

**Supplementary Table 1**  
**Sequence of primers used for real-time RT-PCR analysis**

Accession No.	Gene symbol	Forward primer (5'→3')	Reverse primer (5'→3')
NM_001077643	<i>Mpc2</i>	GGCCAGACCT GCAGAGAAAC T	CCAAATAAAC CCTGTAGCCA TCAG
NM_134364	<i>Atp5f1b</i>	AAAGAATCAC CACCACCAAG AAG	TCATCAGCTG GCACATAGAT AGC
NM_012915	<i>Atp5if1</i>	CAGCTGGCTG CTTGAAGA	CCGTTTCGATC TGTTTTTGCA
NM_138827	<i>Slc2a1</i>	TTGCTGTGGC TGGCTTCTC	GCCACACAGT TGCTCCACAT
NM_012879	<i>Slc2a2</i>	TTCATCATCG CCCTCTGCTT	GCAAAAAGGA AGAACACGTA AGG
NM_012734	<i>Hk1</i>	TCGGCGGGTC TTCCTTTC	CGTTCTGGTT CTTCTCGTGG TT
NM_012735	<i>Hk2</i>	TCAGCCCAGA ACTCCTTACC A	CGATTCCATC CTTATCCTCT TCA
NM_022179	<i>Hk3</i>	CCATCAACCC AGGCAAACA	ACGATCTCCC CCAGGTACAT T
NM_012624	<i>Pklr</i>	ACCAGCATCA TTGCCACCAT	GCAATGTTCA TCCCTGCTTT G
NM_053297	<i>Pkm</i>	TCATCAGCAA AATCGAGAAC CA	CCACGAGCTA CCATGATTCC A
NM_017006	<i>G6pd</i>	CTGCACAAGA TTGATCGAGA GAAG	GGACCTCGGC TGCCATAGA
NM_175758	<i>Slc1a5</i>	TTATGTGGTA CGCCCCCATT	GAGCTGGCGG ATGTCTTTCA
NM_012569	<i>Gls</i>	CCTGAGGCCG TTCGGAATA	AATGCAAACCT GCCCTGAGAA GT
NM_001109968	<i>Gls</i>	CCTGAGGCCG TTCGGAATA	AATGCAAACCT GCCCTGAGAA GT
NM_012603	<i>Myc</i>	GACAGCAGCT CGCCCAAAT	GCGAGTCCGA GGAAGAAGAG A
NM_030989	<i>Tp53</i>	CCCTTCACTG CCTTTTTTTA CCT	GCCAGGAACC AGTTTGCATA G
NM_031144	<i>Actb</i>	CCCTGGCTCC TAGCACCAT	AGAGCCACCA ATCCACACAG A
NM_012583	<i>Hprt1</i>	GTCAAGCAGT ACAGCCCCAA A	CAACACTTCG AGAGGTCCTT TTC

Abbreviations: *Actb*, actin, beta; *Atp5f1b*, ATP synthase F<sub>1</sub> subunit beta; *Atp5if1*, ATP synthase inhibitory factor subunit 1; *G6pd*, glucose-6-phosphate dehydrogenase; *Gls*, glutaminase; *Hk*, hexokinase; *Hprt1*, hypoxanthine phosphoribosyltransferase 1; *Mpc2*, mitochondrial pyruvate carrier 2; *Myc*, MYC proto-oncogene, bHLH transcription factor; *Pklr*, pyruvate kinase, liver and red blood cell; *Pkm*, pyruvate kinase M1/2; RT-PCR, reverse transcription-polymerase chain reaction; *Slc1a5*, solute carrier family 1 member 5; *Slc2a1*, solute carrier family 2 member 1; *Slc2a2*, solute carrier family 2 member 2; *Tp53*, tumor protein p53.

