

Supplementary Table 4: Pathway enrichment analysis of the glomerule dataset. Signaling pathways related to the DE gene, TFs, and kinase of the glomerule network were detremined. Adj. P-value \leq 0.05 was considered as statistical significance threshold.

Pathway	adj. p-value
ABC-family proteins mediated transport	1.23069E-12
Activated TLR4 signalling	9.69569E-05
Activation of AKT2	0.000523836
Activation of APC/C and APC/C:Cdc20 mediated degradation of mitotic proteins	1.23069E-12
Activation of G protein gated Potassium channels	0.015478822
Activation of GABAB receptors	0.000143533
Activation of IRF3/IRF7 mediated by TBK1/IKK epsilon	9.69569E-05
Activation of Kainate Receptors upon glutamate binding	0.015478822
Activation of NF-kappaB in B cells	1.23069E-12
Activation of the AP-1 family of transcription factors	0.001041885
Adaptive Immune System	8.86451E-06
Adenylate cyclase inhibitory pathway	0.000143533
Adherens junction	4.11984E-12
Adipocytokine signaling pathway	0.014248363
ADP signalling through P2Y purinoceptor 1	0.015478822
ADP signalling through P2Y purinoceptor 12	0.000143533
Adrenaline,noradrenaline inhibits insulin secretion	0.015478822
Adrenergic signaling in cardiomyocytes	0.049384343
AGE-RAGE signaling pathway in diabetic complications	6.3338E-13
AKT phosphorylates targets in the cytosol	0.007462562
Antigen processing: Ubiquitination & Proteasome degradation	8.86451E-06
Antigen processing-Cross presentation	1.23069E-12
APC/C:Cdc20 mediated degradation of mitotic proteins	1.23069E-12
APC/C:Cdc20 mediated degradation of Securin	1.23069E-12
APC/C:Cdh1 mediated degradation of Cdc20 and other APC/C:Cdh1 targeted proteins in late mitosis/early G1	1.23069E-12
APC/C-mediated degradation of cell cycle proteins	1.23069E-12
APC:Cdc20 mediated degradation of cell cycle proteins prior to satisfaction of the cell cycle checkpoint	1.23069E-12
Apelin signaling pathway	0.000265052
Apoptosis	0.003114477
ARMS-mediated activation	1.23069E-12
Assembly of collagen fibrils and other multimeric structures	9.26518E-07
Assembly of the pre-replicative complex	1.23069E-12
Asymmetric localization of PCP proteins	1.23069E-12
AUF1 (hnRNP D0) binds and destabilizes mRNA	1.23069E-12
Autodegradation of the E3 ubiquitin ligase COP1	1.23069E-12
Autophagy	0.012187635
Axon guidance	0.000501037
B cell receptor signaling pathway	0.000999416
Beta-catenin independent WNT signaling	1.23069E-12
Ca2+ pathway	0.015478822
cAMP signaling pathway	5.53949E-05
CASP8 activity is inhibited	0.006176324
Caspase activation via extrinsic apoptotic signalling pathway	9.69569E-05
CD209 (DC-SIGN) signaling	1.34199E-06
Cdc20:Phospho-APC/C mediated degradation of Cyclin A	1.23069E-12
CDK-mediated phosphorylation and removal of Cdc6	1.23069E-12
CDT1 association with the CDC6:ORC:origin complex	1.23069E-12
Cell cycle	0.000154315
Cell Cycle Checkpoints	1.23069E-12
Cell Cycle, Mitotic	1.23069E-12
Cell surface interactions at the vascular wall	0.006176324
Cell-Cell communication	0.000509235
Cellular response to hypoxia	1.23069E-12

Cellular responses to stress	1.23069E-12
Centrosome maturation	3.50092E-06
Chaperonin-mediated protein folding	3.50092E-06
Chemokine signaling pathway	0.003038401
Class I MHC mediated antigen processing & presentation	8.86451E-06
CLEC7A (Dectin-1) signaling	1.23069E-12
Collagen biosynthesis and modifying enzymes	9.26518E-07
Collagen chain trimerization	9.26518E-07
Collagen degradation	9.26518E-07
Collagen formation	9.26518E-07
Complement and coagulation cascades	0.000863323
