SUPPLEMENTARY INFORMATION

CDK9-Cyclin K Functions in the Replication Stress Response

David S. Yu[1], Runxiang Zhao[2], Emory Hsu[2], Jennifer Cayer[1], Fei Ye[3], Yan Guo[3], Yu Shyr[3], & David Cortez[2+]

[1]Departments of Radiation Oncology, [2]Biochemistry, and [3]Biostatistics

Vanderbilt University Medical Center

2215 Garland Avenue

Nashville, TN 37232

[+]Corresponding author. Tel: +1 615 322 8547; Fax: +1 615 343 0704

E-mail: david.cortez@vanderbilt.edu

Contains:

SUPPLEMENTARY METHODS

Individual siRNAs were purchased from Dharmacon or Qiagen. These sequences were as follows:

CDK9-1 (CGGCCAGAAGGTGGCTCTGAA)

CDK9-2 (TAGGGACATGAAGGCTGCTAA)

CDK9-3 (TGGGCACAGTTTGGTCCGTTA)

CDK9-4 (GACGTCCATGTTCGAGTACT)

CCNK-1 (ATCCTGGATCTTTACTCACAA)

CCNK-2 (AAGCAACTCAAAGGTGATAAA)

CCNK-3 (CAGCCATATTGGCTCAATAAA)

CCNK-4 (AGCCATGTTGGTACTGGGATA)

CCNT1-1 (GACAAGCAACTTAGCACATAA)

CCNT1-2 (ACCCAGACAATAGACTATCAA)

CCNT1-3 (AGGCTTTGAACTAACAATTGA)

CCNT1-4 (TTGGAACATGTCATCAAGGTA)

CCNT2-1 (CTCGATGTAAGGGATCATTAT)

CCNT2-2 (CACCCTCGTGAAACTGGACAA)

CCNT2-3 (CTGCGGAGTGGAGGCGGATAA)

CCNT2-4 (TGGGAATATGTGGATCCTACA)

Antibodies were purchased from Covance: HA.11; Santa Cruz: ATR (N-19), cyclin T1 (T-18), cyclin T2a/b (S-14), PCNA (FL-261 and PC10); Abcam: claspin (ab3720); Cell Signaling: RPA70 (2267); Bethyl Labs: RPA32 (A300-244A); BD Pharmingen: ORC2

(551178 and 559266); and Millipore: GAPDH (6C5). Rabbit anti-cyclin K (aa 383-400) and anti-CDK9 (aa 329-346) peptide antibodies were custom generated through Open Biosystems.

Microarray analyses. U2OS cells were transfected with NT or CDK9-3 siRNA for 72 hours, treated with or without 3 mM HU for 20 hours, and harvested for RNA extraction using RNeasy mini kit (Qiagen). Targets were prepared with the two-cycle cDNA kit with the WT terminal labelling kit (Affymetrix) and hybridized to the Affymetrix GeneChip Human Exon 1.0 ST Array for genome wide exon level expression profiling and analyzed according to the manufacturer's instructions. Transfections were performed in triplicate. Microarray analysis was done using Linear Model for Microarray Data (LIMMA)(Wettenhall & Smyth, 2004).

SUPPLEMENTARY FIGURE LEGENDS

Supplementary Fig S1 | Primary screen flow diagram. The screen was completed in duplicate, hits ranked by the ratio of the HU-treated to untreated values for each siRNA pool, and analyzed by the weighted flexible compound covariate method (WFCCM). Candidate RSR genes were validated repeating the screen with four individual siRNAs for each gene. Validated genes are listed in Table S1.

Supplementary Fig S2 | Depletion of CDK9 does not affect cell proliferation or apoptosis in the absence of exogenous damage. **(A)** U2OS cells were transfected with NT or CDK9-3 siRNA and assayed for cell proliferation with WST-1 reagent (Roche) 120

hours after transfection. Mean and standard deviation from four replicas is shown. **(B)** U2OS cells were treated with or without 150 nM camptothecin for 20 hours or transfected with NT or CDK9-3 siRNA for the indicated time points. Propidium iodide (PI) and annexin V-FITC staining (BD Pharmingen) was analyzed by flow cytometry. Percentage of cells staining positive for annexin V is shown.