**Supplementary Table 2**  
**Immunohistochemical methodology**

Antigen	Antibody type	Dilution	Antigen retrieval	Source	Catalog. No.
GST-P	Rabbit polyclonal	1:1000	None	Medical & Biological Laboratories (Nagoya, Japan)	311
ATPB	Mouse monoclonal, clone 3D5	1:400	Autoclaving at 121°C for 10 min in Dako target retrieval solution (pH 9.0)	Abcam plc (Cambridge, UK)	ab14730
GLUT1	Rabbit polyclonal	1:250	Autoclaving at 121°C for 10 min in Dako target retrieval solution (pH 9.0)	Abcam plc	ab115730
G6PD	Goat polyclonal	1:500	Autoclaving at 121°C for 10 min in Dako target retrieval solution (pH 9.0)	Novus Biologicals (Littleton, CO, NB100-0954 USA)	
PKLR	Rabbit polyclonal	1:1000	None	Thermo Fisher Scientific (Rockford, IL, USA)	PA5-22178
PKM2	Rabbit polyclonal	1:500	Microwaving at 90°C for 10 min in Dako target retrieval solution (pH 9.0)	Thermo Fisher Scientific	PA5-29339
SLC1A5	Rabbit polyclonal	1:100	Microwaving at 90°C for 10 min in Dako target retrieval solution (pH 9.0)	LifeSpan BioSciences, Inc. (Seattle, WA, USA)	LS-C31887-100
c-MYC	Rabbit monoclonal, clone Y69	1:500	Autoclaving at 121°C for 10 min in Dako target retrieval solution (pH 9.0)	Abcam plc	ab32072

Abbreviations: ATPB, ATP synthase subunit beta, mitochondrial precursor; GLUT1, solute carrier family 2, facilitated glucose transporter member 1; G6PD, glucose-6-phosphate 1-dehydrogenase; GST-P, glutathione *S*-transferase placental form; MYC, myc proto-oncogene protein; PKLR, pyruvate kinase, liver and red blood cell; PKM2, pyruvate kinase isozyme M2; SLC1A5, neutral amino acid transporter B (0).

**Supplementary Table 3**

**Transcript expression levels in the liver of rats treated with genotoxic or non-genotoxic hepatocarcinogens relative to untreated controls after 28 days of treatment in Experiment 1**

	Relative transcript level normalized to <i>Actb</i>			Relative transcript level normalized to <i>Hprt1</i>		
	CONT	DEN	CCl <sub>4</sub>	CONT	DEN	CCl <sub>4</sub>
OXPHOS-related molecules						
<i>Mpc2</i>	1.04±0.31	1.17±0.37	0.65±0.17	1.03±0.25	1.33±0.35	1.10±0.22
<i>Atp5flb</i>	1.02±0.18	1.11±0.16	0.42±0.07**	1.02±0.21	1.28±0.19	0.72±0.05
<i>Atp5ifl</i>	1.03±0.24	1.43±0.23*	1.36±0.26	1.03±0.24	1.65±0.27**	2.31±0.33**
Glycolysis- and PPP-related molecules						
<i>Slc2a1</i>	1.08±0.46	0.78±0.14	0.33±0.05**	1.08±0.41	0.90±0.14	0.57±0.06
<i>Slc2a2</i>	1.02±0.22	0.97±0.15	0.44±0.09**	1.03±0.24	1.11±0.11	0.76±0.10*
<i>Hk1</i>	1.05±0.34	1.71±0.69	2.66±1.12**	1.10±0.52	1.80±0.54	3.98±1.12**
<i>Hk2</i>	1.08±0.51	1.59±0.77	4.07±0.76**	1.13±0.67	1.69±0.63	6.32±1.34**
<i>Hk3</i>	1.03±0.25	1.79±0.48**	1.79±0.38**	1.06±0.40	1.94±0.44	2.83±0.94**
<i>Pklr</i>	1.04±0.31	0.86±0.19	0.21±0.08**	1.05±0.32	1.00±0.26	0.35±0.12**
<i>Pkm</i>	1.04±0.31	1.82±0.25*	5.04±0.74**	1.07±0.40	2.10±0.32**	8.82±2.46**
<i>G6pd</i>	1.05±0.36	0.95±0.30	0.80±0.27	1.11±0.53	1.02±0.25	1.21±0.33
Glutaminolysis-related molecules						
<i>Slc1a5</i>	1.05±0.31	2.17±0.52**	5.68±1.48**	1.10±0.49	2.38±0.63*	9.02±3.57**
<i>Gls</i>	1.02±0.22	1.22±0.34	2.09±0.53**	1.06±0.39	1.32±0.35	3.26±1.02**
Metabolic regulators						
<i>Myc</i>	1.25±0.85	1.77±0.98	1.93±0.29	1.24±0.88	2.08±1.27	3.36±0.88**
<i>Tp53</i>	1.03±0.23	1.12±0.13	0.90±0.13	1.04±0.27	1.31±0.29	1.54±0.22**

