

Supplementary Data

Supp. Table S1: Immunofluorescence and flow cytometry antibody concentrations

Primary Antibodies	Dilution	Company	Catalog Number
Rat-human CPEP	1000	Hybridoma/DSHB	GN-ID4
Rabbit-human PTPN2	100	Millipore-Sigma	HPA046176-100UL
Mouse-human HLA-ABC	200	Biolegend	311420
Mouse-human GCG	1000	Sigma-Aldrich	G2654-100UL
Rabbit-human SST	200	Phoenix Pharmaceuticals	h-060-03
Guinea pig-human INS	500	Dako	A0564
Mouse-human NKX6.1	200	DSHB	F55A10
Flow Cytometry Antibodies	Dilution	Company	Catalog Number
Mouse-human FOXA2 PE	200	BD Bioscience	561589
Mouse-human SOX17 Alexa 488	200	BD Bioscience	562205
Mouse-human SOX2 Alexa 594	100	Biolegend	656106
Mouse-human TRA160 Alexa 647	100	Biolegend	330606
Mouse-human HLA-ABC	200	Biolegend	311420

Secondary Antibodies	Dilution	Company	Serial Number
DAPI	1000	Invitrogen	P36935
Anti-rat Alexa 488	1000	Thermo Fisher	A-21208
Anti-rabbit Alexa 555	1000	Thermo Fisher	A-31572
Anti-mouse Alexa 647	1000	Thermo Fisher	A-31571
Anti-mouse Alexa 555	1000	Thermo Fisher	A-21208
Anti-rabbit Alexa 647	1000	Thermo Fisher	A-31572
Anti-guinea pig Alexa 488	1000	Thermo Fisher	A-31571
Zombie Aqua Fixable Viability Kit	500	Biolegend	423102

Supp. Table S2: Western blot antibody concentrations

Antibody	Dilution	Company	Catalog Number
Rabbit-human PTPN2	500	Millipore-Sigma	HPA046176-100UL
Mouse-human HLA-ABC	100	Biolegend	311420
Anti-rabbit HRP	1000	Thermo Fisher	31460
Anti-mouse HRP	1000	Invitrogen	31430

Supp. Table S3: Differential gene expression analysis of upregulated and downregulated genes

Gene_Symbol	Average_Expression	Log2_Fold_Change	P_Value	Adj_P_Value
AC008770.4	16.9276103292279	-7.39615163730378	5.13323553328244e-09	2.32698899879208e-06
HENMT1	22.2244329093681	-7.05803948605407	1.82662732286186e-10	1.25634167523457e-07
SOX1-OT	62.8846553796748	-6.82070417351137	3.52771148549749e-05	0.0039173530578236
CHL1	37.7354908372708	-6.51485816659156	1.45642926432014e-09	7.85133462327827e-07
THEM6	88.4388675594001	-6.33578593610263	4.07979246199744e-10	2.54298563896878e-07
KCNIP3	12.1079971946242	-6.17833801281077	2.28344592140932e-07	6.996137814908E-05
IRAK4	39.7746628692618	-6.17656854141351	4.23082742525184e-14	6.49139106339025e-11
CEBPZOS	76.7311249547649	-6.11266459572748	4.44686667026804e-24	1.26710289435952e-20
QPCT	581.000221682357	-6.09394264593786	2.61422737474596e-56	2.60716896083415e-52
PHBP2	11.4243343541003	-6.0833116785505	5.43159475382799e-08	1.90067699929567e-05
ZNF841	78.7644035805555	-5.56784693682784	1.19397101799485e-30	5.9537364812313e-27
C9orf64	89.6845167261116	-5.17208005229279	1.24028453311432e-24	4.12311921624972e-21
PSCA	62.015055282846	-5.11505360784986	6.50670182525798e-09	2.76133350226799e-06
LINC01833	48.7050657590972	-5.00220954747028	2.02988369008208e-05	0.00271731946861592
ZNF781	38.3603160709087	-4.7613624798583	2.94052332474615e-16	5.86516782353868e-13
MTUS2	636.020643612133	-4.3528240845671	2.13114028207234e-39	1.4169241355405e-35
TBX1	58.3779052174914	-4.176064074434	1.89899670610291e-09	9.94572321420221e-07
AMN	219.378477713819	-4.09196422318589	5.16513737802366e-23	1.28779787677575e-19
FABP7	43.2321669325889	-4.03618423823636	5.01837872133387e-06	0.000935701496421793
TMEM45B	84.2119146766332	-3.87689327129751	1.1737221451273e-19	2.60122910074545e-16
CCDC152	28.7791743485142	-3.62262150973661	1.60041323637884e-13	2.12812282752083e-10
JAM2	78.6138613064803	-3.50639765111902	7.52140341158695e-05	0.00675774380394204
NPY	22.3037192203324	-3.4252806253089	5.01955580653424e-06	0.000935701496421793
GDF7	22.4374308454953	-3.38032292966499	1.33387467089113e-05	0.00197077512485885
GLUD2	165.294007849288	-3.15824795697689	5.39209163996166e-09	2.39001466334834e-06
ZNF501	17.0963884551785	-3.12717019066074	1.51772529765242e-05	0.00216909656488732

