

iScience, Volume 24

Supplemental information

**Liver sphingomyelin synthase 1 deficiency causes
steatosis, steatohepatitis, fibrosis, and tumorigenesis:
An effect of glucosylceramide accumulation**

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Supplemental Tables and Figures

Table S1. Primers for Real-time PCR, related to Figure 5F.

Mouse PDGFR α	Forward: 5'-TATCCTCCCAAACGAGAATGAGA-3' Reverse: 5'-GTGGTTGTAGTAGCAAGTGTACC-3'
Mouse PDGFR β	Forward: 5'-TTCCAGGAGTGATACCAGCTT-3' Reverse: 5'-AGGGGGCGTGATGACTAGG-3'
Mouse Colla1	Forward: 5'-GCTCCTCTTAGGGGCCACT-3' Reverse: 5'-CCACGTCTCACCATTGGGG-3'
Mouse TIMP1	Forward: 5'-GCAACTCGGACCTGGTCATAA-3' Reverse: 5'-CGGCCCGTGATGAGAACT-3'
Mouse Ccnd2	Forward: 5'-GAGTGGGAACTGGTAGTGTG-3' Reverse: 5'-CGCACAGAGCGATGAAGGT-3'
Mouse Myct1	Forward: 5'-ATGGCTAATAACACCACGAGC-3' Reverse: 5'-CAGCGCCAGAGAAATCCT-3'
Mouse TGF β 1	Forward: 5'-CTCCCGTGGCTTCTAGTGC-3' Reverse: 5'-GCCTTAGTTTGACAGGATCTG-3'
Mouse FSP27	Forward: 5'-CAGAAGCCAACTAAGAAGATCG-3' Reverse: 5'-TGTAGCAGTGCAGGTCATAG-3'
Mouse CD36	Forward: 5'-ATTGGTCAAGCCAGCT-3' Reverse: 5'-TGTAGGCTCATCCACTAC-3'
Mouse GAPDH	Forward: 5'-AGGTCGGTGTGAACGGATTTG-3' Reverse: 5'-TGTAGACCATGTAGTTGAGGTCA-3'
Human PDGFR α	Forward: 5'-TGGCAGTACCCCATGTCTGAA-3' Reverse: 5'-CCAAGACCGTCACAAAAGGC-3'
Human PDGFR β	Forward: 5'-AGCACCTTCGTTCTGACCTG-3' Reverse: 5'-TATTCTCCCGTGTCTAGCCCA-3'
Human Colla1	Forward: 5'-GAGGGCCAAGACGAAGACATC-3' Reverse: 5'-CAGATCACGTCATCGCACAAAC-3'
Human TIMP1	Forward: 5'-CTTCTGCAATTCCGACCTCGT-3' Reverse: 5'-ACGCTGGTATAAGGTGGTCTG-3'
Human Ccnd2	Forward: 5'-ACCTTCCGCAGTGCTCCTA-3' Reverse: 5'-CCCAGCCAAGAAACGGTCC-3'
Human Myct1	Forward: 5'-CAATCGGGCTGGTACTTGGAG-3' Reverse: 5'-CGTGGGTGTAAGAAGACCTAGA-3'
Human Mycn	Forward: 5'-ACCCGGACGAAGATGACTTCT-3' Reverse: 5'-CAGCTCGTTCTCAAGCAGCAT-3'
Human TGF β 1	Forward: 5'-GGCCAGATCCTGTCCAAGC-3' Reverse: 5'-GTGGGTTTCCACCATTAGCAC-3'
Human SMS1	Forward: 5'-TGTGCCGAGTCTCCTCTGA-3' Reverse: 5'-CCGTTCTTGTGTGCTTCCAAA-3'
Human SMS2	Forward: 5'-CAAATTGCTATGCCCACTGAATC-3' Reverse: 5'-GTTGTCAAGACGAGGTTGAAAAC-3'

Table S2. Description of human NASH samples, related to Figure 7.