Constitutive Signaling by AKT1 E17K in Cancer	0.007462562
Cooperation of PDCL (PhLP1) and TRiC/CCT in G-protein beta folding	0.000143533
Cooperation of Prefoldin and TriC/CCT in actin and tubulin folding	3.50092E-06
COPI-independent Golgi-to-ER retrograde traffic	3.50092E-06
COPI-mediated anterograde transport	3.50092E-06
CREB phosphorylation	1.34199E-06
Cross-presentation of soluble exogenous antigens (endosomes)	1.23069E-12
CTLA4 inhibitory signaling	0.000523836
C-type lectin receptors (CLRs)	1.23069E-12
Cytokine Signaling in Immune system	1.23069E-12
DAP12 interactions	1.23069E-12
DAP12 signaling	1.23069E-12
Death Receptor Signalling	0.006176324
Dectin-1 mediated noncanonical NF-kB signaling	1.23069E-12
Defective B3GALTL causes Peters-plus syndrome (PpS)	0.000423478
Defective CFTR causes cystic fibrosis	1.23069E-12
Degradation of AXIN	1.23069E-12
Degradation of beta-catenin by the destruction complex	1.23069E-12
Degradation of DVL	1.23069E-12
Degradation of GLI1 by the proteasome	1.23069E-12
Degradation of GLI2 by the proteasome	1.23069E-12
Degradation of the extracellular matrix	6.91075E-09
Deubiquitination	1.23069E-12
Developmental Biology	2.82745E-06
Dimerization of procaspase-8	0.006176324
Disease	0.000423478
Diseases associated with O-glycosylation of proteins	0.000423478
Diseases associated with the TLR signaling cascade	9.69569E-05
Diseases of glycosylation	0.000423478
Diseases of Immune System	9.69569E-05
Diseases of signal transduction	1.23069E-12
Disinhibition of SNARE formation	0.047794098
Disorders of transmembrane transporters	1.23069E-12
DNA Replication	1.23069E-12
DNA Replication Pre-Initiation	1.23069E-12
Downstream signal transduction	1.23069E-12
Downstream signaling events of B Cell Receptor (BCR)	1.23069E-12
Downstream TCR signaling	1.23069E-12
ECM proteoglycans	9.26518E-07
ECM-receptor interaction	6.43147E-05
Elastic fibre formation	0.023000815
ER to Golgi Anterograde Transport	3.50092E-06
ErbB signaling pathway	2.6995E-05
ERK/MAPK targets	1.34199E-06
ER-Phagosome pathway	1.23069E-12
Extracellular matrix organization	6.91075E-09
Factors involved in megakaryocyte development and platelet production	3.50092E-06
FBXL7 down-regulates AURKA during mitotic entry and in early mitosis	1.23069E-12

Fc epsilon receptor (FCERI) signaling	1.23069E-12
Fc epsilon RI signaling pathway	0.000574743
Fc gamma R-mediated phagocytosis	0.019602279
FCERI mediated MAPK activation	1.23069E-12
FCERI mediated NF-kB activation	1.23069E-12
Focal adhesion	4.62455E-13
Formation of the cornified envelope	2.82745E-06
Formation of tubulin folding intermediates by CCT/TriC	3.50092E-06
FoxO signaling pathway	4.07829E-14
Frs2-mediated activation	1.23069E-12
G alpha (s) signalling events	0.000143533
G beta:gamma signalling through PLC beta	0.015478822
G protein gated Potassium channels	0.015478822
G1/S DNA Damage Checkpoints	1.23069E-12
G2/M Checkpoints	1.23069E-12
G2/M Transition	1.23069E-12
GABA B receptor activation	0.000143533
Gap junction	0.047454756
Gap junction assembly	3.50092E-06
Gap junction trafficking	3.50092E-06
Gap junction trafficking and regulation	3.50092E-06
Gastrin-CREB signalling pathway via PKC and MAPK	1.23069E-12
GLI3 is processed to GLI3R by the proteasome	1.23069E-12
Glucagon-like Peptide-1 (GLP1) regulates insulin secretion	0.015478822
Glucagon-type ligand receptors	0.015478822
G-protein activation	0.000143533
G-protein mediated events	0.000143533
GRB2 events in EGFR signaling	1.23069E-12
Hedgehog ligand biogenesis	1.23069E-12
Hedgehog 'off' state	1.23069E-12