Supplementary Fig S3 | Depletion of Cyclin T1 and T2 does not impair cell cycle recovery following replication stress. **(A,B)** U2OS cells were transfected with NT or both Cyclin T1 and Cyclin T2 siRNA, treated with 3 mM HU for 20 hours, and released into nocodazole for 10 hours. DNA content was analyzed by flow cytometry. **(B)** The percentage (mean and standard deviation) of cells that completed DNA synthesis in three replicate experiments is shown.

Supplementary Fig S4 | CDK9 is not required for ATR-dependent CHK1 activation but it does regulate CDC25A protein levels. (A) Immunoblot analysis of U2OS cells transfected with NT, ATR, or CDK9-3 siRNA and treated with 3 mM HU for 6 hours. (B) Immunoblot analysis of U2OS cells transfected with the NT, ATR, or CDK9-3 siRNA and treated with 3mM HU for 2h. Lanes 4 and 8 are lysates from cells expressing an siRNA resistant CDK9 cDNA. Cells were harvested 72 hours after transfection with 0.5% NP-40 lysis buffer, separated by SDS-PAGE, and probed with the indicated antibodies. (* = crossreacting protein)

Supplementary Fig S5 | Inactivation of CDK9 with flavopiridol or DRB impairs cell cycle recovery. **(A)** Schematic of cell cycle recovery assay. **(B/C)** U2OS cells were incubated with 50 nM flavopiridol (FP), 25 μM DRB, or no drug for 1 hour prior to and during the recovery assay. Cells were treated with 3 mM HU for 20 hours and released into nocodazole for 10 hours prior to analyzing for DNA content by flow cytometry. Mean and standard deviation from three replicas is shown. * indicates $p < 0.05$.

Supplementary Table S1 | Validated hits from primary screen.

Supplementary Table S2 | Summary of microarray gene expression analysis following CDK9-silencing and/or treatment with HU. NT, non-targeting.

Reference

Wettenhall JM, Smyth GK (2004) limmaGUI: a graphical user interface for linear modeling of microarray data. *Bioinformatics* **20:** 3705-3706

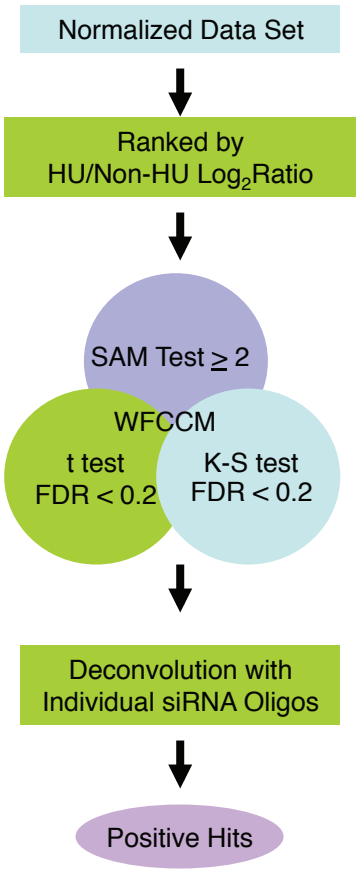

Normalized Data Set
Ranked by
HU/Non-HU Log2Ratio
SAM Test ≥ 2
WFCCM
t test
FDR < 0.2
K-S test
FDR < 0.2
Deconvolution with
Individual siRNA Oligos
Positive Hits