Patient ID	Diagnosis	Gender	Ethnicity	Age	Date	Description
110048441	Normal	Female	Non-Hispanic/Latino	41	11/19/20	Plasma
110040477	Normal	Female	Non-Hispanic/Latino	43	03/19/19	Plasma
110027068	Normal	Female	Non-Hispanic/Latino	45	11/11/13	Plasma
110032771	Normal	Female	Non-Hispanic/Latino	47	01/28/13	Plasma
110039644	Normal	Female	Non-Hispanic/Latino	41	11/20/20	Plasma
110046384	Normal	Female	Non-Hispanic/Latino	42	11/24/20	Plasma
110046590	Normal	Female	Non-Hispanic/Latino	49	11/23/20	Plasma
110032771	Normal	Female	Non-Hispanic/Latino	47	11/07/13	Plasma
EDP0000-AI900368145012020DD	NASH	Female	Non-Hispanic/Latino	60	01/20/20	Plasma
EDP0000-AI900420897073120DD	NASH	Female	Non-Hispanic/Latino	60	07/31/20	Plasma
LHP0000-AI900338336110719DD	NASH	Female	Unknown	60	11/07/19	Plasma
LHP0000-AI900360896122419DD	NASH	Female	Non-Hispanic/Latino	48	12/24/19	Plasma
LHP0000-AI900368178011520DD	NASH	Female	Unknown	49	01/15/20	Plasma
LHP0000-AI900371017020920DD	NASH	Female	Non-Hispanic/Latino	61	02/09/20	Plasma
LHP0000-AI900371343021220DD	NASH	Female	Non-Hispanic/Latino	61	02/12/20	Plasma
LHP0000-AI900385725031120DD	NASH	Female	Non-Hispanic/Latino	63	03/11/20	Plasma

Figure S1. Sphingolipid biosynthesis pathway.

Figure S2. SMS1 deficiency-mediated liver fibrosis.

WT, *Sms2* KO, and *Sms1/Sms2* KO mouse liver sections were stained with trichrome for fibrosis. (A) Six-month-old and (B) one-year-old mice. The pictures are representative of six mice/group.

Figure S3. SMS1 deficiency-mediated liver tumor formation.

Liver tumor observations in 1-year-old WT, *Sms2* KO, and *Sms1/Sms2* KO mice. The pictures are representative of six mice/group.

Figure S4. Mouse liver S1P measurement. Using LC/MS/MS, S1P was measured in livers from 6-month-old WT, *Sms2* KO, and *Sms1/Sms2* KO mice. Data are represented as mean \pm SD, n=5.

Figure S5. Scatter Plot of RNA sequencing. WT hepatocytes vs. *Sms1/Sms2* KO hepatocytes.

