

## Supplemental Methods

**Quantitative Real-Time PCR.** Total RNA was extracted from proximal small intestine, distal small intestine, and colon from 2 month old female C57BL/6J, DBA/2J, and congenic DBA/2J.B6 *Mom2<sup>R</sup>* animals. Four animals from each group were analyzed. All animals were from the N15 generation, except for DBA/2J.B6 *Mom2<sup>R</sup>* #3 which was from the N14 generation. First-strand cDNA was synthesized using the SuperScript First-Strand Synthesis System for RT-PCR kit, as instructed by the manufacturer (Invitrogen, Carlsbad, CA) starting with 1 ug of total RNA as a template. Real-time PCR amplification was performed using the ABI Assay-on-Demand Gene Expression Assay for each respective gene, which consists of 2 unlabeled PCR primers, and a TaqMan MGB probe labeled at the 5' end with the fluorescent reporter dye FAM, combined in a single tube at 20X concentration. The amplification reactions contained 25 ul of 2X TaqMan Universal PCR Master Mix, No AmpErase UNG (universal concentration conditions: 4 mM MgCl<sub>2</sub>, 200 mM each dATP, dCTP, and dGTP; 400 mM dTTP, 1.25 U AmpliTaq Gold), 2.5 ul of the 20X primer/probe set (45 pM of each of the specific primers, and 200 nM of the fluorescent probe, with a final concentration of 900 nM primer/250 nM probe). 50 ng of cDNA (5 ul) was added to each reaction tube producing a final volume of 50 ul. Three replicate samples were analyzed for all PCR amplification of the target samples. The 18S housekeeping gene was utilized as the endogenous RNA control. The ABI Assays-on-Demand Gene Expression Assays that were analyzed are as follows: Hs99999901\_s1 (18S); Mm00431960\_m1 (*Atp5a1*); Mm01257362\_m1 (*Atp5a1*—between exons 1 and 2); Mm012573865\_m1 (*mCG18269*—proximal to *Atp5a1*); Mm0125773\_m1 (*mCG125522*—distal to *Atp5a1*; between *Pstpip2* and *Slc14a1*); Mm00524939\_m1 (*Ccdc5*); Mm00479201\_m1 (*Pstpip2*); Mm00457285\_m1 (*Siat8e*); Mm00472198\_m1 (*Slc14a1*); Mm00453117\_m1 (*Slc14a2*); Mm00509412\_s1 (4930465K10Rik); Mm00555972\_m1 (4932417K07); and Mm00618413\_m1 (8030462N17Rik). The PCR reactions were performed according to the standard ABI TaqMan PCR profile as recommended—the thermal cycling parameters were as follows: 10 min at 95°C, followed by 40 cycles of 95°C for 15 seconds, and 60°C for 1 minute. Amplification of target DNA and detection of PCR products were performed with an ABI Prism 7000 Sequence Detection System (Applied Biosystems, Foster City, CA). ABI Prism 7000 SDS

Software v1.1 was used for relative quantification analysis of PCR product amplification and gene expression as described (<http://www.appliedbiosystems.com/support/tutorials>).

Supplemental Table 1. Oligonucleotide primers designed to refine the map location of the Mom2 locus.