Figure S1

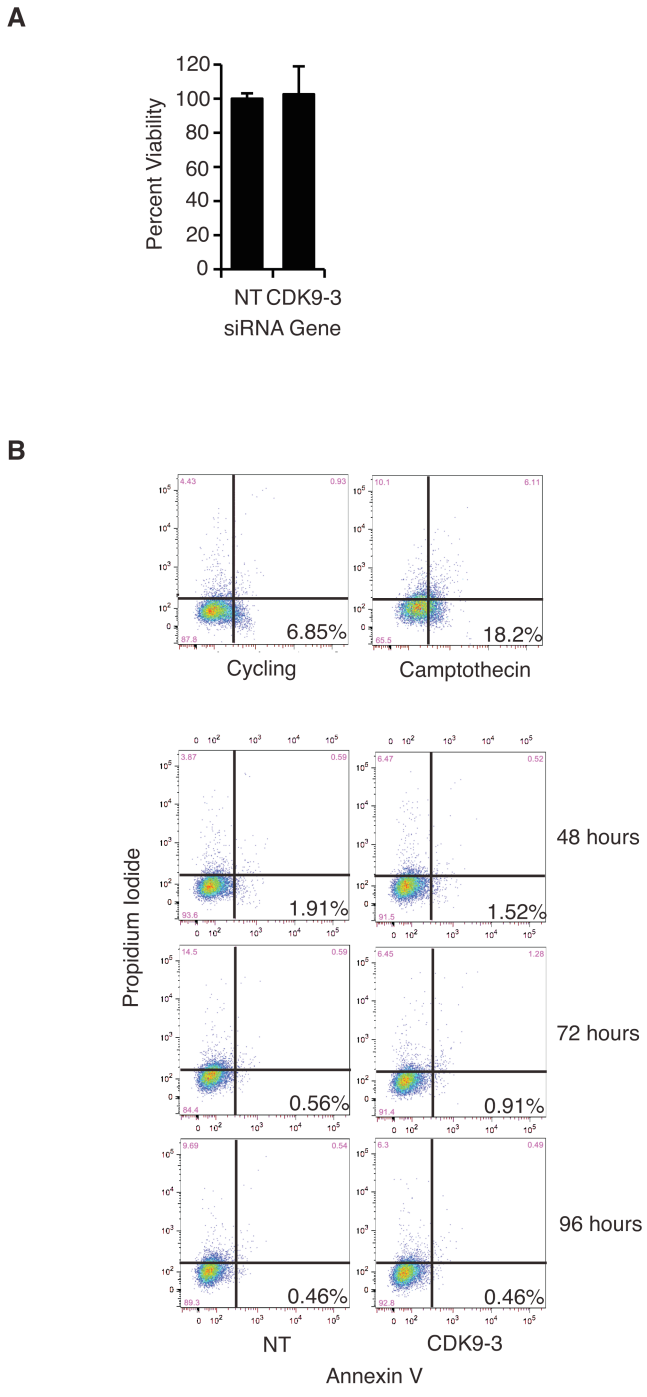

A
120
100
80
60
40
20
0
Percent Viability
NT CDK9-3
siRNA Gene
B
6.85%
18.2%
Cycling
Camptothecin
Propidium Iodide
48 hours
72 hours
96 hours
1.91%
1.52%
0.56%
0.91%
0.46%
0.46%
NT
CDK9-3
Annexin V