ZNF844	69.4419823533117	-3.06846553023025	2.44204733838139e-12	2.56363559007133e-09
COL13A1	48.6209218371613	-2.94329162577649	1.38788471967617e-05	0.00203549622196036
STK32B	70.6780279394179	-2.91684267863254	2.10042648731796e-05	0.00279300711440294
CNTN2	86.1500871466087	-2.84425131630264	3.91467720944607e-06	0.000765511290388346
ZNF875	426.546828321387	-2.83992930155236	6.6333763690062e-62	1.32309325056198e-57
DAW1	20.5320850379952	-2.83363269070895	9.46866189558136e-05	0.00807102265680623
KLK13	130.288525812354	-2.80807845016074	0.000133712813518276	0.0102578299170598
ADGRB1	82.7241568817753	-2.76787088675132	6.58357800204366e-05	0.00617376687865502
PUS7L	153.19874669085	-2.7533375010483	1.38511045267416e-12	1.53485628272438e-09
LINC01535	13.3847195540517	-2.73658900678414	2.26932890443288e-05	0.002864812299229
TRIM58	30.7682757754058	-2.71331709117127	0.00016417981376709	0.0117373855390623
TF	461.221070033873	-2.64430477693544	1.49399119506309e-10	1.10367216210105e-07
ZNF283	49.6713828531055	-2.6281048255158	3.80881368453397e-12	3.6176475119864e-09
SOX2	571.923332121034	-2.61756685805309	3.45579690575688e-06	0.000718013802939861
KLK10	126.584306411394	-2.61629991468919	7.19288146047081e-07	0.000196533169329522
TRABD2B	224.980499285663	-2.57900512903945	5.24942319060342e-05	0.00536948692101414
H2BC14	45.1993153315963	-2.52206269418926	6.82867700437892e-07	0.000191837734548369
SLIT1	1950.54526575647	-2.49766875388471	0.000154868622749717	0.0113985592227522
CYP26B1	89.2254716779295	-2.49341587022212	0.000214966201529005	0.0142449031750749
MIR124-1HG	94.7558873869623	-2.47192565067249	2.23050186954164e-06	0.00049180221606157
AL137786.1	12.2593830962957	-2.41176617632217	2.34497676078855e-05	0.00294169223086091
CLCN3P1	30.1493336390662	-2.38617426021343	1.71802361440643e-06	0.000398461616429658
BMPR1B	63.4261528621762	-2.34733396335961	2.3929385215376e-05	0.0029645684317136
GRIA1	153.440788693016	-2.30587223873594	1.10885788971595e-05	0.00174151806836805
LINC00665	190.691029814776	-2.30054755859959	1.30688940701946e-14	2.17226800936751e-11
VWA3A	96.4253677697378	-2.21855345367053	1.6011131516688e-10	1.14056439011378e-07
GALR1	63.9096649099122	-2.17565896591353	0.000196458560641732	0.013419734419726
TCEAL5	287.188954752021	-2.14116443032159	3.47636926252874e-11	2.88915255459993e-08
LINC01882	15.6418226754415	-2.13668998729675	0.000191820303346306	0.0131479304829739
FAM66B	70.5809994082742	-2.12621438515264	2.29194676942571e-09	1.11500415275525e-06
FABP3	247.000143616805	-2.0874051423977	5.54793259210174e-05	0.00555611031389358
ST8SIA1	87.207918818387	-2.07943556716369	4.28774137224221e-05	0.00462288050868881
AC007608.3	20.9052968988956	-2.05894256120298	1.61041371595812e-05	0.00226206422383807
PNCK	16.935839745172	-2.05654237894118	0.000147786565174561	0.0111657228370144
VASH2	51.9077413430709	-2.04896152254863	0.00013368089364277	0.0102578299170598
PRDM8	28.4296028476535	-2.03280615040869	0.000166953814694995	0.0118649665394584
RGS5	287.822997382032	-2.02419574702978	2.36995881069213e-09	1.12550472471584e-06
CLDN19	67.1188435830853	-1.9461166670589	0.000119486519792281	0.00959150550399578
ELAVL3	187.532017158908	-1.92830416591448	0.000110543824908123	0.00903650463777628
RGS22	29.374154953076	-1.91061145595221	3.19531376559337e-05	0.00362123456639349
ARHGAP19-SLIT1	72.9616357587185	-1.90041831758642	0.000126944822494053	0.00985230128197038
GRIK4	126.659870439044	-1.85905176823613	3.01092532146466e-05	0.00347144025791527
PTGIS	94.9829607943162	-1.85698029762023	1.99193702249305e-09	9.94572321420221e-07
SYNDIG1	63.4566782425514	-1.84169563820344	2.46995843772767e-07	7.35310313416658e-05
SDK2	1421.98065996761	-1.78959782951525	3.12584288901761e-11	2.7107853158411e-08
EPHB1	269.765921624948	-1.78128638421785	4.95039452891635e-06	0.000935701496421793
CDHR3	641.412784962643	-1.76525518080253	1.30170162253816e-05	0.00195451768399138
LRP8	472.415408187504	-1.69875760274219	7.59297616010876e-10	4.20693062470915e-07
CAVIN4	49.5026436411105	-1.69162116740513	5.77192814490774e-06	0.0010562098970489
SNORD17	2593.46180733423	-1.67745538114853	8.52134155893746e-06	0.00141638898945472