| Locus                 | Position          | Sequences                                                           | RE      |
|-----------------------|-------------------|---------------------------------------------------------------------|---------|
| D18Mit80              | 77246872-77246981 | F-CTA GCA TGC TTG AGG CTA TGG<br>R-GGA ATG CCA GAG AAC ATG GT       |         |
| D18Mit7               | 77268009-77268103 | F-ACA GGA GAA CGG GAA CTC AG<br>R-GCC AGA GTG GAC CAA GAT GA        |         |
| D18Kcc2               | 77608417-77608710 | F-CAT CGG TCA CAT ACG CTC<br>R-GAA GGA ACA GCC AGA CTG              |         |
| D18Kcc3               | 77734176-77734462 | F-GCA TGT GAA TAT GGA TAC TAA AAG<br>R-CTG AAA CAT CAC TGG GGA GAG  |         |
| D18Kcc4               | 77750185-77750343 | F-GGC TTC GGG TTC TTC TTT C<br>R-GAG CGT CCA GTG TGA ACT TG         |         |
| D18Mit106             | 77898424-77898560 | F-CCA GGC CAG AAA ATC AAA GA<br>R-GTT GTG GTG GTG GTA TGT GC        |         |
| D18Kcc5               | 78176834-78186962 | F-CAA CAG GGT TCG CTT CTG C<br>R-GCA ATG CTT TCT CCT CCG            |         |
| D18Mit47              | 78205576-78205675 | F-CTT CTT CTT CCC AAC CAG ACC<br>R-CTA GCA CAT TTT TAT AAG CAA CCC  |         |
| D18Kcc6               | 78373089-78373245 | F-CAA GCC AAA CAA CAA AAG AG<br>R-GGG GAT TTT ACT CAG GGA AG        |         |
| D18Kcc7               | 78428303-78428441 | F-GAA CAC CAA CTC CCT TGT GTG<br>R-GGC ACA CAT GTA GCC TGA AA       |         |
| D18Kcc8               | 78496354-78496510 | F-TGT TTC CAA AAT AAT GGC ACT G<br>R-TCT ACA GAA CCA TGA GCA CTA CA |         |
| D18Kcc9               | 78518346-78518365 | F-GGC CAT TAG GTC AAG ATG GA<br>R-CAT GGG GCT AAC TCA TGG TC        |         |
| D18Kcc10              | 78604457-78604895 | F-GCC ATT GTA TTG GAG AGG<br>R-CCT GCT GGC ACT TGT CTG              | HindIII |
| D18Mit46*             | 79208269-79208487 | F-ACT GGA TGC AGC TGT AAG<br>R-AGT GAG AAG CAA CTC CAC              |         |
| D18Mit126             | 79366947-79367091 | F-ATG GAG GGT TTC TTT TGG CT<br>R-TCT CTC CTT TCC ATT TTT TCT CC    |         |
| D18Kcc11 <sup>a</sup> | 80644383-80644747 | F-CCA GAC CTA GCT ATA TAG TG<br>R-CTA CAC AGA GAA ACC CTG TC        |         |

The *Txn14* (*Dim1*) gene was mapped using *D18Kcc11*, a microsatellite marker that we generated from intronic sequence between exons 1 and 2 of the *Txn14* gene. The primers were Forward 5'-CCA GAC CTA GCT ATA TAG TG-3' and Reverse 5'-CTA CAC AGA GAA ACC CTG TC-3'. A 2 bp polymorphism was detected by PCR using radiolabeled primers.

Supplemental Table 2: Oligonucleotide primers used to amplify and sequence the exons of *Atp5a1*

| <u>Exon(s)</u> | <u>Primers</u>                                                                                                                                               | <u>Position of Primers</u><br>Ensembl v.33                                       | <u>Exon Size</u><br>(bp) | <u>Annealing</u><br><u>Temperature</u> |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------|----------------------------------------|
| 1              | (F) 5' – AAGATTTGCGTCCGCAGGAGC – 3'<br>(R) 5' – GAAGGCCCCGCAGCAAAGC – 3'<br>Nested (F) 5' – AGGAGAGGGGCGGTACT – 3'<br>Nested (R) 5' – AGCCACGGTGCAAGATG – 3' | 78193405-78193425<br>78193770-78193753<br>78193426-78193442<br>78193727-78193711 | 90                       | 60°C                                   |
| 2              | (F) 5' – TTGCGTCCGGAGGAGCAG - 3'<br>(R) 5' – AGCCACGGTGCAAGATG – 3'                                                                                          | 78193410-78193427<br>78193727-78193711                                           | 79                       | 59°C                                   |
| 3              | (F) 5' –ACCATCTCTCCAGCACCAAG - 3'<br>(R) 5' –GGAACTTGGCTTAGTCAAAC – 3'                                                                                       | 78196895-78196914<br>78197360-78197341                                           | 170                      | 60°C                                   |
| 4 & 5          | (F) 5' –GTGCTGCCGTGTGATATTG - 3'<br>(R) 5' –CCACAGCATTCACCATCC – 3'                                                                                          | 78197906-78197924<br>78198482-78198465                                           | 174<br>167               | 60°C                                   |
| 6              | (F) 5' – GCACAACTGTGCTTGGGG – 3'<br>(R) 5' – GACAGACACACTACACTCCT – 3'                                                                                       | 78198524-78198541<br>78198972-78198953                                           | 149                      | 64°C                                   |
| 7 & 8          | (F) 5' –CAGGCTTACATAGCAAGCTCC - 3'<br>(R) 5' –CATGCTTGTTAGTCTCAACTAGTGC – 3'                                                                                 | 78199183-78199203<br>78199874-78199850                                           | 152<br>225               | 59°C                                   |
| 9 & 10         | (F) 5' –TGGCACAGTGACTIONTAAATTTGG - 3'<br>(R) 5' –CAGGCTACATTAATGGTACAGCAC - 3'                                                                              | 78200418-78200439<br>78200924-78200901                                           | 108<br>145               | 59°C                                   |
| 11             | (F) 5' –GAGTGGTAGTGGAATTGTAGG - 3'<br>(R) 5' –CCAGGGAAAGCAAGACTACG - 3'                                                                                      | 78201162-78201182<br>78201514-78201495                                           | 151                      | 58°C                                   |
| 12             | (F) 5' –TCATTTGCACGAGTCATTTACTC - 3'<br>(R) 5' –GGGATCAAGACTAGAGCTTCA - 3'                                                                                   | 78201722-78201744<br>78202420-78202400                                           | 562                      | 58°C                                   |