Figure S2

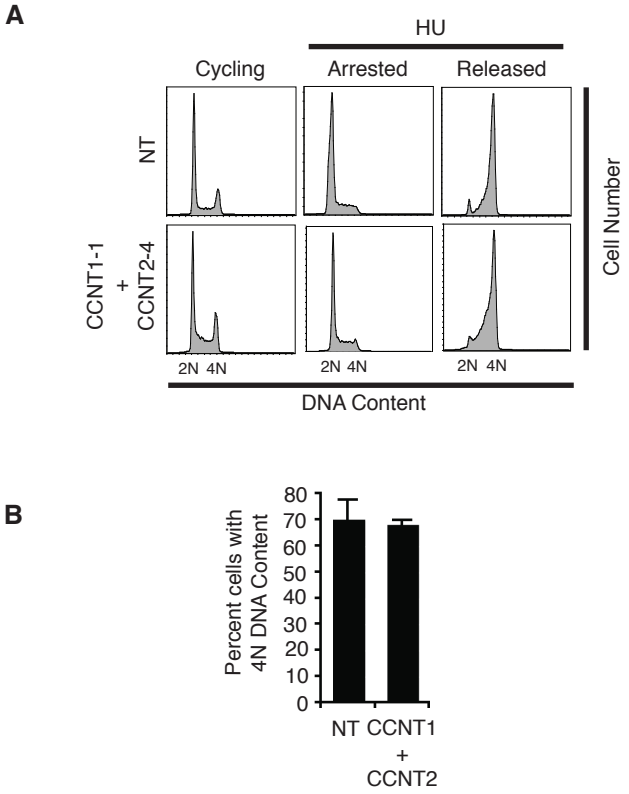

A
HU
Cycling
Arrested
Released
NT
CCNT1-1
+
CCNT2-4
2N 4N
2N 4N
2N 4N
Cell Number
DNA Content
B
Percent cells with
4N DNA Content
80
70
60
50
40
30
20
10
0
NT
CCNT1
+
CCNT2

Figure S3

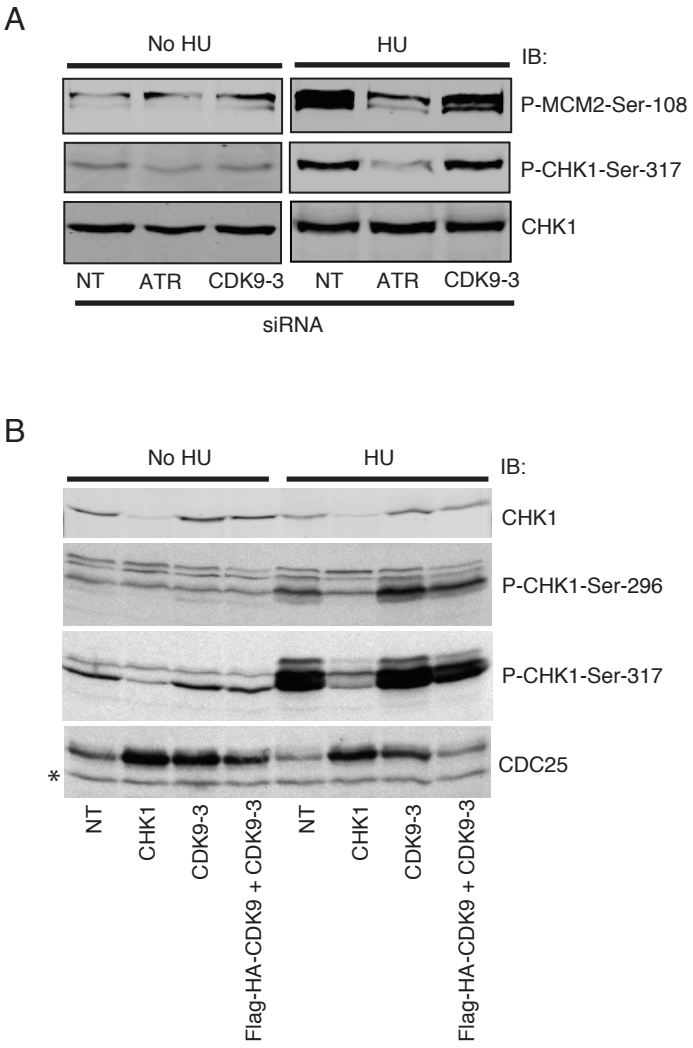
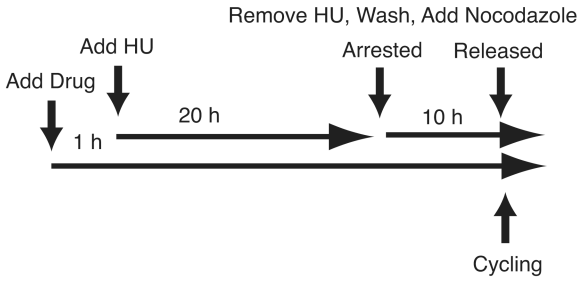

