	4.4	NM_031192	renin 1 structural

1453588_at	4.3	BB213876	carbonic anhydrase 3
1421425_a_at	4.3	NM_030598	Down syndrome critical region gene 1-like 1
1425273_s_at	4.3	AF083876	epithelial membrane protein 2
1415812_at	4.3	NM_010354	gelsolin
1456312_x_at	4.3	AV224521	gelsolin
1425644_at	4.1	U42467	leptin receptor
1425875_a_at	4.1	U58862	leptin receptor
1438431_at	4.1	BB197269	expressed sequence AL024097
1432944_at	4.0	AK013658	RIKEN cDNA 2900046L07 gene
1450971_at	4.0	AK010420	growth arrest and DNA-damage-inducible 45 beta
1415997_at	4.0	AF173681	thioredoxin interacting protein
1441891_x_at	3.9	BB338945	ELOVL family member 7, elongation of long chain fatty acids (yeast)
1426622_a_at	3.9	BB150720	glutaminy-peptide cyclotransferase (glutaminy cyclase)
1456156_at	3.9	BM124366	ESTs
1450883_a_at	3.7	BB534670	CD36 antigen
1424959_at	3.5	BC013521	annexin A13
1449773_s_at	3.5	AI323528	growth arrest and DNA-damage-inducible 45 beta
1421681_at	3.5	NM_032002	neuregulin 4
1423166_at	3.5	BB534670	CD36 antigen
1419700_a_at	3.4	NM_008935	prominin 1
1422997_s_at	3.4	NM_134188	mitochondrial acyl-CoA thioesterase 1 /// cytosolic acyl-CoA thioesterase 1
1415996_at	3.4	AF173681	thioredoxin interacting protein
1451064_a_at	3.4	BC004827	phosphoserine aminotransferase 1
1450884_at	3.3	BB534670	CD36 antigen
1427473_at	3.3	J03953	glutathione S-transferase, mu 3
1449065_at	3.3	NM_012006	cytosolic acyl-CoA thioesterase 1
1451798_at	3.2	M57525	interleukin 1 receptor antagonist
1450243_a_at	3.2	NM_030598	Down syndrome critical region gene 1-like 1
1429123_at	3.1	BB025283	RAB27A, member RAS oncogene family
1425272_at	3.1	AF083876	epithelial membrane protein 2
1427063_at	3.0	AK017241	RIKEN cDNA 5330417C22 gene
1418780_at	3.0	NM_018887	cytochrome P450, family 39, subfamily a, polypeptide 1
1422811_at	2.9	NM_011977	solute carrier family 27 (fatty acid transporter), member 1

1427474_s_at	2.9	J03953	glutathione S-transferase, mu 3
1458176_at	2.9	BB021263	period homolog 3 (Drosophila)
1446423_at	2.9	BB479853	ESTs
1440840_at	2.8	BB335455	RIKEN cDNA D630004K10 gene
1421430_at	2.8	NM_009014	RAD51-like 1 (S. cerevisiae)
1438617_at	2.8	BB222737	ESTs
1428626_at	2.8	AK008800	RIKEN cDNA 2210402C18 gene
1418191_at	2.8	NM_011909	ubiquitin specific protease 18
1433670_at	2.8	BE571790	epithelial membrane protein 2
1423555_a_at	2.8	BB329808	interferon-induced protein 44
1415958_at	2.8	AB008453	solute carrier family 2 (facilitated glucose transporter), member 4
1418328_at	2.7	AF017174	carnitine palmitoyltransferase 1b, muscle
1417101_at	2.6	BC004714	heat shock protein 2
1456226_x_at	2.6	BB234940	discoïdin domain receptor family, member 1
1419759_at	2.5	M30697	ATP-binding cassette, sub-family B (MDR/TAP), member 1A
1425109_at	2.4	BC025548	cDNA sequence BC010552

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Supplementary Figure 1. HNF4 α regulates the Dio1 gene expression in human. (A) siRNA-mediated knockdown of HNF4 α . The duplexes of each siRNA, targeting HNF4 α mRNA (si-HNF4 α (i); target sequences of 5'-GGCAGUGCGUGGUGGACAAAdTdT-3' and 5'-UUGUCCACCACGCACUGCCdGdG-3', si-HNF4 α (ii); target sequences of 5'-AGAGAUCCAUGGUGUCCAAdTdT-3' and 5'-UUGAACACCAUGGAUCUCUdTdG) and negative control (non-silencing siRNA) (si-cont; 5'-UUCUCCGAACGUGUCACGUdTdT-3' and 5'-ACGUGACACGUUCGGAGAAAdTdT-3') were purchased from Qiagen (Valencia, CA) as previously described (1). HepG2 cells were plated on day 0 at a density of 5×10^5 cells/6-well plates. On day 1, cells were transfected with HNF4 α -specific (si-HNF4 α (i) or (ii)) or control siRNA (si-cont), at final concentration of 100 nM using Lipofectamine 2000 reagent. On day 3, the cells were harvested for RNA as well as for protein. Total RNA was reverse-transcribed and subjected to QRT-PCR with specific primers for HNF4 α (top). Cyclophilin was used as the invariant control. Values represent the amount of mRNA relative to that in the control group, which is arbitrarily defined as 1. Each value represents mean \pm S.D. of triplicate experiments. *, $P < 0.01$ compared with control. 5 μ g of protein were subjected to SDS-PAGE and immunoblot analysis using either anti-HNF4 α (IgG-H1415) or β -actin antibody (bottom). (B and C) Effect of HNF4 α on the levels of Dio1 transcripts in HepG2 cells. Total RNA was reverse-transcribed and subjected to QRT-PCR with specific primers for Dio1 (B). Cell lysates from HepG2 cells were prepared and Dio1 activities were determined using rT₃ as substrate (C). Each bar represents means \pm SD. * $P < 0.01$ compared with control. (D) ChIP assays for HNF4 α association with the human Dio1 promoter. Crosslinked DNA-protein complexes from HepG2 cells extracts were immunoprecipitated with anti-HNF4 α antibody, or control IgG, followed by PCR amplification with specific primers as schematically depicted in the diagram. Genomic DNA in the input cell lysates was used as a positive control.

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