PCR Conditions: 94°C for 4 minutes  
35 cycles of: [94°C for 45 seconds, (annealing temperature found in chart above) for 45 seconds, 72°C for 45 seconds]  
72°C for 7 minutes

Supplemental Table 3 : Oligonucleotide primers used to amplify and sequence *Ccdc5*

| <u>Exon</u> | <u>Primers</u>                                                                | <u>Position of Primers</u><br><u>Ensembl v. 38</u> | <u>Exon</u><br><u>Size (bp)</u> | <u>Annealing</u><br><u>Temperature</u> |
|-------------|-------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------|----------------------------------------|
| 1           | (F) 5'- GAGGACTCCAGCCAGAAATG – 3'<br>(R) 5'-CTCCCTTCTCCGGGTCTC – 3'           | 78049600-78049619<br>78049218-78049201             | 61                              | 63.6 °C                                |
| 2           | (F) 5' – GAAAGAGTGATGCTCTTTGATAATG – 3'<br>(R) 5' – GTTACATTTGCATGGGTGGG – 3' | 78048846-78048870<br>78048346-78048327             | 175                             | 66.0 °C                                |
| 3           | (F) 5' – AAAATCAGAGGTCTGCCTGC – 3'<br>(R) 5' – GTTGTTGCTGGTTTGTATGCT – 3'     | 78046023-78046042<br>78045566-78045546             | 136                             | 64.5 °C                                |
| 4           | (F) 5' – GTGTCCTTGCCATACCCAG – 3'<br>(R) 5' – CTCCCATTTGCTTTAGGCAG – 3'       | 78043933-78043952<br>78043475-78043456             | 135                             | 64.5 °C                                |
| 5           | (F) 5' – TGAGAAAAGTCTCACGTGGC – 3'<br>(R) 5' – CAGCTCCAGGTTCTGAAGC – 3'       | 78042843-78042862<br>78042411-78042394             | 124                             | 66.0 °C                                |
| 6           | (F) 5' – ACCGTCTTCTCCCCACATC – 3'<br>(R) 5' – CAGTTGCAGGCAGGCGT – 3'          | 78042350-78042368<br>78041961-78041945             | 66                              | 67.8 °C                                |
| 7           | (F) 5' – GCCTCTCAGTGACAGATTGC – 3'<br>(R) 5' – GGTCCCTGCTTTCTTGGATA – 3'      | 78041317-78041336<br>78040923-78040904             | 72                              | 64.5 °C                                |
| 8           | (F) 5' – TCACAGCAAAGAACCCAG – 3'<br>(R) 5' – GTATCTCAGTTGAGTAACTGC – 3'       | 78040326-78040345<br>78040074-78040054             | 48                              | 56.0 °C                                |
| 9           | (F) 5' – CTTGACTAGCGTAAATGAGTTCC – 3'<br>(R) 5' – CTCACAACCATCCCCAAC – 3'     | 78039556-78039578<br>78039039-78039022             | 186                             | 65.0 °C                                |

PCR Conditions:

- 94 °C for 4 minutes

-35 cycles of: [94 °C for 45 seconds, (annealing temperature in chart above) for 45 seconds, 72 °C for 45 seconds]