A
No HU
HU
IB:
P-MCM2-Ser-108
P-CHK1-Ser-317
CHK1
NT
ATR
CDK9-3
NT
ATR
CDK9-3
siRNA
B
No HU
HU
IB:
CHK1
P-CHK1-Ser-296
P-CHK1-Ser-317
CDC25
*
NT
CHK1
CDK9-3
Flag-HA-CDK9 + CDK9-3
NT
CHK1
CDK9-3
Flag-HA-CDK9 + CDK9-3

Figure S4

A



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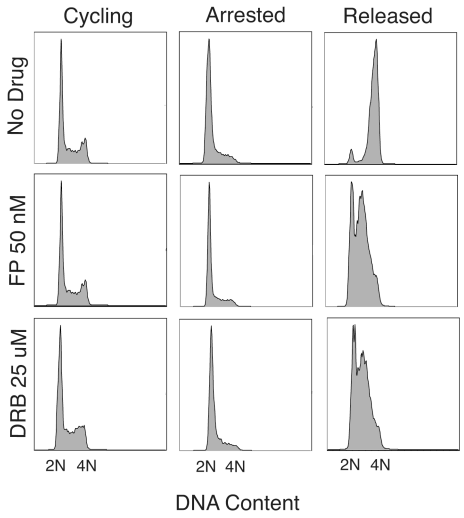