Abbreviations: *Actb*, actin, beta; *Atp5flb*, ATP synthase F<sub>1</sub> subunit beta; *Atp5ifl*, ATP synthase inhibitory factor subunit 1; CCl<sub>4</sub>, carbon tetrachloride; CONT, untreated controls; DEN, *N*-nitrosodiethylamine; *G6pd*, glucose-6-phosphate dehydrogenase; *Gls*, glutaminase; *Hk*, hexokinase; *Hprt1*, hypoxanthine phosphoribosyltransferase 1; *Mpc2*, mitochondrial pyruvate carrier 2; *Myc*, MYC proto-oncogene, bHLH transcription factor; OXPHOS, oxidative phosphorylation; *Pklr*, pyruvate kinase, liver and red blood cell; *Pkm*, pyruvate kinase M1/2; PPP, pentose phosphate pathway; *Slc1a5*, solute carrier family 1 member 5; *Slc2a1*, solute carrier family 2 member 1; *Slc2a2*, solute carrier family 2 member 2; *Tp53*, tumor protein p53.

Data are expressed as the mean ± SD.

\**P* < 0.05, significantly different from untreated controls by Dunnett's or Steel's test.

\*\**P* < 0.01, significantly different from untreated controls by Dunnett's or Steel's test.

**Supplementary Table 4**

**Transcript expression levels in the liver of rats treated with genotoxic or non-genotoxic hepatocarcinogens relative to untreated controls after 84 days of treatment in Experiment 1**

	Relative transcript level normalized to <i>Actb</i>			Relative transcript level normalized to <i>Hprt1</i>		
	CONT	DEN	CCl <sub>4</sub>	CONT	DEN	CCl <sub>4</sub>
OXPHOS-related molecules						
<i>Mpc2</i>	1.06±0.41	1.39±0.27	0.55±0.26*	1.07±0.45	0.90±0.17	0.54±0.18*
<i>Atp5f1b</i>	1.01±0.19	0.95±0.20	0.42±0.15**	1.01±0.19	0.61±0.08**	0.43±0.10**
<i>Atp5if1</i>	1.01±0.18	3.02±1.12**	1.32±0.30	1.01±0.18	1.93±0.62**	1.35±0.26*
Glycolysis- and PPP-related molecules						
<i>Slc2a1</i>	1.04±0.30	2.08±0.27**	1.46±0.90	1.02±0.25	1.34±0.07	1.76±1.77
<i>Slc2a2</i>	1.02±0.21	0.98±0.08	0.46±0.20**	1.02±0.24	0.63±0.04**	0.45±0.15**
<i>Hk1</i>	1.08±0.54	2.89±0.88*	4.61±1.38**	1.06±0.45	1.89±0.62	4.61±0.73**
<i>Hk2</i>	1.06±0.41	2.29±0.77*	4.98±1.70**	1.05±0.35	1.46±0.43	5.72±4.09**
<i>Hk3</i>	1.05±0.34	2.47±0.59**	1.88±0.48*	1.04±0.30	1.59±0.38*	1.89±0.31**
<i>Pklr</i>	1.04±0.26	0.78±0.12	0.14±0.07**	1.04±0.29	0.50±0.07**	0.13±0.06**
<i>Pkm</i>	1.02±0.23	1.77±0.29*	4.27±1.17**	1.03±0.25	1.15±0.24	4.39±1.07**
<i>G6pd</i>	1.04±0.32	4.84±3.09**	0.98±0.35	1.03±0.25	3.05±1.76**	0.98±0.22
Glutaminolysis-related molecules						
<i>Slc1a5</i>	1.03±0.29	1.78±0.26**	3.93±0.82**	1.03±0.27	1.15±0.14	4.11±1.10**
<i>Gls</i>	1.05±0.36	1.58±0.32	2.69±0.51**	1.04±0.33	1.02±0.17	2.79±0.59**
Metabolic regulators						
<i>Myc</i>	1.03±0.28	3.08±1.92*	1.89±0.45*	1.02±0.23	1.95±1.11*	2.07±1.02*
<i>Tp53</i>	1.00±0.10	1.05±0.33	0.67±0.24	1.00±0.10	0.67±0.17*	0.68±0.24*

