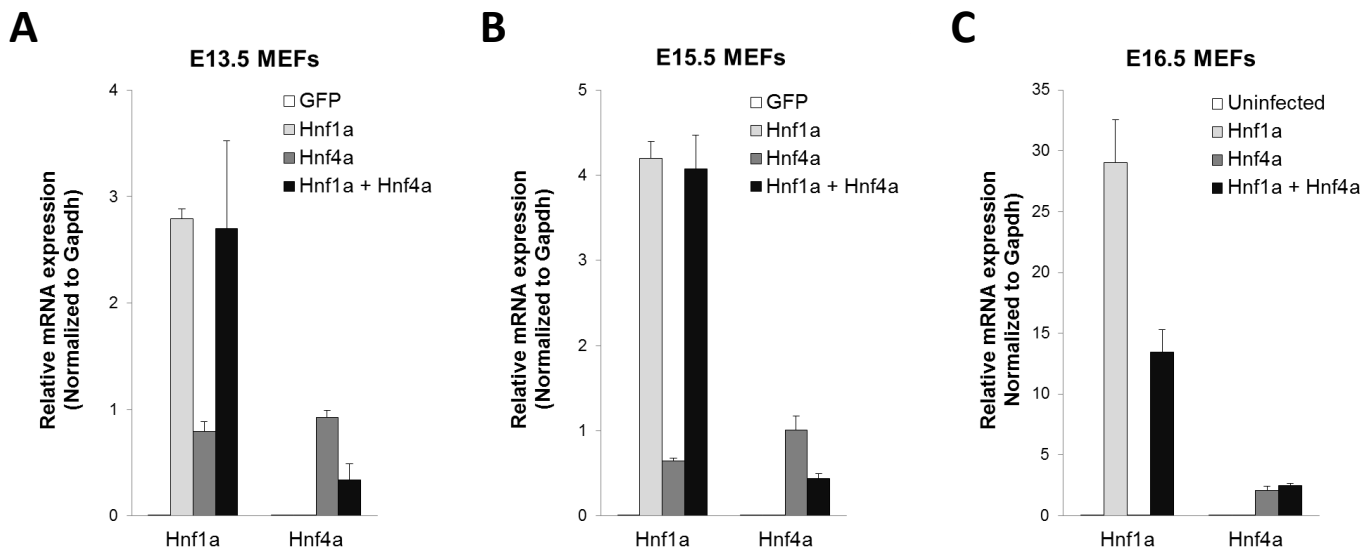


Transcription factor-mediated regulation of kidney versus liver specification of SLC and ABC drug transporters, tight junction molecules and signature biomarkers. Martovetsky G, Bush KT, Nigam SK. *Drug Metabolism and Disposition*



**Supplemental Figure 1. Levels of Hnf1a and Hnf4a expression in transduced MEFs.**

Lentiviral transduction led to high levels of exogenous Hnf1a and Hnf4a expression in all cases. However, in E13.5 (A) and E15.5 (B) MEFs, but not in E16.5 MEFs (C), Hnf4a overexpression induced the expression of endogenous Hnf1a. It is worth noting that E13.5 and E15.5 MEFs were prepared slightly differently than E16.5 MEFs (see Methods).