Hedgehog 'on' state	1.23069E-12
Hedgehog signaling pathway	0.000182363
Hematopoietic cell lineage	0.003169127
Hemostasis	3.50092E-06
Hh mutants abrogate ligand secretion	1.23069E-12
Hh mutants that don't undergo autocatalytic processing are degraded by ERAD	1.23069E-12
HIF-1 signaling pathway	3.53001E-06
Hippo signaling pathway	0.005328066
HIV Transcription Initiation	0.000344402
Host Interactions of HIV factors	1.23069E-12
IGF1R signaling cascade	1.23069E-12
IKKB deficiency causes SCID	0.007462562
IKK complex recruitment mediated by RIP1	9.69569E-05
IL-17 signaling pathway	0.000437571
Immune System	8.86451E-06
Incretin synthesis, secretion, and inactivation	0.000143533
Inhibition of voltage gated Ca2+ channels via Gbeta/gamma subunits	0.015478822
Inhibition of adenylate cyclase pathway	0.000143533
Innate Immune System	1.23069E-12
Insulin receptor signalling cascade	1.23069E-12
Insulin resistance	0.011394908
Integrin alphaIIb beta3 signaling	0.000523836
Integrin cell surface interactions	9.26518E-07
Interleukin receptor SHC signaling	1.23069E-12
Interleukin-10 signaling	1.13141E-05
Interleukin-2 signaling	1.23069E-12
Interleukin-3, 5 and GM-CSF signaling	1.23069E-12
Interleukin-4 and 13 signaling	1.13141E-05
Inwardly rectifying K+ channels	0.015478822

IRAK2 mediated activation of TAK1 complex upon TLR7/8 or 9 stimulation	9.69569E-05
IRAK4 deficiency (TLR2/4)	9.69569E-05
IRS-mediated signalling	1.23069E-12
IRS-related events triggered by IGF1R	1.23069E-12
JNK (c-Jun kinases) phosphorylation and activation mediated by activated human TAK1	0.000975181
Keratinization	2.82745E-06
Kinesins	3.50092E-06
L1CAM interactions	3.70615E-07
Ligand-dependent caspase activation	9.69569E-05
Longevity regulating pathway	0.020245093
Long-term potentiation	0.04276411
M Phase	1.23069E-12
M/G1 Transition	1.23069E-12
MAP kinase activation in TLR cascade	0.000975181
MAP2K and MAPK activation	0.02234388
MAPK family signaling cascades	1.23069E-12
MAPK signaling pathway	1.29202E-11
MAPK targets/ Nuclear events mediated by MAP kinases	1.34199E-06
MAPK1/MAPK3 signaling	1.23069E-12
MAPK6/MAPK4 signaling	1.23069E-12
MET activates RAS signaling	0.02234388
Metabolism of polyamines	1.23069E-12
Metabolism of proteins	8.86451E-06
MHC class II antigen presentation	3.50092E-06
Microtubule-dependent trafficking of connexons from Golgi to the plasma membrane	3.50092E-06
Mitotic Anaphase	1.23069E-12
Mitotic G2-G2/M phases	1.23069E-12
Mitotic Metaphase and Anaphase	1.23069E-12
Mitotic Prometaphase	3.50092E-06
Molecules associated with elastic fibres	0.023000815
mTOR signaling pathway	0.012955231
MyD88 cascade initiated on plasma membrane	0.000975181
MyD88 deficiency (TLR2/4)	9.69569E-05
MyD88 dependent cascade initiated on endosome	9.69569E-05
MyD88:Mal cascade initiated on plasma membrane	9.69569E-05
MyD88-independent TLR3/TLR4 cascade	9.69569E-05
NCAM signaling for neurite out-growth	1.23069E-12
NCAM1 interactions	9.26518E-07
Negative regulation of MAPK pathway	0.02234388
Neurophilin interactions with VEGF and VEGFR	0.01051389
Neurotrophin signaling pathway	3.82536E-06
NF-kappa B signaling pathway	0.031587338
NGF signalling via TRKA from the plasma membrane	1.23069E-12
NIK-->noncanonical NF-kB signaling	1.23069E-12
Nuclear Events (kinase and transcription factor activation)	1.34199E-06
O-glycosylation of TSR domain-containing proteins	0.000423478
O-linked glycosylation	0.000423478
Opioid Signalling	0.000143533
Orc1 removal from chromatin	1.23069E-12
Osteoclast differentiation	9.15186E-09