Abbreviations: *Actb*, actin, beta; *Atp5f1b*, ATP synthase F<sub>1</sub> subunit beta; *Atp5if1*, ATP synthase inhibitory factor subunit 1; CCl<sub>4</sub>, carbon tetrachloride; CONT, untreated controls; DEN, *N*-nitrosodiethylamine; *G6pd*, glucose-6-phosphate dehydrogenase; *Gls*, glutaminase; *Hk*, hexokinase; *Hprt1*, hypoxanthine phosphoribosyltransferase 1; *Mpc2*, mitochondrial pyruvate carrier 2; *Myc*, MYC proto-oncogene, bHLH transcription factor; OXPHOS, oxidative phosphorylation; *Pklr*, pyruvate kinase, liver and red blood cell; *Pkm*, pyruvate kinase M1/2; PPP, pentose phosphate pathway; *Slc1a5*, solute carrier family 1 member 5; *Slc2a1*, solute carrier family 2 member 1; *Slc2a2*, solute carrier family 2 member 2; *Tp53*, tumor protein p53.

Data are expressed as the mean ± SD.

\**P* < 0.05, significantly different from untreated controls by Dunnett's or Steel's test.

\*\**P* < 0.01, significantly different from untreated controls by Dunnett's or Steel's test.

**Supplementary Table 5****Transcript expression levels in the liver of rats treated with genotoxic or non-genotoxic hepatocarcinogens relative to untreated controls after 28 days of treatment in Experiment 2**