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Supplemental Table 1 List of primers used for RT-q-PCR		
Mouse Gene	Forward Primer	Reverse Primer
Abcb1l	GAACAAGCTGTGGTTGGTG	GACGAGCCCCAGTGATTACC
Abcb1a	GATCCTCACCAAGCGACTCC	GACCCCTGTAGCCCTTTCAC
Abcb1b	GATCCTCACCAAGCGAGTCC	GCCCATCGCCCTTAAACAC
Abcb4	ACTAGGCAGCATCAGCAACC	GGGTGCCAGGAACATAAAC
Abcc1	CTGCTCACCCCTGTCTCTG	TGCACCATCATCCCTGTAACTCC
Abcc2	CAAGCAGGTGTTCGTGTGTG	TGGATCACCAACACCAGGAG
Abcc3	TGTCTATGCCTTACAGGTGAC	GGAACCTCCACCATTCCTCGC
Abcc4	AGAGGCCATCGTCAGCATTCT	ACTGTCTAGTGCCTTGTCCC
Abcc5	GTGTCTGGGAGAGACACCCC	AGCTGCCCTTCTCCGAC
Abcc6	GTGCCTGGAAAGAAGTAGACCC	TGAGGTTGATCCCCTGCAG
Abeg2	AAACTTGCTCGGAACCCCTC	CTCCAGCTCTATTTGCATTCC
Alb	AGCGGAGCAACTGAAGACTG	GGTTTGGACCCCTCAGTCGAG
Apoa1	AGCTGAACCTGAATCTCCTGG	GAAAGTCCCGAGTCATGGGC
Cdh1	AACCCAAGCACGTATCAGGG	ACTGCTGGTCAGGAATCGTTG
Cdh16	TCGCTTCCACATCTGAGCC	CAAGGCATGGTCTAGGCTG
Cdh2	GCAGTCTTACCGAAGGATGTG	CGTCCACCTTAAAATCTGCTG
Cdh26	TCATCCCAAGTGACAGTGGC	GATAGACCCGGGTGGAAGAC
Cdh6	GAGATGGCTGATGTGGCAC	TGAGCAACCGCTGTCTTGATG
Cldn10	CCGACAACAACAAGACACCC	TCCGCCTTGATACTTGGTCC
Cldn12	AGCCGATGTGCTCCTGTTG	GGAGGGCTTGAGCTGTATGG
Cldn6	CAGTCTCTTTTGCAGGCTCG	TCCCCAAGATTTGCAGACCAG
Cldn8	GGAGGACGATGGCAACCTAC	CAGACACTCTCACTGAGGC
Cldn9	AAAGTACGTGAGCAGCCAGC	AGCCTTCACCCATACAGCC
Dsc2	GATCACTACCACTCGGCTC	TGCACCTTGTCTGTTGTGTC
Dsg2	GCACTCCTGCTCCTGCTC	TGGCACCACTTGTCTCTC
Dsp	AGACCTGCGTGAGAAGTCAG	GAGAGGTGCGCTGGATGATG
Fabp1	TGAAGGCAATAGGTCTGCCC	GTGAACTCATTGCGGACCAC
Gapdh	CTTTGGCATTGTGGAAGGGC	TGCAGGGATGATGTTCTGGG
Ggt1	CAGCACCACAGGAAAAGTTGAG	ACGGATTTCAACAGGGACAG
Hnf1a	AGAGCCCTTCATGGCAACC	TGAAGACCTGCTGGTGGGTG
Hnf4a	GGCTGCGATGAAGAAGGAAG	GGAGAGGTGATCTGCTGGG
Jam3	GAGCCAATCCCAGGTTCCAG	CGTCTTGTGGACAGCATTG
Kap	ATCATGGACTTACGCCAGC	TGTGATGTCTGTGTCTCAGTG
Ocln	AGAGTACATGGCTGCTGCTG	CACCATCCTCTTGATGTGCG
Pard3	CCACCAAGGAAATGAATGC	TCCGGTGTGAGAACAACTGC
Pard6b	TTTCCACCOCATCCACTG	ATGTGAGGCTTCTCCGGTG
Serpina1	GCAAGCTGAAAATGACTCCCTC	TCTGGGAGTGTCTGTCTCC
Slc22a1	GACCTGAAGATGATGTCCCTTG	TGGTACAGCACACACAAGAG
Slc22a12	ACGACCACAGCACCTTTCAG	GCCCAAACCTATCTGAGGC
Slc22a18	GCCTCCCTTCAAGACTCTTCT	CTCAGCCTCCCAATGACCAG
Slc22a2	ATTTCTGGTGCATACCCGAGTC	GCCAGTATCCTCATCTCCCG
Slc22a3	TGGCTAAGTGCAATGGAAAACAC	TCGTGAACCAAGCAACATAAGG
Slc22a4	GCCAGCAGGGATATTCGATCC	GGTGTAGCATCCACAGCATCAC
Slc22a6	CTACTGCATTTTCCGGCTCC	ATAGGCACGGGTGTGAATAGG
Slc22a7	CCGGGCATCATAGCATCTG	GTCTCTCACTTATGGGCCGC
Slc34a1	TTGTGAGCATGGTCTCCTCC	CAAAAAGCCCGCTGAAAGTC
Slc47a1	GGCTGTAAAGATCTCGTGGG	ACCACAGGTACAAGCAAGACC
Slc51a	ACCCAGGTACACAGCAGAG	GGTGGGGCTATGTCCACTG
Slc51b	CAGGAACTGCTGGAAGAAATGC	TCCGATTTCTGTTCGCCAGGATG
Slco1a1	TGGTTCCTTCTGAGGTGTGTCT	CGCCAAAGTAAACAGGTGCC
Slco1a6	ACCTCATTTCCTCATGGGCAG	TTCACACACTCTGCTGGGTCT
Slco2a1	TTGCAGAGCCTACCAACTCG	AGGTTCACCTGTAGCCGTGTCT
Slco2b1	CCAGCAAGGGTGGAGACC	ACCAGCAAGAAGATGGGGTG
Slco3a1	GGCCAAACCCCTTCTGTCT	GGGGATGAAACCCCAACAACCG
Tjp1	ACCCTCCTTACTCACCACAAG	ATGAGGCTTCTGCTTCTGTGTG
Tjp2	CCCCTTCTCCAGGGTCCAG	GTGTCTCTGACTCCCGAC
Tjp3	ACTGACCACAGAGATGCCAG	TGGCTGCTTATCCCTCTCTG
Trf	TGCTCCTCACTCAACCATTC	CCGCAAGACCTCAAATATGG
Ttr	CGCGGATGTGGTTTTCACAG	GGTGTGTAGGAGTATGGGC
Vim	TGCGAGAGAAATTCAGGAGG	CCGTTCAAGGTCAAGACGTG