Oxygen-dependent proline hydroxylation of Hypoxia-inducible Factor Alpha	1.23069E-12
Oxytocin signaling pathway	0.014168671
p53 signaling pathway	0.014248363
p53-Dependent G1 DNA Damage Response	1.23069E-12
p53-Dependent G1/S DNA damage checkpoint	1.23069E-12
p53-Independent DNA Damage Response	1.23069E-12
p53-Independent G1/S DNA damage checkpoint	1.23069E-12
PCP/CE pathway	1.23069E-12
Peptide hormone metabolism	0.000143533

PI3K-Akt signaling pathway	1.46068E-13
Platelet activation	0.019919175
Platelet activation, signaling and aggregation	0.000143533
Platelet Aggregation (Plug Formation)	0.000523836
PLC beta mediated events	0.000143533
Post-chaperonin tubulin folding pathway	3.50092E-06
Post-translational protein modification	8.86451E-06
Presynaptic function of Kainate receptors	0.015478822
Progesterone-mediated oocyte maturation	0.035485862
Programmed Cell Death	2.5354E-05
Prolactin signaling pathway	0.003905837
Prolonged ERK activation events	1.23069E-12
Prostacyclin signalling through prostacyclin receptor	0.015478822
Protein folding	3.50092E-06
Protein ubiquitination	8.86451E-06
RAF/MAP kinase cascade	1.23069E-12
Rap1 signaling pathway	2.80626E-08
RAS signaling downstream of NF1 loss-of-function variants	0.02234388
Ras signaling pathway	1.89757E-08
Recruitment of mitotic centrosome proteins and complexes	3.50092E-06
Recruitment of NuMA to mitotic centrosomes	3.50092E-06
Recycling pathway of L1	3.70615E-07
Regulated Necrosis	0.006176324
Regulation by c-FLIP	0.006176324
Regulation of actin cytoskeleton	0.000240316
Regulation of activated PAK-2p34 by proteasome mediated degradation	1.23069E-12
Regulation of APC/C activators between G1/S and early anaphase	1.23069E-12
Regulation of Apoptosis	2.5354E-05
Regulation of DNA replication	1.23069E-12
Regulation of Hypoxia-inducible Factor (HIF) by oxygen	1.23069E-12
Regulation of mitotic cell cycle	1.23069E-12
Regulation of mRNA stability by proteins that bind AU-rich elements	1.23069E-12
Regulation of necroptotic cell death	0.006176324
Regulation of ornithine decarboxylase (ODC)	1.23069E-12
Regulation of PAK-2p34 activity by PS-GAP/RHG10	2.5354E-05
Regulation of RAS by GAPs	1.23069E-12
Regulation of TLR by endogenous ligand	9.69569E-05
Regulation of TP53 Activity	5.50978E-06
Regulation of TP53 Activity through Phosphorylation	0.000344402
Regulation of TP53 Degradation	5.50978E-06
Regulation of TP53 Expression and Degradation	5.50978E-06
Removal of licensing factors from origins	1.23069E-12
Resolution of Sister Chromatid Cohesion	3.50092E-06
Response to elevated platelet cytosolic Ca2+	0.047794098
RET signaling	1.23069E-12
Rho GTPase cycle	2.5354E-05
RHO GTPases Activate Formins	3.50092E-06
RHO GTPases activate IQGAPs	3.50092E-06
RIPK1-mediated regulated necrosis	0.006176324
RNA Polymerase II HIV Promoter Escape	0.000344402
RNA Polymerase II Promoter Escape	0.000344402
RNA Polymerase II Transcription Initiation	0.000344402
RNA Polymerase II Transcription Initiation And Promoter Clearance	0.000344402
RNA Polymerase II Transcription Pre-Initiation And Promoter Opening	0.000344402
RSK activation	0.000523836
S Phase	1.23069E-12
SCF-beta-TrCP mediated degradation of Emi1	1.23069E-12
Sema3A PAK dependent Axon repulsion	0.01051389
SEMA3A-Plexin repulsion signaling by inhibiting Integrin adhesion	0.01051389

Separation of Sister Chromatids	1.23069E-12
SHC1 events in EGFR signaling	1.23069E-12
SHC-related events triggered by IGF1R	0.02234388
Signal amplification	0.000143533
Signal regulatory protein (SIRP) family interactions	0.000509235
Signal Transduction	2.5354E-05