	Relative transcript level normalized to <i>Actb</i>					
	CONT	AFB <sub>1</sub>	NPYR	CRB	TAA	MP
OXPHOS-related molecules						
<i>Mpc2</i>	1.14±0.73	0.10 ± 0.02*	0.13 ± 0.02*	0.51 ± 0.37	0.15 ± 0.03*	0.30 ± 0.13*
<i>Atp5flb</i>	1.01 ± 0.12	0.58 ± 0.03*	0.69 ± 0.04*	0.77 ± 0.15	0.36 ± 0.08*	0.47 ± 0.12*
<i>Atp5ifl</i>	1.00 ± 0.10	0.43 ± 0.05*	0.49 ± 0.06*	0.69 ± 0.51	1.27 ± 0.21	1.24 ± 0.34
Glycolysis- and PPP-related molecules						
<i>Slc2a1</i>	1.02 ± 0.24	0.80 ± 0.24	0.58 ± 0.22*	0.91 ± 0.26	0.45 ± 0.14**	0.97 ± 0.35
<i>Slc2a2</i>	1.01 ± 0.18	0.65 ± 0.05*	0.88 ± 0.09	0.64 ± 0.06*	0.55 ± 0.08*	0.68 ± 0.20
<i>Hk1</i>	1.01 ± 0.13	1.37 ± 0.24	1.56 ± 0.23*	1.59 ± 0.70	0.94 ± 0.15	1.94 ± 0.66*
<i>Hk2</i>	1.07 ± 0.40	1.57 ± 0.20	1.88 ± 0.47**	2.35 ± 0.68**	1.02 ± 0.23	1.68 ± 0.27
<i>Hk3</i>	1.09 ± 0.49	1.06 ± 0.10	1.26 ± 0.12	1.53 ± 0.51	0.52 ± 0.12*	0.69 ± 0.10
<i>Pklr</i>	1.04 ± 0.32	0.96 ± 0.06	1.03 ± 0.18	1.57 ± 0.54	0.09 ± 0.02*	0.13 ± 0.07*
<i>Pkm</i>	1.02 ± 0.20	1.28 ± 0.17	1.41 ± 0.16	1.94 ± 0.98	0.82 ± 0.16	1.20 ± 0.15
<i>G6pd</i>	1.05 ± 0.40	0.58 ± 0.17	0.82 ± 0.24	1.17 ± 0.34	1.36 ± 0.33	0.86 ± 0.47
Glutaminolysis-related molecules						
<i>Slc1a5</i>	1.02 ± 0.21	2.32 ± 0.45*	1.88 ± 0.26*	1.64 ± 0.06*	4.64 ± 0.63*	7.04 ± 1.37*
<i>Gls</i>	1.04 ± 0.32	1.36 ± 0.30	1.80 ± 0.33*	1.46 ± 0.21	2.91 ± 0.37*	2.96 ± 1.20*
Metabolic regulators						
<i>Myc</i>	1.04 ± 0.30	1.05 ± 0.57	0.53 ± 0.38	2.04 ± 1.36	2.55 ± 0.71*	3.66 ± 1.96*
<i>Tp53</i>	1.00 ± 0.09	0.65 ± 0.06*	0.70 ± 0.16*	0.99 ± 0.22	1.45 ± 0.15*	1.64 ± 0.35*
	Relative transcript level normalized to <i>Hprt1</i>					
	CONT	AFB <sub>1</sub>	NPYR	CRB	TAA	MP
OXPHOS-related molecules						
<i>Mpc2</i>	1.12 ± 0.62	0.06 ± 0.01*	0.07 ± 0.01*	0.58 ± 0.40	0.14 ± 0.05*	0.23 ± 0.09*
<i>Atp5flb</i>	1.01 ± 0.16	0.61 ± 0.05**	0.65 ± 0.07**	1.48 ± 0.14**	0.47 ± 0.11**	0.47 ± 0.11**
<i>Atp5ifl</i>	1.01 ± 0.11	0.25 ± 0.02*	0.26 ± 0.03*	0.73 ± 0.44	1.16 ± 0.32	0.97 ± 0.22
Glycolysis- and PPP-related molecules						
<i>Slc2a1</i>	1.03 ± 0.25	0.81 ± 0.17	0.53 ± 0.16*	1.77 ± 0.43**	0.57 ± 0.19*	0.97 ± 0.34
<i>Slc2a2</i>	1.02 ± 0.19	0.68 ± 0.05*	0.83 ± 0.11	0.77 ± 0.16	0.70 ± 0.05*	0.68 ± 0.18
<i>Hk1</i>	1.01 ± 0.15	1.42 ± 0.22*	1.45 ± 0.22*	3.02 ± 3.02*	1.21 ± 0.30	2.01 ± 0.87*
<i>Hk2</i>	1.05 ± 0.33	1.63 ± 0.19	1.76 ± 0.47*	2.69 ± 2.69**	1.32 ± 0.41	1.75 ± 0.61*
<i>Hk3</i>	1.04 ± 0.30	1.10 ± 0.10	1.19 ± 0.16	1.77 ± 1.77	0.68 ± 0.25	0.71 ± 0.22
<i>Pklr</i>	1.01 ± 0.15	1.01 ± 0.17	0.96 ± 0.18	3.05 ± 0.97*	0.11 ± 0.03*	0.13 ± 0.07*
<i>Pkm</i>	1.01 ± 0.12	1.32 ± 0.14*	1.32 ± 0.19*	3.68 ± 1.51*	1.06 ± 0.28	1.22 ± 0.30
<i>G6pd</i>	1.02 ± 0.24	0.62 ± 0.23	0.77 ± 0.23	1.37 ± 0.41	1.79 ± 0.70*	0.94 ± 0.66
Glutaminolysis-related molecules						
<i>Slc1a5</i>	1.02 ± 0.23	2.43 ± 0.61*	1.76 ± 0.28*	1.95 ± 0.35*	5.47 ± 1.45*	7.91 ± 2.38*
<i>Gls</i>	1.00 ± 0.09	1.40 ± 0.24	1.68 ± 0.32*	1.69 ± 0.09*	3.39 ± 0.58*	3.27 ± 1.44*
Metabolic regulators						
<i>Myc</i>	1.05 ± 0.37	1.08 ± 0.57	0.47 ± 0.27	4.12 ± 3.14*	3.26 ± 0.95*	4.07 ± 3.36*
<i>Tp53</i>	1.02 ± 0.23	0.68 ± 0.08*	0.65 ± 0.12*	1.14 ± 0.11	1.72 ± 0.43	1.80 ± 0.43*