ADAM23	142.682662105269	-1.66664585392292	3.52470584435706e-06	0.000722490392190181
APBA2	365.663991948344	-1.61253562861292	2.20215485758097e-06	0.00049180221606157
CFAP74	94.3688459628154	-1.60306640629755	0.000173153053900516	0.0121581360523346
ENO4	55.0787331657322	-1.59242608174577	0.000221939684838737	0.0145119552285874
EFR3B	279.549450164911	-1.5838699407528	8.40595255224786e-05	0.00735373375469894
EFCAB12	108.297069902356	-1.56617776305814	3.71945082293423e-05	0.0040987937079694
TSPAN18	467.69395989169	-1.55143466640765	1.34617932693837e-12	1.53485628272438e-09
NRIP3	68.8488449812889	-1.54451659099122	2.48235587302584e-05	0.00301908964898619
PLTP	603.941737527216	-1.53003826765601	1.86814384207155e-08	7.16576866806907e-06
INSYN2A	73.0928609446169	-1.5238510761745	0.000108237540474816	0.00893601055463958
SLC35F1	76.1206838427196	-1.50592556827591	0.000167154095938424	0.0118649665394584
PNPLA3	188.639996927308	-1.49958783483527	2.40098668016755e-13	2.99313002016387e-10
CDH26	115.350570745589	-1.49392742129265	4.07948747792311e-06	0.000789994730433537
TAF45	229.094718550793	-1.46842836817791	6.29942526728723e-07	0.000182099038233784
PCSK9	252.629818439525	-1.46353153152925	0.00015351688955631	0.0113985592227522
PCDHGB7	163.472778642781	-1.46184914248256	2.71162252253576e-05	0.00318153075497049
ATP8A2	127.769132657606	-1.43948790304217	0.000122828172801065	0.00976068021788865
GRIK3	1727.50652298755	-1.39657416566537	0.000200755128026782	0.0136199380395313
CDH7	65.5925124931835	-1.38682777843488	3.91779387936083e-05	0.00429364377569952
GPR162	92.0389754486906	-1.35544940171381	5.97045974443618e-06	0.00106409105299985
SLC13A3	47.8053778697953	-1.35401978045706	2.97949727693013e-05	0.00347144025791527
CFAP92	226.452725601287	-1.32565999544946	1.30323168561797e-06	0.000322408125777479
AFF3	325.909893342799	-1.31435817482215	8.06261313292951e-05	0.00717932506917018
HOMER3	126.022044252044	-1.30317769206358	0.00015269463541478	0.0113985592227522
PDE11A	76.7637593054119	-1.26126624883777	1.72973878647568e-05	0.00239592846076694
TMEM178A	74.5804452578439	-1.25503629210251	8.20921245870666e-05	0.00727737563117169
CIT	769.292513583339	-1.24672905774164	0.000105742002787095	0.00879360998598132
SPAG8	48.7123053249938	-1.24139344449071	5.94830742803282e-05	0.0057316396115721
AK5	361.137328323812	-1.22066379283883	7.18395714179536e-05	0.00661977555674585
CRB2	977.761462919898	-1.20973196224931	0.000161033546371651	0.0116375909997426
LINC01197	81.5347911459607	-1.19684593922274	5.58777754504273e-05	0.00555611031389358
LRRIQ1	125.655441453368	-1.17273492982266	2.24375823030196e-06	0.00049180221606157
GALNT16	300.865780654425	-1.16135926421916	6.66393619432426e-07	0.000189884101902845
TMEFF1	294.89596578478	-1.15476803226501	7.43885509862046e-10	4.20693062470915e-07
POU2F2	66.580024788132	-1.13094933418088	0.000169958455616878	0.0119787680414638
GLB1L2	240.106799463853	-1.09132361427727	7.45552993379869e-05	0.00672886878097505
ZFP82	120.770546234535	-1.06629333268348	6.80541531956475e-06	0.00117017943072447
STARD9	610.759849242279	-1.04514628237199	4.09671421114397e-08	1.48569203009959e-05
FAT3	3819.72464744818	-1.03765616904463	1.15639644519088e-15	2.09686213597976e-12
KLHL14	57.8631778470166	-1.03015940168751	2.44573066384386e-05	0.00299279409944968
TIMELESS	1058.80714228094	-1.02961955429386	7.20613246121756e-08	2.39555863452409e-05
FAM27C	144.497796722378	-1.01830841573925	0.000160195446475485	0.011619121365091
PER3	312.138818111883	-1.00026857968478	1.32967411905676e-06	0.000323435121691539
ARHGEF4	393.903616096281	-0.98657544115277	9.42751048246956e-06	0.00154132068920769
CAD	1925.62838252244	-0.42510279831855	9.61772563802583e-06	0.00154705770625857
CD63	4231.97757539401	0.43026675329535	6.16784247884919e-06	0.00108870607153209
DOK4	1382.93051899788	0.58644953358132	0.00015425526529879	0.0113985592227522
MAP3K13	467.404688463618	0.62595807656109	5.90013125161823e-05	0.00571281640508627
TMEM59	4231.27125936604	0.64128846244713	1.57114863972981e-05	0.00222256246581921
MYO3A	2514.93741799287	0.71208607816489	6.30105424445592e-06	0.00109917649954437