C

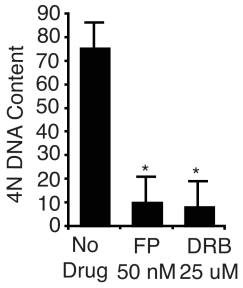

Figure S5

Supplementary Table S1

Validated HU Sensitivity Genes

Gene	Description	Accession	# siRNA Positive/siRNA Tested
AATK	apoptosis-associated tyrosine kinase	NM_001080395 XM_001128317 XM_927215	2 of 4
AKT2	v-akt murine thymoma viral oncogene homolog 2	NM_001626	3 of 4
AKTIP	AKT interacting protein	NM_001012398 NM_022476	3 of 4
ARFGEF2	ADP-ribosylation factor guanine nucleotide-exchange factor 2 (brefeldin A-inhibited)	NM_006420	3 of 4
AURKB	aurora kinase B	NM_004217	3 of 4
BMP1	bone morphogenetic protein 1	NM_001199 NM_006128 NM_006129 NM_006130 NM_006131 NM_006132	2 of 4
CD40LG	CD40 ligand	NM_000074	2 of 4
CD70	CD70 molecule	NM_001252	3 of 4
CDC2L2	cell division cycle 2-like 2 (PITSLRE proteins)	NM_024011 NM_033527 NM_033528 NM_033529 NM_033531 NM_033532	2 of 4
CDH5	cadherin 5, type 2 (vascular endothelium)	NM_001114117 NM_001795	2 of 4
CDK5RAP1	CDK5 regulatory subunit associated protein 1	NM_016082 NM_016408	4 of 4
CDK9	cyclin-dependent kinase 9	NM_001261	4 of 4
CDKL1	cyclin-dependent kinase-like 1 (CDC2-related kinase)	NM_004196	2 of 4
CDKN1B	cyclin-dependent kinase inhibitor 1B (p27, Kip1)	NM_004064	2 of 4
CDKN3	cyclin-dependent kinase inhibitor 3 (CDK2-associated dual specificity phosphatase)	NM_005192	3 of 4
CNNM2	cyclin M2	NM_017649 NM_199076 NM_199077	3 of 4
DYNLL1	dynein, light chain, LC8-type 1	NM_001037494 NM_001037495 NM_003746	3 of 4
EDN1	endothelin 1	NM_001955	3 of 4
ESRRA	estrogen-related receptor alpha	NM_004451	2 of 4
FCRL2	Fc receptor-like 2	NM_030764 NM_138738 NM_138739	2 of 4
FGFR2	fibroblast growth factor receptor 2	NM_000141 NM_022969 NM_022970 NM_022971 NM_022972 NM_022973 NM_022974 NM_022975 NM_022976 NM_023028 NM_023029 NM_023030 NM_023031	2 of 4
FKBP1A	FK506 binding protein 1A, 12kDa	NM_000801	2 of 4
FRS3	fibroblast growth factor receptor substrate 3	NM_006653	2 of 4
FRZB	frizzled-related protein	NM_001463	2 of 4
GAS8	growth arrest-specific 8	NM_001481 NR_023348	2 of 4
GCKR	glucokinase (hexokinase 4) regulator	NM_001486	3 of 4
GP6	glycoprotein VI (platelet)	NM_001083899 NM_016363	2 of 4
GRB2	growth factor receptor-bound protein 2	NM_002086 NM_203506	3 of 4
GTF3C2	general transcription factor IIIC, polypeptide 2, beta 110kDa	NM_001035521 NM_001521	3 of 4
GUCA1A	guanylate cyclase activator 1A (retina)	NM_000409	2 of 4
HERC1	hect (homologous to the E6-AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	NM_003922	2 of 4
HUS1	HUS1 checkpoint homolog (S. pombe)	NM_004507	3 of 4
IFNA14	interferon, alpha 14	NM_002172	2 of 4
IL18R1	interleukin 18 receptor 1	NM_003855	3 of 4
IL4	interleukin 4	NM_000589 NM_172348	2 of 4
INPPL1	inositol polyphosphate phosphatase-like 1	NM_001567	2 of 4
INSRR	insulin receptor-related receptor	NM_014215	2 of 4
IQGAP2	IQ motif containing GTPase activating protein 2	NM_006633	2 of 4
KIF11	kinesin family member 11	NM_004523	2 of 4
KIF1C	kinesin family member 1C	NM_006612	3 of 4
MPHOSPH1	M-phase phosphoprotein 1	NM_016195	3 of 4
KIF26A	kinesin family member 26A	NM_015656 XM_050278 XM_941210	3 of 4
MAPK15	mitogen-activated protein kinase 15	NM_139021	4 of 4
MLL5	myeloid/lymphoid or mixed-lineage leukemia 5 (trithorax homolog, Drosophila)	NM_018682 NM_182931	2 of 4
NID2	nidogen 2 (osteonidogen)	NM_007361	4 of 4
NUAK2	NUAK family, SNF1-like kinase, 2	NM_030952	2 of 4
PPP2R3B	protein phosphatase 2 (formerly 2A), regulatory subunit B'', beta	NM_013239 NM_199326	2 of 4
PTMA	prothymosin, alpha	NM_001099285 NM_002823 NM_002873 NM_133338 NM_133339 NM_133340 NM_133341 NM_133342 NM_133343	2 of 4
RAD17	RAD17 homolog (S. pombe)	NM_133344	4 of 4
RBKS	ribokinase	NM_022128	2 of 4
RNF31	ring finger protein 31	NM_017999	2 of 4
ROBO1	roundabout, axon guidance receptor, homolog 1 (Drosophila)	NM_002941 NM_133631	2 of 4
SEMA3F	sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3F	NM_004186	2 of 4
SIVA1	SIVA1, apoptosis-inducing factor	NM_006427 NM_021709	3 of 4
SRMS	src-related kinase lacking C-terminal regulatory tyrosine and N-terminal myristylation sites	NM_080823	3 of 4
SRPK1	SFRS protein kinase 1	NM_003137	3 of 4
TPRXL	tetra-peptide repeat homeobox-like	NR_002223 XM_496631	2 of 4
TUSC4	tumor suppressor candidate 4	NM_006545	3 of 4
VPS72	vacuolar protein sorting 72 homolog (S. cerevisiae)	NM_005997	2 of 4
XCL2	chemokine (C motif) ligand 2	NM_003175	2 of 4