Abbreviations: *Actb*, actin, beta; AFB<sub>1</sub>, aflatoxin B<sub>1</sub>; *Atp5flb*, ATP synthase F<sub>1</sub> subunit beta; *Atp5ifl*, ATP synthase inhibitory factor subunit 1; CONT, untreated controls; CRB, carbadox; *G6pd*, glucose-6-phosphate dehydrogenase; *Gls*, glutaminase; *Hk*, hexokinase; *Hprt1*, hypoxanthine phosphoribosyltransferase 1; MP, methapyriline hydrochloride; *Mpc2*, mitochondrial pyruvate carrier 2; *Myc*, MYC proto-oncogene, bHLH transcription factor; NPYR, *N*-nitrosopyrrolidine; OXPHOS, oxidative phosphorylation; *Pklr*, pyruvate kinase, liver and red blood cell; *Pkm*, pyruvate kinase M1/2; PPP, pentose phosphate pathway; *Slc1a5*, solute carrier family 1 member 5; *Slc2a1*, solute carrier family 2 member 1; *Slc2a2*, solute carrier family 2 member 2; TAA, thioacetamide; *Tp53*, tumor protein p53.

Data are expressed as the mean ± SD.

\**P* < 0.05, significantly different from untreated controls by Dunnett's or Steel's test.

\*\**P* < 0.01, significantly different from untreated controls by Dunnett's or Steel's test.

**Supplementary Table 6****Transcript expression levels in the liver of rats treated with genotoxic or non-genotoxic hepatocarcinogens relative to untreated controls after 90 days of treatment in Experiment 2**