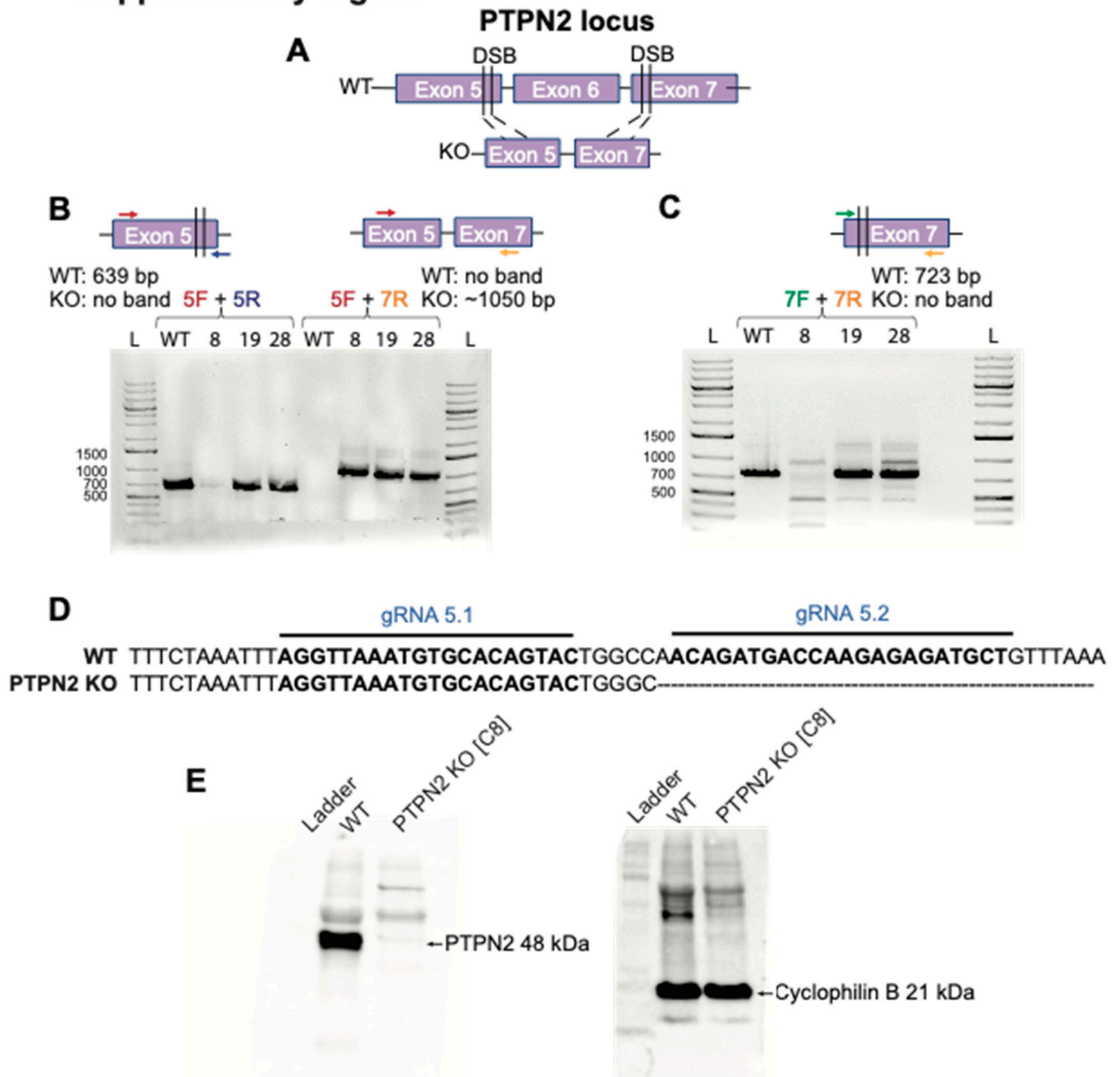
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CCDC68	210.911022894206	0.99157808388485	7.2019016134255e-05	0.00661977555674585
KRT8P46	135.000746511139	1.02163650895731	0.000207393559537607	0.0138432812990456
CTSZ	9169.90692838244	1.07617418292432	7.62419529455054e-07	0.00020276293246014
SMIM6	370.074559747987	1.10029612900564	1.73397533140045e-07	5.48982094604975e-05
DMTN	1291.52579946529	1.10256211272733	7.39294232624936e-05	0.00670271034724408
TMEM238	414.868084386097	1.1210895561402	0.000108418457546515	0.00893601055463958
AC012101.2	311.850458045992	1.14643663230266	2.42774865750229e-05	0.00298912806929264
ALDH1A1	11238.7957971455	1.17028605182656	1.42800092648011e-05	0.00207904426858192
CDH10	591.751308877031	1.17979430246455	3.12351066480867e-07	9.16199172356966e-05
LINC01036	67.549546747744	1.23340190567192	0.000112587546630062	0.00916600491870697
SKOR2	185.695663007126	1.24817383027903	2.83493491095929e-09	1.31501422637195e-06
EGFL7	1614.28459159702	1.25242377454946	1.22409524469887e-24	4.12311921624972e-21
FA2H	207.004769215174	1.25725891067001	6.33737578700502e-06	0.00109917649954437
GDA	422.787589799994	1.25957341641157	0.000105809004142962	0.00879360998598132
BIK	189.755426037418	1.26933683752494	1.65842294878039e-06	0.000389163578074985
VWA5A	2027.08277524063	1.27767806396723	6.28669096531716e-11	5.01577351976865e-08
EGFR	2616.65661040266	1.2863138664191	1.99452987349889e-09	9.94572321420221e-07
TTC22	341.340189287422	1.31526950828773	0.000119791761620071	0.00959150550399578
ZNF69	103.8825355431	1.33155264424366	6.66417963058594e-08	2.25294452392656e-05
C2CD4B	970.237680735714	1.33543439622759	1.41113193779913e-13	2.0104598308101e-10
TMEM236	1700.24767375668	1.33596018436942	0.000109033482945467	0.00894971955074193
TMEM61	201.47753364237	1.34361843409112	3.53516269130777e-05	0.0039173530578236
BDKRB2	668.954618464325	1.37551213782597	1.10278489336655e-05	0.00174151806836805
NCKAP5	2158.2329993646	1.42923974776548	2.99416901164916e-05	0.00347144025791527
HS3ST3B1	398.090706263412	1.44849034193904	0.000126798792863621	0.00985230128197038
C2CD4A	1453.06590003316	1.50895898957441	3.95810562067319e-10	2.54298563896878e-07
PCDH10	917.871615080274	1.53263080206173	5.09107465749352e-05	0.00526148057608113
CNTN1	1848.24633318589	1.54626584773342	1.79091042736612e-07	5.58148427878823e-05
IL1R1	1174.74606267636	1.54938894922828	5.63877585752549e-06	0.00104139836346485
GRPR	357.942743727892	1.59845827988076	2.38442630593704e-05	0.0029645684317136
LINC00643	830.468368781083	1.60212909847579	3.96608047276246e-05	0.00432281098960218
ANKRD53	152.298616418279	1.61234929493344	5.60105553852915e-05	0.00555611031389358
PON3	34.5747344986133	1.66666800772157	9.39936329851868e-06	0.00154132068920769
BTBD17	907.005554160403	1.72398600739252	2.67126183887601e-08	9.86684974781869e-06
ZP1	30.5557124338402	1.75780280091701	3.09687607743044e-05	0.00352973087088157
CALB1	97.3047216267614	1.77243461465301	2.01168338108377e-06	0.000455966326353373
SLC38A4	1452.97722572857	1.79394801532308	4.41777508921889e-10	2.67021036150182e-07
AC093898.1	107.108144153928	1.80464496843297	3.99689567630366e-12	3.62373096179786e-09
SYT16	351.410901121448	1.81185807427479	0.000136850418643547	0.0104583082385601
SCIN	199.634430306675	1.81253038677059	3.93478927626333e-10	2.54298563896878e-07
CYP1A1	4328.65786077582	1.86859998690415	1.32188916938754e-08	5.49300028595914e-06
AC012645.1	26.4691397446541	1.93016904429797	1.19333393890861e-05	0.00184339835200186
GAS2L3	1263.98485482806	1.95015348034589	1.43978623862278e-07	4.63193166380161e-05
MLN	111.727169898469	1.97705570330448	9.3565181559145e-05	0.00800966142222621
FGF18	90.6144331921781	2.02565335536336	4.39868944318282e-08	1.56671892203079e-05
PTGER3	1479.97381343113	2.16476573073557	0.000220232079436714	0.0144498324225155
CALHM2	27.9883106659349	2.29953126267851	1.52247828679547e-05	0.00216909656488732
AL355102.4	62.2049638694738	2.63458146057286	9.5494402698009e-06	0.00154705770625857
LINC01451	20.6396015723203	2.73001046394698	1.32003453341695e-05	0.00196488125399511
SPX	96.9916767659345	3.59380045569277	7.24322603545142e-05	0.00662721956436303