Figure S1. Li et al

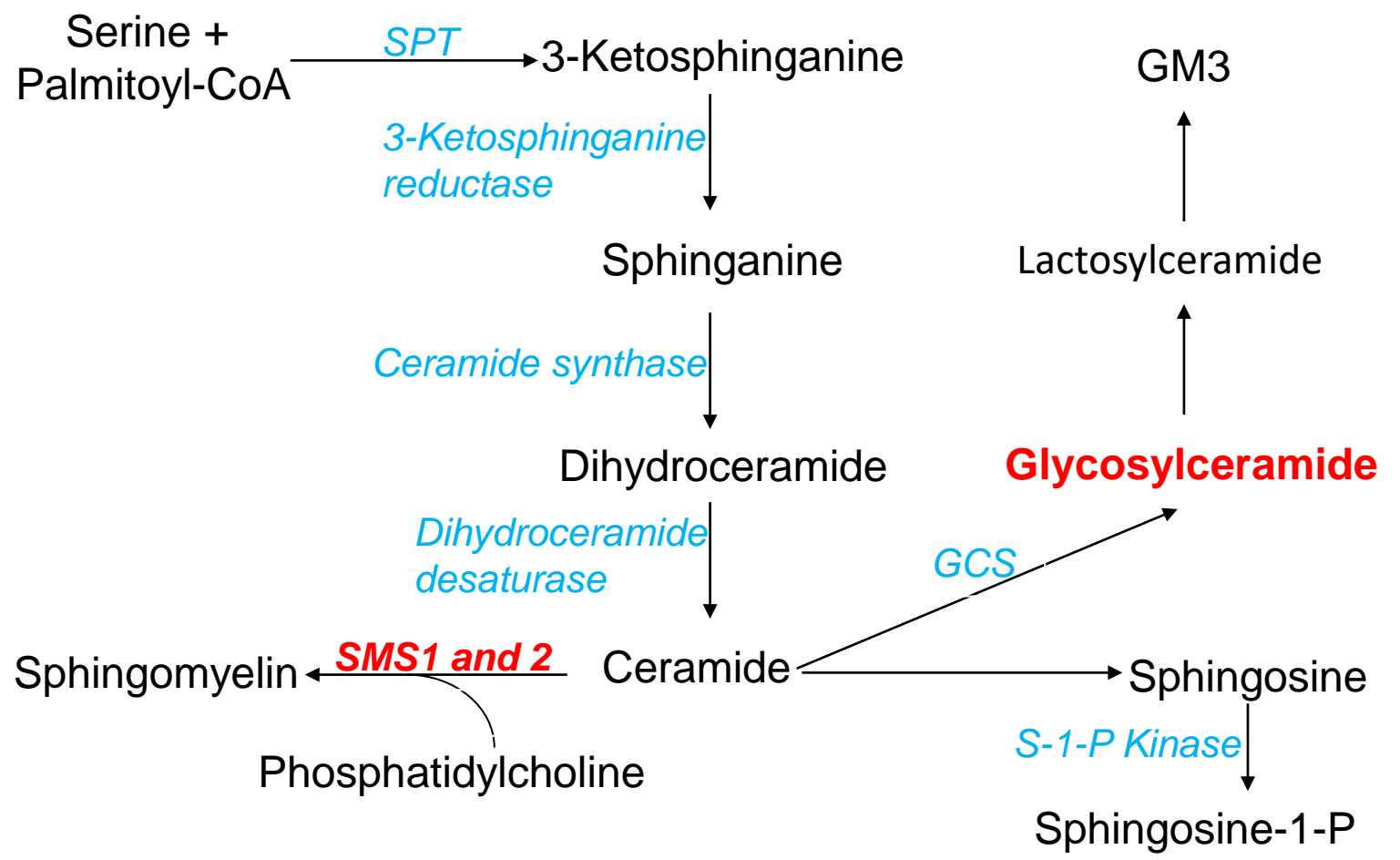


Figure S2. Li et al