-72.0 °C for 7 minutes

Supplemental Table 4 : Oligonucleotide primers used to amplify and sequence *Pstpip2*

| Exon<br>(s) | Primers                                                                                                                                                                   | Position of Primers<br>Ensembl v. 38                                             | Exon<br>Size (bp) | Annealing<br>Temperature |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|--------------------------|
| 1           | (F) 5' - CAATCGGGCGTGGTTTAG - 3'<br>(R) 5' - GCGTGAGAACGCCGGGTGAC - 3'                                                                                                    | 78076178-78076195<br>78076548-78076529                                           | 30                | 55.2°C                   |
| 2           | (F) 5' - TCGGCGTCATCATTTGAAC - 3'<br>(R) 5' - GAGAGGGCCAACCGCACAAAGTTG - 3'                                                                                               | 78116603-78116621<br>78117057-78117034                                           | 101               | 62.0°C                   |
| 3           | (F) 5' - GTGACGTCACATCTGAACGTCC - 3'<br>(R) 5' - GAAAGCAAGAAGCGGGAGG - 3'                                                                                                 | 78127916-78127937<br>78128268-78128250                                           | 78                | 55°C                     |
| 4           | (F) 5' - GGTACGAGTGCTGCATTTTC - 3'<br>(R) 5' - AGCGGTTGGTACTGGCTGC - 3'                                                                                                   | 78129497-78129516<br>78130007-78129989                                           | 35                | 66°C                     |
| 5           | (F) 5' - CCAAGAAGGACCTCAATGGG - 3'<br>(R) 5' - CAGACTGTCCTGCTGTCCTG - 3'<br>Nested (F) 5' - GGACCTCAATGGGTATTAGTGACC - 3'<br>Nested (R) 5' - GTCCTGCTGTCCTGGAACCTCAC - 3' | 78136318-78136337<br>78136751-78136732<br>78136348-78136325<br>78136745-78136724 | 107               | 62°C<br>62.5°C           |
| 6           | (F) 5' - AACATGGCCGAGTCACAGTC - 3'<br>(R) 5' - GCCCTGTTACACCCACTCTC - 3'                                                                                                  | 78143317-78143336<br>78143774-78143755                                           | 63                | 67.1°C                   |
| 7           | (F) 5' - GGGAGACTGCTCAAAGAGCAC - 3'<br>(R) 5' - GACTTCCAATTCTAATCACTG - 3'                                                                                                | 78151765-78151786<br>78152430-78152409                                           | 99                | 62.6°C                   |
| 8,9         | (F) 5' - GGAAGTAGACCAGACCGTACC - 3'<br>(R) 5' - TCTGTTCACGTAAATGCTCG - 3'                                                                                                 | 78153125-78153145<br>78153675-78153656                                           | 46<br>80          | 62°C                     |
| 10          | (F) 5' - TCTGCACAGTTAGCTATTATGGG - 3'<br>(R) 5' - ACGGTGGTAAGATGGACCAG - 3'                                                                                               | 78154873-78154895<br>78155313-78155294                                           | 99                | 60°C<br>55°C B6          |
| 11          | (F) 5' - TGCTGGGACTTGGCATAGAG - 3'<br>(R) 5' - CTGCCACTCTCACACGGTCTC - 3'                                                                                                 | 78155768-78155784<br>78156260-78156240                                           | 97                | 64°C                     |
| 12          | (F) 5' - CTCCATCTCTGAGGGACAG - 3'<br>(R) 5' - GGCCATGCTCAAGTAACTG - 3'                                                                                                    | 78157348-78157367<br>78157805-78157786                                           | 82                | 62.6°C                   |
| 13          | (F) 5' - TGCGTCATATGTATCTGCCC - 3'<br>(R) 5' - CACATGCAGCTTGAGGTAGC - 3'                                                                                                  | 78159083-78159102<br>78159685-78159666                                           | 35                | 65°C                     |
| 14          | (F) 5' - GCCCTTCCTAATGTTGAGACC - 3'<br>(R) 5' - GTCCTCTTTCCAACAGGCTTC - 3'                                                                                                | 78160793-78160813<br>78161273-78161253                                           | 61                | 69.5°C                   |
| 15          | (F) 5' - CTACCCAAAGATCAGCTATTTCC - 3'<br>(R) 5' - CAGCTGAGAAGAGATGTATGTCTAAC - 3'                                                                                         | 78163386-78163403<br>78163794-78163777                                           | 206               | 55°C                     |

#### PCR Conditions:

For all exons except those listed below:

- 94 °C for 4 minutes

-35 cycles of: [94 °C for 45 seconds, (annealing temperature in chart above) for 45 seconds, 72 °C for 45 seconds]

-72.0 °C for 7 minutes

For exons 3 and 10 from B6 DNA:

- 94 °C for 4 minutes

-35 cycles of: [94 °C for 45 seconds, 55°C for 1 minute, 72 °C for 1 minute]

-72.0 °C for 7 minutes