CEP250	2089.34623470659	-0.497747643905468	5.80056337099108e-05	0.00566611436424441
CECR2	933.617377286061	-0.515135543768792	0.000208650982267278	0.0138725083076771
WDR19	665.11030940063	-0.517897518834272	3.57369354556838e-06	0.000722490392190181
LIMD2	430.085214007991	-0.537450503220005	2.80614766674487e-06	0.000608385014792316
NFATC4	396.602308645138	-0.540938559210074	0.000187926325363419	0.0129254430541336
FYN	1319.2931636759	-0.549054960190743	0.000118028094320999	0.00953112700132242
EPB41	1740.43228119262	-0.562649734523383	1.86333247872431e-05	0.00254561846716679
CEP41	315.128166645493	-0.574323503383571	0.000103986034105238	0.00875149973106783
ZNF75A	232.736043849054	-0.598533807784775	1.90281523832858e-05	0.00258187433630625
MICAL1	1842.26844033216	-0.605415635964751	1.93743673140979e-05	0.00261108871923647
CAMSAP2	823.824054665051	-0.620308385762817	1.81295631845399e-06	0.000415646284228544
PLCG1	2149.50854664974	-0.623864112093955	3.24034164113417e-12	3.23159271870311e-09
FADS1	3636.18795746839	-0.638626792089584	2.92561820621313e-06	0.000620791284480075
MSI1	1197.22850852444	-0.666172178400032	6.96981176325777e-06	0.00118820397803367
THBS3	388.619502710537	-0.674590633050501	2.16652757104644e-05	0.00284299729816396
PHF21B	418.214328227067	-0.723527424525908	0.000176511490146803	0.0123101335051333
ZMYM3	982.304320153659	-0.727283442354117	5.57944450273049e-05	0.00555611031389358
ENAH	1686.65818901823	-0.742829411687303	0.000144074652376884	0.0109266654612522
C20orf96	362.415969944647	-0.755288580528666	1.37320960694328e-06	0.000330000467711936
ZNF615	133.326188524529	-0.763419994342447	4.68523352494563e-05	0.00489739592725707
PPP2R3B	710.723392037883	-0.765624147096903	0.000163964337555469	0.0117373855390623
CROCC	1175.23179251627	-0.774529014740255	1.2106947965118e-05	0.00184339835200186
DDAH2	456.288639990493	-0.802038471063271	5.16626907826511e-05	0.00531167025954
RPGRIP1L	291.143399572386	-0.831876556260702	1.30327309721675e-05	0.00195451768399138
PTPN2	486.539380816153	-0.838380429588731	7.92543888510279e-11	6.08003092316386e-08
ZNF107	179.018733412328	-0.855155615979657	2.22849058711307e-05	0.002864812299229
CFAP43	137.077836028583	-0.868371783018719	6.5513827488739e-05	0.00617376687865502
MPP3	110.653621259928	-0.871717188908051	6.60443327781958e-05	0.00617376687865502
AL513548.4	59.9700053714785	-0.929158754503423	0.000150926472085583	0.0113599223102606
KCTD15	308.510444081757	-0.936189298634179	0.000229771134413292	0.0148799189837906
AC107871.1	93.7469028609015	-0.944790575143065	8.4728007103711e-05	0.00735555115427981
GPR173	206.488605668234	-0.960320409447778	0.000115558159895364	0.00936960592387373
ERC2	166.937011408034	-0.979008583271439	9.99031836464025e-07	0.000252236569748246
ASAP3	503.617796472737	-0.987623803023967	0.000168973913120302	0.0119516087627573
ZNF527	96.1081924184032	-0.997881993381917	4.4007903065632e-05	0.00465649558306719
EIF5	5121.14945437085	0.340821580233486	0.000216714795876081	0.0142834097047447
UBE2W	577.830833252533	0.407082902884412	0.000197318809853635	0.0134324948168622
LGMN	1360.80470913065	0.415183808753404	5.47225104001789e-05	0.00554058473320796
RAB11A	3317.15889194922	0.416782514244983	1.20967958555327e-05	0.00184339835200186
NFE2L2	1314.86625484967	0.429851706486932	7.38391587523885e-05	0.00670271034724408
SCP2	1413.78960158704	0.436274816333457	0.000125791824264924	0.00983954990539441
ITM2B	4912.2521791814	0.443336500722429	0.000125793904836838	0.00983954990539441
DAP	2901.69312947811	0.448055452444758	2.56253230093614e-05	0.00305926700012906
BCAP31	1726.59208759253	0.451589948061293	5.62686394969669e-05	0.00555611031389358
SRPRB	1210.06696357008	0.452604654718301	0.000205510956237189	0.0138017560037272
TMEM167A	2697.26497381832	0.453701263602191	0.000207517352271866	0.0138432812990456
CAPN2	6486.86670444671	0.460827191376836	2.23577101820787e-05	0.002864812299229
RNASEK	2965.40345944679	0.474265233426514	1.39874224019423e-06	0.000332134675272788
GSDMD	760.963599925207	0.478131513310616	0.000178346379890658	0.0123947626944218
SEC24D	3450.98473074605	0.493564350006012	1.32000449651681e-07	4.31619830943023e-05
YPEL5	1422.58364175868	0.496160432398143	0.000128282817784278	0.00991755458730698