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Supplemental Table 2 Microarray Datasets Used for Analysis									
Study (PMID)	Accession Number	Array Platform	Mouse Strain	Sex	Total Number of samples	Samples			
						# Used	Number	Tissue	Age
19501082	GSE6290	Mouse430_2	CD1	mixed	37	2	GSM144594 GSM144595	Proximal tubule	E15.5
	GSE6589	Mouse430_2	CD1	mixed	11	3	GSM152247 GSM152248 GSM152249	Proximal tubule	E15.5
18349385	GSE10162	Mouse430_2	C57BL/6	mixed	6	3	GSM256959 GSM256960 GSM256961	Proximal tubule	Adult
17468757	GSE7342	Mouse430_2	C57BL/6	mixed	12	3	GSM177040 GSM177041 GSM177042	Liver	E15.5
19127519	GSE11899	Mouse430_2	C57BL/6	mixed	10	5	GSM300676 GSM300677 GSM300678 GSM300679 GSM300680	Liver	Adult
18059474	GSE8969	Mouse430_2	C57BL/6	mixed	6	3	GSM227410 GSM227411 GSM227412	Liver	Adult
23064266	GSE32354	Mouse430_2	C57BL/6	mixed	35	5	GSM801178 GSM801179 GSM801180 GSM801181 GSM801182	Liver	Adult

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**Supplemental Table 3**  
**Expression of transporters and junction-related genes in transduced MEFs, isolated PTs and liver tissue**