Signal transduction by L1	0.01051389
Signaling by EGFR	1.23069E-12
Signaling by FGFR3 fusions in cancer	0.02234388
Signaling by FGFR4 in disease	0.02234388
Signaling by Hedgehog	1.23069E-12
Signaling by high-kinase activity BRAF mutants	0.02234388
Signaling by Insulin receptor	1.23069E-12
Signaling by Interleukins	1.23069E-12
Signaling by Leptin	1.23069E-12
Signaling by PDGF	1.23069E-12
Signaling by Rho GTPases	2.5354E-05
Signaling by SCF-KIT	1.23069E-12
Signaling by the B Cell Receptor (BCR)	1.23069E-12
Signaling by Type 1 Insulin-like Growth Factor 1 Receptor (IGF1R)	1.23069E-12
Signaling by VEGF	1.23069E-12
Signaling by Wnt	1.23069E-12
Signaling pathways regulating pluripotency of stem cells	8.14166E-05
Signalling to ERKs	1.23069E-12
Signalling to p38 via RIT and RIN	1.23069E-12
Signalling to RAS	1.23069E-12
SOS-mediated signalling	1.23069E-12
Stabilization of p53	1.23069E-12
Switching of origins to a post-replicative state	1.23069E-12
Syndecan interactions	0.013439221
Synthesis of active ubiquitin: roles of E1 and E2 enzymes	8.86451E-06
Synthesis of DNA	1.23069E-12
Synthesis, secretion, and inactivation of Glucagon-like Peptide-1 (GLP-1)	0.000143533
T cell receptor signaling pathway	1.82277E-07
TCF dependent signaling in response to WNT	1.23069E-12
TCR signaling	1.23069E-12
TGF-beta signaling pathway	0.007916254
Th1 and Th2 cell differentiation	0.001562264
Th17 cell differentiation	1.27716E-08
The role of GTSE1 in G2/M progression after G2 checkpoint	1.23069E-12
Thromboxane signalling through TP receptor	0.015478822
Thyroid hormone signaling pathway	0.000756156
Tight junction	0.000289417
TNF signaling pathway	0.012714665
TNFR2 non-canonical NF-kB pathway	1.23069E-12
Toll Like Receptor 10 (TLR10) Cascade	0.000975181
Toll Like Receptor 2 (TLR2) Cascade	9.69569E-05
Toll Like Receptor 3 (TLR3) Cascade	9.69569E-05
Toll Like Receptor 4 (TLR4) Cascade	9.69569E-05
Toll Like Receptor 5 (TLR5) Cascade	0.000975181
Toll Like Receptor 7/8 (TLR7/8) Cascade	9.69569E-05
Toll Like Receptor 9 (TLR9) Cascade	9.69569E-05
Toll Like Receptor TLR1:TLR2 Cascade	9.69569E-05
Toll Like Receptor TLR6:TLR2 Cascade	9.69569E-05
Toll-like receptor signaling pathway	0.000133836
Toll-Like Receptors Cascades	9.69569E-05
TP53 Regulates Transcription of Cell Death Genes	0.006176324
TP53 Regulates Transcription of Death Receptors and Ligands	0.006176324
TRAF6 mediated induction of NFkB and MAP kinases upon TLR7/8 or 9 activation	9.69569E-05

TRAF6 mediated induction of TAK1 complex	9.69569E-05
TRAIL signaling	0.006176324
Translocation of GLUT4 to the plasma membrane	3.50092E-06
Transport of connexons to the plasma membrane	3.50092E-06
Transport to the Golgi and subsequent modification	3.50092E-06
TRIF-mediated programmed cell death	9.69569E-05
TRIF-mediated TLR3/TLR4 signaling	9.69569E-05
Ubiquitin Mediated Degradation of Phosphorylated Cdc25A	1.23069E-12
Ubiquitin-dependent degradation of Cyclin D	1.23069E-12
Ubiquitin-dependent degradation of Cyclin D1	1.23069E-12
Ub-specific processing proteases	1.23069E-12
UCH proteinases	1.23069E-12
Uptake and actions of bacterial toxins	0.000975181
Uptake and function of anthrax toxins	0.000975181
Vasopressin regulates renal water homeostasis via Aquaporins	0.015478822
VEGF signaling pathway	0.002636991
VEGFA-VEGFR2 Pathway	1.23069E-12
VEGFR2 mediated cell proliferation	1.23069E-12
VEGFR2 mediated vascular permeability	0.000523836
Vif-mediated degradation of APOBEC3G	1.23069E-12
Vpu mediated degradation of CD4	1.23069E-12
Wnt signaling pathway	4.17868E-09