VASP	1190.82694127572	0.497399420914438	0.000123551205191485	0.00977917594741808
TMTC1	2799.23667280133	0.497713012655192	2.57674148211011e-05	0.00305926700012906
KRT10	374.100831273322	0.499314612281675	5.82349064810039e-05	0.00566611436424441
NCOA6	3137.45178583311	0.500809020288594	0.000203309451153162	0.0137464756362744
RAB11FIP5	766.328890994169	0.509833166802542	3.03591650696525e-05	0.00348013739355913
TUSC3	3342.44596110161	0.516533367724699	4.75256313069461e-06	0.000911486771200334
TMED3	3016.59668421727	0.516753313273698	0.000224713143827288	0.0145997666670328
PERP	2232.62514795736	0.521923951903104	1.30928798696359e-06	0.000322408125777479
DNAJC3	2144.84967934221	0.526355295565942	0.000180744240935133	0.0125177938530978
SOWAHB	318.476260566584	0.527031680739193	0.000120218408502905	0.00959150550399578
SAMD4A	1421.0761724219	0.528600884467419	0.00018544959069198	0.0127992302281738
GPX7	663.367767608937	0.534722741514324	3.50492834001341e-05	0.0039173530578236
SETD7	1253.70183086625	0.535616056374854	6.62381486028363e-05	0.00617376687865502
UQCR11	880.83452400842	0.540756178835581	8.95137323574321e-05	0.00772918140952961
ASAP1	4038.782662012	0.543608969064408	0.000156968599460747	0.0114726140503245
PDE3B	3530.13331411808	0.543698626577196	0.000104886514321084	0.00879019501953088
CASP3	772.867473772907	0.548360592002552	5.97504251158043e-06	0.00106409105299985
C11orf24	986.985080963047	0.549906438448025	0.000152707050330297	0.0113985592227522
ITCH	1857.84666257036	0.551236624747489	1.79392564515844e-08	7.01600802320203e-06
SSR4	3504.13897109569	0.559321514039543	2.24720456241084e-05	0.002864812299229
GPD2	1068.02519150389	0.577392431875913	3.86865208790247e-06	0.000764001332131709
GAB2	1380.10722681697	0.588462719499591	1.50498658509296e-05	0.00216909656488732
CYBA	1137.40192196993	0.594030346303346	0.00017372248946733	0.0121581360523346
TP53INP2	2602.67007245458	0.598274433968179	7.13166988778574e-05	0.00661619942240811
ATP6V0B	1301.45793354913	0.598481425131574	0.000222634026869936	0.0145119552285874
PRKD3	1059.3561406435	0.604973035078408	2.11970263039959e-05	0.00279997275933445
DHRS7	1798.82794412276	0.608613560260215	0.000139922581408027	0.0106522740792538
P4HA2	1785.85160577395	0.610706129055727	3.40067815042142e-06	0.00071399922514006
CIB1	356.388507468355	0.625029237105077	8.4580288252312e-06	0.00141638898945472
FKBP2	1104.42852225164	0.635699041979698	5.92870484638003e-08	2.03886115286028e-05
ELL2	5693.46113107409	0.657798582412891	2.03184453677009e-08	7.6466360623427e-06
MTFR1	586.569707157251	0.660996623298216	3.58801801940312e-06	0.000722490392190181
MON1B	1904.85908296856	0.663856753281837	9.93595174291949e-05	0.00839756328238441
MGST2	372.013146855127	0.671791835544223	4.07489103276523e-05	0.00441727046410517
SMARCA2	13572.7885605972	0.674616788252847	7.30169311974379e-07	0.000196810231035689
TLCD2	348.654707052347	0.687108946305447	8.48178464596589e-05	0.00735555115427981
CBR1	713.464809504068	0.687380200802609	5.03736917002928e-05	0.00523309195132312
TTC39A	1869.74605804322	0.688825008826288	0.000163942214376666	0.0117373855390623
IL10RB	223.659453278399	0.691255266827149	8.36959352991524e-05	0.00735373375469894
SASH1	1537.10553905624	0.691530121699669	5.30696031111822e-05	0.00540064440640632
GRPEL2	338.198965243065	0.693750994079816	3.4976504533197e-05	0.0039173530578236
TIPARP	1320.13442714781	0.715550346051426	3.62223198731666e-06	0.000722490392190181
MYLIP	396.085756172869	0.724911768133687	0.000154738287525345	0.0113985592227522
MPP2	872.223785803888	0.732158444627524	1.69707892721329e-05	0.0023671284113424
AGPAT2	879.116067752332	0.735624960617983	2.66569197907271e-05	0.00314614746831859
CST3	5338.87217296872	0.735929330364531	0.000205273279385237	0.0138017560037272
C4orf48	362.878075534512	0.737910496529894	9.27182476880858e-05	0.00797137141545931
CDS1	532.627563431706	0.745749825590034	2.19554866797444e-05	0.00286224926349138
HM13	3595.20834073965	0.762890840514099	7.18694852032962e-07	0.000196533169329522
VAMP8	471.809438973302	0.767480416255672	0.000158158691293131	0.0115132600603386
MAPK13	2725.36846933216	0.777249727433374	8.86180157740653e-07	0.000229555187354481

IL17RA	739.562292653066	0.783692011312545	1.05997642540608e-05	0.00169138318249198
PAK6	273.584253525148	0.787461657207155	4.41230154015692e-05	0.00465649558306719
DOK6	1808.96171362588	0.799951619618196	4.35154948440555e-05	0.00464149764791193
ANKS4B	2262.13856378564	0.806303665257318	7.88209333057703e-07	0.000206863465225907
FOXO1	1711.75507390885	0.807181713823938	8.33753739989529e-05	0.00735373375469894
GAREM1	2067.1374451853	0.816638474455278	6.17611799158602e-05	0.00592254083943148
CACNA2D1	5675.49671534187	0.842958198205838	1.86102542304589e-05	0.00254561846716679
FFAR1	792.698209576178	0.845956605360298	5.66338444183846e-05	0.00556462394467537
AL035071.1	206.890398225742	0.848268188484389	6.30859437702672e-05	0.00602063270067823
ATP1B1	3342.87248487682	0.860040649072349	5.2520709993019e-10	3.08111200447282e-07
PLIN2	2804.53287652331	0.869257605501486	9.52964958137663e-05	0.00808844215106972
SMG8	360.490084359587	0.870295027544105	2.31497591388714e-07	6.996137814908E-05
F3	917.506165898506	0.872131210201091	8.03444739422415e-06	0.00135809396377284
CNNM1	442.135286666705	0.889062281626063	6.34255438887451e-05	0.00602421856383291
SLC43A2	3691.04060724946	0.913246196127101	4.68967523366139e-05	0.00489739592725707
SLC7A14	1939.15521623731	0.925889973342565	5.96991506097722e-06	0.00106409105299985
TRIB1	818.235787562682	0.928422185095651	2.55664905275011e-05	0.00305926700012906
ZFP92	90.6592276274678	0.934596065459751	7.57326323029628e-05	0.00677382548840761
SH3BP5	1396.35644241654	0.939991803887889	2.25531255070538e-05	0.002864812299229
PDE5A	865.289277700832	0.944693862358633	0.000157025149691095	0.0114726140503245
RAB31	322.878598092589	0.945733378118101	6.38726090131617e-09	2.76133350226799e-06
TMPRSS2	780.880799934071	0.945802019062892	1.49328260195091e-08	6.07857444459445e-06
MET	2495.03103249175	0.962626950784099	9.8602052791404e-07	0.000252143146791967
PYCARD	94.657680741809	0.968183008066486	0.000124081149640508	0.0097823028092078
GPR142	674.395741266071	0.970875930299713	2.50350828525295e-05	0.00302636219743365
GNAS	39101.3162437221	0.976643388762739	2.8853725631024e-06	0.000618834851006887
SHROOM1	168.715645907283	0.977429654501559	1.18351227195308e-05	0.00184339835200186
RGS6	684.402523630763	0.982914320926207	0.000216979501681422	0.0142834097047447
ABCG1	290.441512263076	0.986725884900798	1.73823741025047e-08	6.93417667697118e-06