Gene Symbol	Gene Name	Category	Hnf1a + Hnf4a /Uninfected (Fold Change)	E15.5 PT (Normalized Expression)	Adult PT (Normalized Expression)	E15.5 Liver (Normalized Expression)	Adult Liver (Normalized Expression)
Cdh1	Cadherin 1	Junction (adherens)	23.3	9.4	9.8	9.0	9.5
Cdh2	Cadherin 2	Junction (adherens)	-2.1	6.1	6.4	8.5	10.0
Cdh6	Cadherin 6	Junction (adherens)	2.4	7.4	6.4	5.5	5.9
Cdh16	Cadherin 16	Junction (adherens)	5.0	11.8	13.0	5.3	6.0
Cdh26	Cadherin 26	Junction (adherens)	7.3	6.1	6.4	8.5	10.0
Dsc2	Desmocollin 2	Junction (desmosome)	1.4	4.8	4.6	7.1	8.6
Dsg2	Desmoglein 2	Junction (desmosome)	1.4	6.7	6.0	7.0	9.1
Dsp	Desmoplakin	Junction (desmosome)	12.9	7.8	6.2	7.4	8.3
Cldn6	Claudin 6	Junction (tight)	895.2	8.2	5.3	5.3	5.3
Cldn8	Claudin 8	Junction (tight)	1.9	4.7	9.2	3.1	3.5
Cldn9	Claudin 9	Junction (tight)	94.7	7.7	3.3	3.1	3.1
Cldn10	Claudin 10	Junction (tight)	1.4	8.7	9.8	4.4	4.6
Cldn12	Claudin 12	Junction (tight)	5.3	9.5	9.1	7.8	9.8
Jam3	Junctional adhesion molecule 3	Junction (tight)	-3.5	6.1	7.2	5.1	5.1
Ocln	Occludin	Junction (tight)	21.9	8.7	7.4	7.1	7.7
Tjp1	Tight junction protein 1	Junction (tight)	6.1	9.8	9.3	9.0	9.2
Tjp2	Tight junction protein 2	Junction (tight)	115.9	8.7	8.2	7.6	7.5
Tjp3	Tight junction protein 3	Junction (tight)	10.2	6.7	6.2	5.3	7.4
Pard6b	Par-6 family cell polarity regulator beta	Polarity	3.1	8.5	7.4	5.8	6.1
Pard3	Par-3 family cell polarity regulator	Polarity	1.2	8.5	7.4	5.8	6.1
Abcb11 (Bsep)	ATP-binding cassette, sub-family B (MDR/TAP), member 11	Transporter (apical)	125.1	5.3	4.7	8.0	11.7
Abcb1a (Mdr1a)	ATP-binding cassette, sub-family B (MDR/TAP), member 1A	Transporter (apical)	75.0	3.8	4.6	3.7	4.3
Abcb1b (Mdr1b)	ATP-binding cassette, sub-family B (MDR/TAP), member 1B	Transporter (apical)	-1.1	3.8	5.3	4.2	3.9
Abcb4 (Mdr2)	ATP-binding cassette, sub-family B (MDR/TAP), member 4	Transporter (apical)	-1.9	6.3	6.2	10.5	11.1
Abcc2 (Mrp2)	ATP-binding cassette, sub-family C (CFTR/MRP), member 2	Transporter (apical)	1192.1	7.8	10.3	7.8	10.1
Abcc4 (Mrp4)	ATP-binding cassette, sub-family C (CFTR/MRP), member 4	Transporter (apical)	3.9	8.2	9.4	7.4	6.1
Abcg2 (Bcrp1)	ATP-binding cassette, sub-family G (WHITE), member 2	Transporter (apical)	10.5	11.1	11.9	11.6	10.5
Slc22a4 (Oatn1)	Solute carrier family 22 (organic cation/zwitterion transporter), member 4	Transporter (apical)	8.2	5.1	7.7	8.4	4.9
Slc22a12 (Urat1)	Solute carrier family 22 (organic anion/cation transporter), member 12	Transporter (apical)	576.1	8.6	10.8	6.3	6.8
Slc22a18	Solute carrier family 22 (organic anion transporter), member 18	Transporter (apical)	-1.5	7.6	11.6	7.7	10.0
Slc34a1	Solute carrier family 34 (sodium phosphate), member 1	Transporter (apical)	1336.9	9.9	13.3	4.7	4.9
Slc47a1	Solute carrier family 47 (multidrug and toxin extrusion), member 1	Transporter (apical)	194.7	12.8	12.5	9.2	11.0
Slco1a1 (Oatp1a1)	Solute carrier organic anion transporter family, member 1a1	Transporter (apical)	6.4	5.8	8.8	4.9	11.7
Slco1a6 (Oatp1a6)	Solute carrier organic anion transporter family, member 1a6	Transporter (apical)	346.8	10.1	10.3	3.2	3.4
Slco2a1 (Oatp2a1)	Solute carrier organic anion transporter family, member 2a1	Transporter (apical)	16.6	6.9	6.7	6.4	7.9
Slco2b1 (Oatp2b1)	Solute carrier organic anion transporter family, member 2b1	Transporter (apical)	1.3	6.6	6.7	5.4	10.3
Slco3a1 (Oatp3a1)	Solute carrier organic anion transporter family, member 3a1	Transporter (apical)	2.6	7.8	8.9	5.4	5.8
Abcc1 (Mrp1)	ATP-binding cassette, sub-family C (CFTR/MRP), member 1	Transporter (basolateral)	-1.0	8.5	7.3	7.3	5.7
Abcc3 (Mrp3)	ATP-binding cassette, sub-family C (CFTR/MRP), member 3	Transporter (basolateral)	4.8	7.3	6.1	7.8	11.2
Abcc5 (Mrp5)	ATP-binding cassette, sub-family C (CFTR/MRP), member 5	Transporter (basolateral)	3.6	6.9	6.6	6.7	6.1
Abcc6 (Mrp6)	ATP-binding cassette, sub-family C (CFTR/MRP), member 6	Transporter (basolateral)	14.8	7.1	6.7	7.2	10.0
Slc22a2 (Oct2)	Solute carrier family 22 (organic cation transporter), member 2	Transporter (basolateral)	4.3	10.4	10.3	4.7	5.2
Slc22a3 (Oct3)	Solute carrier family 22 (organic cation transporter), member 3	Transporter (basolateral)	13.0	6.4	5.2	6.0	6.5
Slc22a6 (Oat1)	Solute carrier family 22 (organic cation transporter), member 6	Transporter (basolateral)	3438.8	7.9	8.9	4.5	4.7
Slc22a7 (Oat2)	Solute carrier family 22 (organic anion transporter), member 7	Transporter (basolateral)	7.9	6.6	7.8	6.2	10.8
Slc51a (Osta)	Solute carrier family 51, alpha subunit	Transporter (basolateral)	138.1	6.7	8.4	5.1	5.2
Slc51b (Ostb)	Solute carrier family 51, beta subunit	Transporter (basolateral)	715.8	7.9	8.1	5.7	6.0

\* Fourth column colored based on the fold-change of expression level in MEFs transduced with Hnf1a and Hnf4a compared with control MEFs. Final four columns show mRNA microarray expression levels in E15.5 and adult mouse proximal tubules followed by E15.5 and adult liver tissue.