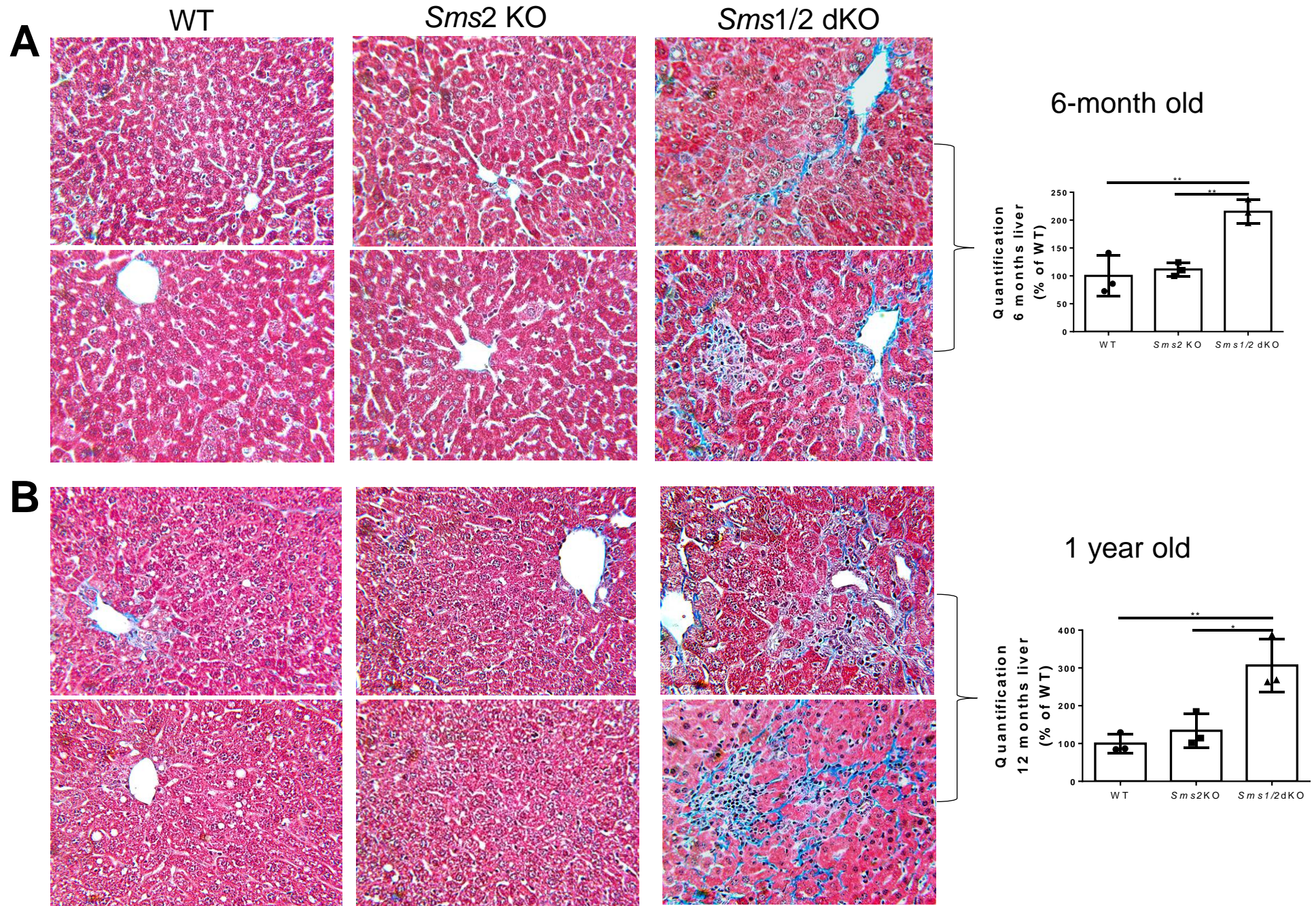


Figure S3. Li et al

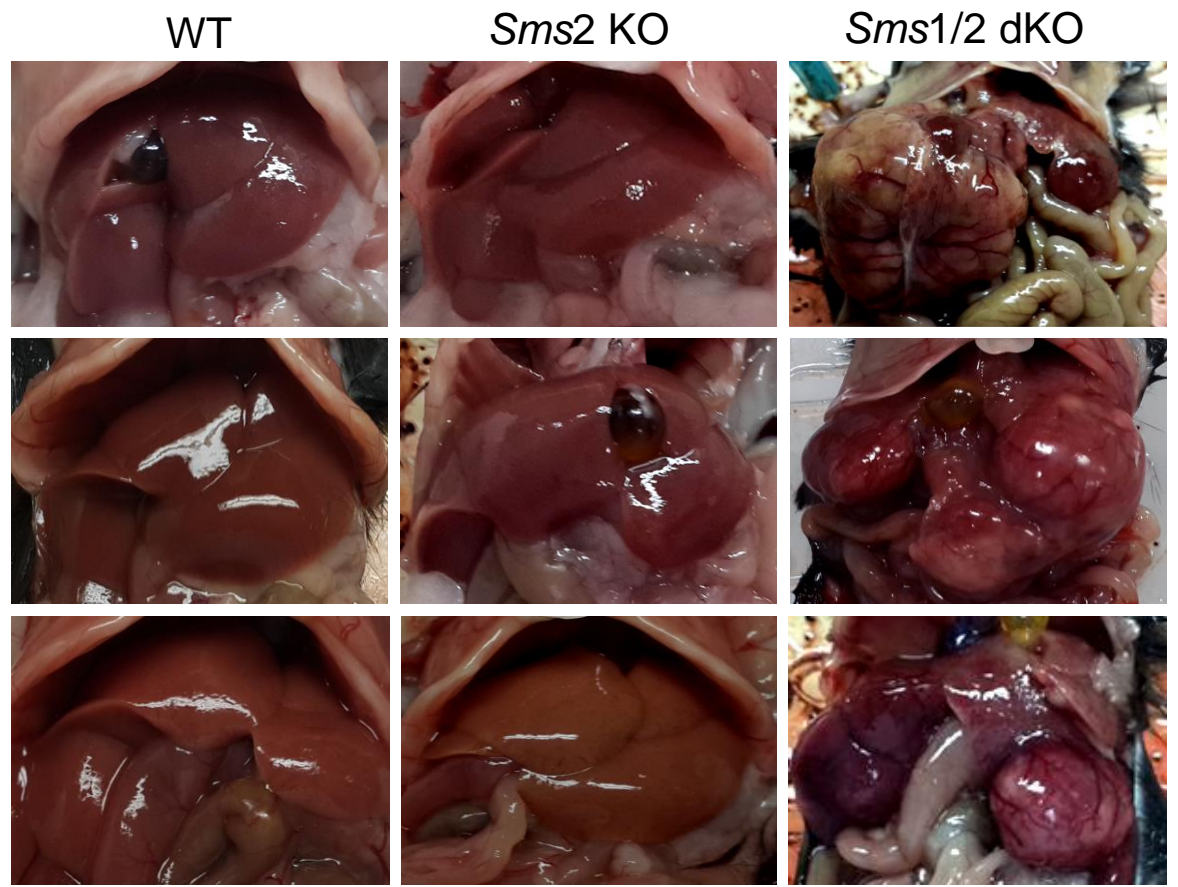