Supplementary Figure S1

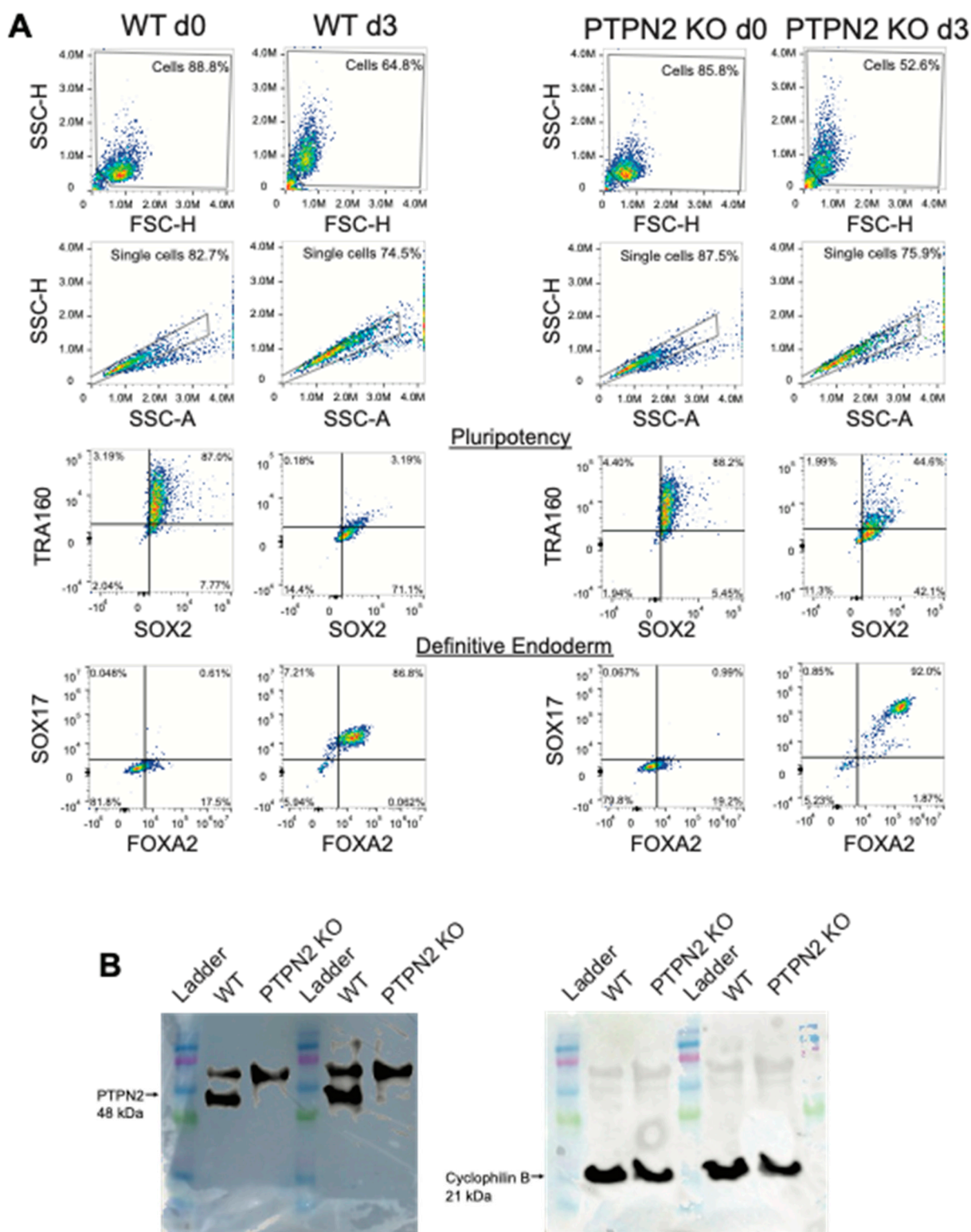


Supplemental Figure S1: Generation of a CRISPR mediated knock out of *PTPN2* in human pluripotent stem cells

A: Schematic of CRISPR-mediated disruption of *PTPN2* in hPSCs at the functional domain between exons 5 and 7. Two gRNAs targeted the functional domain of *PTPN2* at exon 5 and two at 7 inducing a large frame shift mutation in exon 5. B: gDNA PCR amplification of clonal WT and *PTPN2* KO clones of interest (C8, C19, C28) hPSC lines employing primers that will amplify intact, unedited DNA of exon 5 with the forward primer in exon 5 and the reverse primer in exon 5 and employing primers that will only amplify after successful deletion of DNA piece spanning exon 5-7 with the forward primer in exon 5 and the reverse primer in exon 7. A 639 bp band amplified in WT and no band amplified in the *PTPN2* KO clones for the 5F and 5R primers. A 1050 bp band amplified in the *PTPN2* KO clones and no band amplified in the WT for the 5F and 7R primers. C: gDNA PCR amplification of clonal WT and *PTPN2* KO clones of interest (C8, C19, C28) hPSC lines employing primers that will amplify intact, unedited DNA of exon 7 with the forward primer in exon 7 and the reverse primer in exon 7. A 723 bp band amplified in WT and no band amplified in the *PTPN2* KO clones for the 7F and 7R primers. D: Sanger sequencing of exon 5 in WT and *PTPN2* KO clone 8 after CRISPR-Cas9 double stranded break showing large deletion of bp in clone 8, clones 19 and 28 were excluded due to in-frame deletions. E: Uncropped representative western blot of *PTPN2* protein expression in WT and *PTPN2*

KO hPSC. Bars indicate protein expression in WT hPSCs at 48 kDa and no expression in PTPN2 KO (C8) hPSCs. (n=3 independent analysis) Normalized to endogenous control protein cyclophilin b at 21 kDa.