	Relative transcript level normalized to <i>Actb</i>					
	CONT	AFB <sub>1</sub>	NPYR	CRB	TAA	MP
OXPHOS-related molecules						
<i>Mpc2</i>	1.08±0.48	0.07±0.02*	0.09±0.02*	0.46±0.10*	0.54±0.43	0.44±0.14*
<i>Atp5flb</i>	1.01±0.17	0.71±0.15	0.79±0.19	1.43±0.45	0.48±0.12*	0.41±0.10*
<i>Atp5ifl</i>	1.07±0.43	0.87±0.22	1.02±0.18	1.68±0.39	5.73±1.39*	2.30±0.84
Glycolysis- and PPP-related molecules						
<i>Slc2a1</i>	1.03±0.29	0.86±0.28	0.52±0.10*	2.05±0.64*	0.88±0.13	0.61±0.14*
<i>Slc2a2</i>	1.01±0.18	0.99±0.29	1.22±0.20	0.78±0.18	0.63±0.16*	0.40±0.15**
<i>Hk1</i>	1.01±0.14	1.71±0.35	1.94±0.25*	2.55±0.93*	3.06±0.97*	2.16±1.55*
<i>Hk2</i>	1.03±0.26	0.93±0.27	1.18±0.32	0.93±0.29	1.82±0.44*	1.06±0.76
<i>Hk3</i>	1.02±0.26	0.57±0.08**	0.63±0.13**	1.01±0.11	0.86±0.17	0.37±0.11**
<i>Pklr</i>	1.02±0.24	1.70±0.47	1.69±0.41*	0.93±0.32	0.12±0.04*	0.11±0.07*
<i>Pkm</i>	1.00±0.10	1.27±0.19	1.49±0.18*	2.21±0.64*	2.28±0.74*	1.70±1.17
<i>G6pd</i>	1.02±0.24	1.23±0.22	1.39±0.31	0.53±0.25	3.31±1.71*	1.15±0.47
Glutaminolysis-related molecules						
<i>Slc1a5</i>	1.02±0.20	1.36±0.37	1.35±0.23	1.06±0.25	5.99±2.10*	2.90±2.30*
<i>Gls</i>	1.03±0.25	0.80±0.15	1.10±0.20	0.84±0.17	3.12±0.82*	1.60±1.23
Metabolic regulators						
<i>Myc</i>	1.08±0.43	0.80±0.69	0.25±0.06*	3.14±1.95	1.61±0.29	1.36±0.49
<i>Tp53</i>	1.01±0.14	1.15±0.23	1.17±0.13	0.81±0.22	1.15±0.21	0.63±0.17**
	Relative transcript level normalized to <i>Hprt1</i>					
	CONT	AFB <sub>1</sub>	NPYR	CRB	TAA	MP
OXPHOS-related molecules						
<i>Mpc2</i>	1.10±0.53	0.06±0.01*	0.07±0.01*	0.36±0.10*	0.34±0.19*	0.53±0.14
<i>Atp5flb</i>	1.02±0.21	1.02±0.14	1.14±0.06	1.92±0.58	0.58±0.15*	0.44±0.16*
<i>Atp5ifl</i>	1.07±0.43	0.72±0.13	0.86±0.09	1.31±0.36	3.89±1.10*	2.81±1.07*
Glycolysis- and PPP-related molecules						
<i>Slc2a1</i>	1.06±0.40	1.26±0.48	0.77±0.14	2.82±1.10*	1.09±0.34	0.73±0.51
<i>Slc2a2</i>	1.02±0.20	1.44±0.51	1.80±0.30**	0.78±0.26	0.78±0.26	0.41±0.14**
<i>Hk1</i>	1.01±0.16	2.51±0.88*	2.87±0.42*	3.52±1.66*	3.68±1.16*	2.93±3.50
<i>Hk2</i>	1.02±0.21	1.30±0.24	1.72±0.35*	0.96±0.45	2.23±0.72*	1.43±1.71
<i>Hk3</i>	1.02±0.20	0.83±0.22	0.92±0.17	1.01±0.18	1.05±0.27	0.45±0.34**
<i>Pklr</i>	1.03±0.30	2.46±0.86*	2.49±0.49*	1.26±0.50	0.15±0.06*	0.11±0.07*
<i>Pkm</i>	1.01±0.15	1.86±0.56*	2.20±0.34*	2.98±1.06*	2.73±0.91*	2.24±2.51
<i>G6pd</i>	1.04±0.33	1.82±0.60	2.09±0.67*	0.56±0.36	3.79±1.33*	1.44±1.22
Glutaminolysis-related molecules						
<i>Slc1a5</i>	1.02±0.22	1.96±0.49*	2.01±0.40*	1.05±0.23	7.38±3.33*	4.07±5.27*
<i>Gls</i>	1.02±0.22	1.16±0.31	1.62±0.22*	0.85±0.27	3.79±1.19*	2.19±2.82
Metabolic regulators						
<i>Myc</i>	1.08±0.45	1.12±0.84	0.37±0.09*	4.18±2.71*	1.98±0.54	1.64±1.15
<i>Tp53</i>	1.01±0.11	1.69±0.52*	1.74±0.37*	0.82±0.35	1.45±0.55	0.72±0.40