Figure S4. Li et al

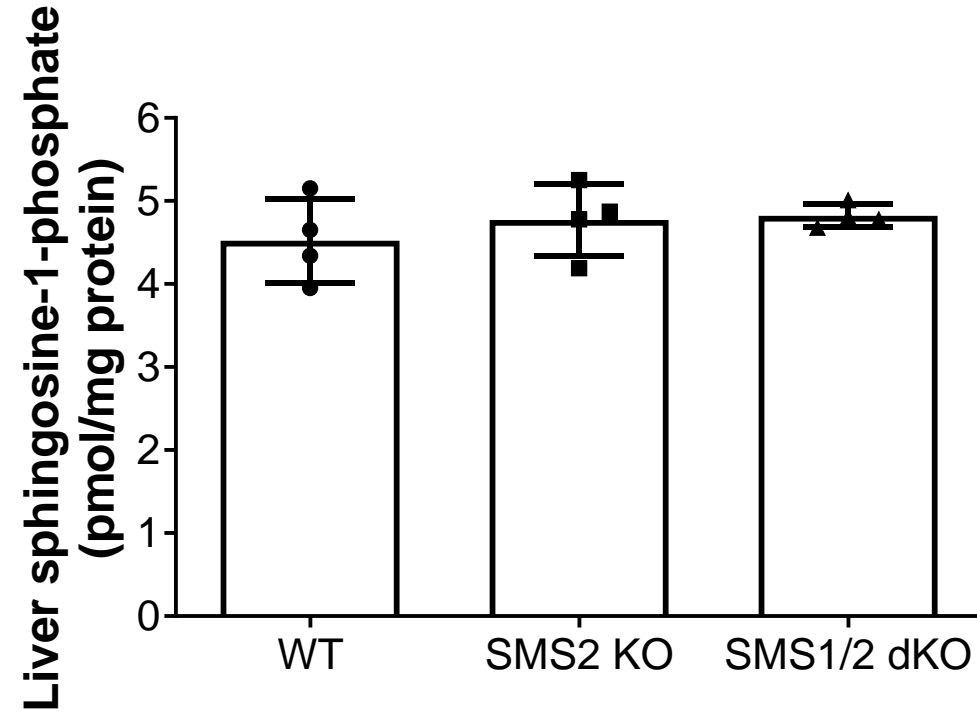


Figure S5. Li et al