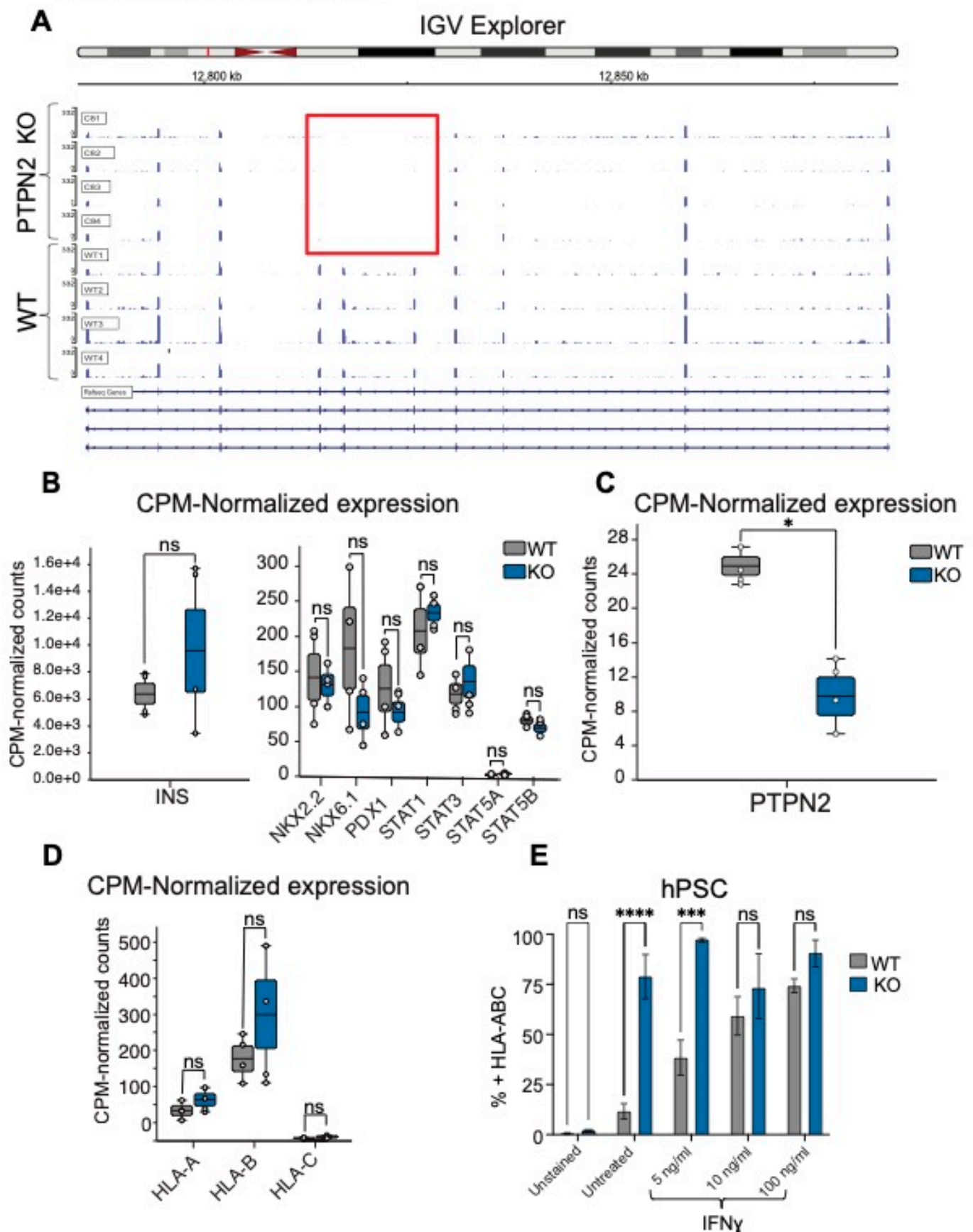
Supplementary Figure S2



Supplemental Figure S2: WT and PTPN2 KO sBCs demonstrate similar phenotypic features during direct differentiation

A: Representative flow cytometric gating strategy throughout differentiation of pluripotency markers (SOX2 and TRA160) and definitive endoderm markers (SOX17 and FOXA2) at day 0 (d0) and day 3 (d3) for WT and PTPN2 KO sBCs. B: Representative western blot of PTPN2 protein at 48 kDa from GFP+ sBCs from WT and PTPN2 KO hPSC. (n=3) Normalized to endogenous control protein cyclophilin B at 21 kDa.

Supplementary Figure S3



Supplemental Figure S3: RNAseq and HLA Class 1 expression in WT and PTPN2 KO cells

A: Bulk RNAseq IGV explorer from WT and PTPN2 KO GFP+ sBCs demonstrating lack of gene expression in exons 5-8 of the *PTPN2* region for PTPN2 KO compared to WT. B: Bar graph of the CPM-Normalized expression of *INS*, *NKX2.2*, *NKX6.1*, *PDX1*, *STAT1/3/5A/5B* on the y-axis with WT (gray) and PTPN2 KO (blue) GFP+ sBCs on the x-axis. Bars are drawn at the average value for each group and are colored according to group. Error bars represent the average +/- standard deviation (SD). non-significant=ns. C: Bar graph of the CPM-Normalized expression of *PTPN2* on the y-axis with WT (gray) and PTPN2 KO (blue) GFP+ sBCs on the x-axis. Bars are drawn at the average value for each group and are colored according to group. Error bars represent the average +/- standard deviation (SD). * $p=0.003$. D: Bar graph of the CPM-Normalized expression of *HLA-ABC* on the y-axis with WT (gray) and PTPN2 KO (blue) GFP+ sBCs on the x-axis. Bars are drawn at the average value for each group and are colored according to group. Error bars represent the average +/- standard deviation (SD). non-significant=ns. E: Flow cytometric quantification of percentage of HLA-ABC expression from WT (gray) and PTPN2 KO (blue) hPSC treated with and without IFN γ in increasing concentrations: from 5 ng/ml, 10 ng/ml and 100 ng/ml. (n=4) *** $p \leq 0.0002$, **** $p \leq 0.0001$; non-significant=ns.