Abbreviations: *Actb*, actin, beta; AFB<sub>1</sub>, aflatoxin B<sub>1</sub>; *Atp5flb*, ATP synthase F<sub>1</sub> subunit beta; *Atp5ifl*, ATP synthase inhibitory factor subunit 1; CONT, untreated controls; CRB, carbadox; *G6pd*, glucose-6-phosphate dehydrogenase; *Gls*, glutaminase; *Hk*, hexokinase; *Hprt1*, hypoxanthine phosphoribosyltransferase 1; MP, methapyrilene hydrochloride; *Mpc2*, mitochondrial pyruvate carrier 2; *Myc*, MYC proto-oncogene, bHLH transcription factor; NPYR, *N*-nitrosopyrrolidine; OXPHOS, oxidative phosphorylation; *Pklr*, pyruvate kinase, liver and red blood cell; *Pkm*, pyruvate kinase M1/2; PPP, pentose phosphate pathway; *Slc1a5*, solute carrier family 1 member 5; *Slc2a1*, solute carrier family 2 member 1; *Slc2a2*, solute carrier family 2 member 2; TAA, thioacetamide; *Tp53*, tumor protein p53.

Data are expressed as the mean ± SD.

\**P* < 0.05, significantly different from untreated controls by Dunnett's or Steel's test.

\*\**P* < 0.01, significantly different from untreated controls by Dunnett's or Steel's test.

**Supplementary Table 7****Number and area fraction of GST-P<sup>+</sup> liver cell foci in Experiment 1**

Group	No. of animals examined	Number (number/cm <sup>2</sup> liver section)	Area fraction (mm <sup>2</sup> /cm <sup>2</sup> liver section)
28 days			
CONT	10	0.00±0.00	0.00±0.00
DEN	10	0.00±0.00	0.00±0.00
CCl <sub>4</sub>	10	0.13±0.22	0.01±0.01
84 days			
CONT	10	0.00±0.00	0.00±0.00
DEN	10	102.00±39.75**	8.89±4.81**
CCl <sub>4</sub>	10	3.44±1.48**	1.24±0.65**

Abbreviations: CCl<sub>4</sub>, carbon tetrachloride; CONT, untreated controls; DEN, *N*-nitrosodiethylamine; GST-P, glutathione *S*-transferase placental form.

Data are expressed as the mean ± SD.

\*\**P* < 0.01, significantly different from untreated controls by Dunnett's or Steel's test.

**Supplementary Table 8**  
**Number and area of GST-P<sup>+</sup> liver cell foci in Experiment 2**

Group	No. of animals examined	Number (number/cm <sup>2</sup> liver section)	Area fraction (mm <sup>2</sup> /cm <sup>2</sup> liver section)
28 days			
CONT	10	0.00±0.00	0.00±0.00
AFB <sub>1</sub>	10	0.00±0.00	0.00±0.00
NPYR	10	0.00±0.00	0.00±0.00
CRB	10	0.00±0.00	0.00±0.00
TAA	10	0.80±0.81	0.06±0.07
MP	10	0.00±0.00	0.00±0.00
90 days			
CONT	10	0.00±0.00	0.00±0.00
AFB <sub>1</sub>	10	2.22±1.29**	0.06±0.03**
NPYR	10	23.13±5.73**	0.94±0.35**
CRB	10	0.04±0.01	0.01±0.05
TAA	10	22.58±4.21**	3.24±1.37**
MP	10	1.78±1.07**	0.40±0.28**

Abbreviations: AFB<sub>1</sub>, aflatoxin B<sub>1</sub>; CONT, untreated controls; CRB, carbadox; GST-P, glutathione S-transferase placental form; MP, methapyrilene hydrochloride; NPYR, *N*-nitrosopyrrolidine; TAA, thioacetamide.

Data are expressed as the mean ± SD.

\*\**P* < 0.01, significantly different from untreated controls by Dunnett's or Steel's test.