Supplementary Table S2

CDK9 vs NT Downregulated (> 1.5 FC, P <0.05)

Gene	P Value	FC
SEMA3A	0.003598	-3.684497
CDK9	1.83E-05	-3.522216
CFI	0.021754	-3.220309
OLR1	0.012776	-3.167604
HRSP12	1.91E-05	-2.938401
C4orf18	0.005152	-2.845392
SLC40A1	0.002693	-2.666496
CFH	0.00176	-2.664318
COL5A2	0.000993	-2.455569
COL3A1	0.013921	-2.41393
LOC221442	0.016566	-2.178884
PGM2L1	0.005963	-2.115445
C12orf59	0.036429	-2.108929
MMP2	0.01481	-1.93911
HMOX1	0.013598	-1.920059
P4HB	0.000157	-1.912421
P4HB	1.69E-05	-1.901226
BDKRB1	0.002224	-1.881275
SERPINE1	1.08E-05	-1.881051
VEGFC	0.001221	-1.879586
FER1L3	0.002018	-1.879555
RDH10	0.045035	-1.875367
NAV3	0.00123	-1.871011
AHR	0.036731	-1.8636
FOSL2	0.002277	-1.826931
PCDHB2	0.027791	-1.811224
ENPP1	0.043874	-1.805319
CPM	0.042754	-1.783323
MAOB	0.028223	-1.781678
GALNT13	0.032585	-1.757209
FN1	0.001266	-1.755379
RAB30	0.003767	-1.754904
RSPO3	0.012365	-1.743148
RIMS1	0.022442	-1.736452
PLA2G7	0.047668	-1.735862
MICA	0.018422	-1.708783
DOCK4	0.020035	-1.705338
ZNF286A	0.008454	-1.698361
ARHGAP12	0.016042	-1.694528
CDH11	0.037244	-1.678821
TMTC2	0.005516	-1.676778
PLAGL2	0.002375	-1.667906
USP28	0.031698	-1.651487
PPIL3	0.028313	-1.650169
SRGAP1	0.002148	-1.647791
SGK1	0.02689	-1.635955
BAMBI	0.017872	-1.632652
SLC16A2	0.031217	-1.625997
RAB35	0.03392	-1.625896
ANKRD27	0.023379	-1.616565
MICA	0.011061	-1.61258
GTDC1	0.013785	-1.594923
AGPAT9	0.005688	-1.591895
VKORC1	0.048971	-1.587391
URM1	0.015721	-1.564548
SLC29A4	0.034076	-1.563697
LTBP1	0.027394	-1.550741
MAP3K13	0.009804	-1.536649
CENTD1	0.039704	-1.521095
KITLG	0.045522	-1.513783
SOCS2	0.010494	-1.508974

CDK9 vs NT Upregulated (> 1.5 FC, P < 0.05)

Gene	P Value	FC
LCP1	4.84E-10	4.403857
SPP1	0.001362	2.822405
C12orf39	0.001451	2.456706
FAM70A	0.026043	2.309297
MLLT11	0.002486	2.264048
CD274	0.000492	2.185713
ITGA6	7.86E-06	2.139149
PDGFC	0.004012	2.124432
PLSCR4	0.007278	2.087193
IL8	0.040233	2.062742
GLP2R	0.007336	2.001267
RND3	0.002643	1.984142
SLC7A2	1.31E-05	1.965125
MAP1A	0.000425	1.94641
CLGN	0.033417	1.916079
PSG3	0.028668	1.895225
SLC1A4	0.000612	1.892018
FST	0.04532	1.86305
KIAA0825	0.014728	1.857232
ANXA3	0.000358	1.854734
UCA1	0.00363	1.853163
TRIM16L	7.43E-05	1.844131
TAGLN	0.015004	1.842838
PRKACB	0.027019	1.819584
ANKRD46	0.001095	1.81701
MT1E	0.006285	1.795497
SCML1	0.005564	1.791898
FBXO4	0.021567	1.787957
LAMB3	0.001969	1.783417
CYP4F11	0.036659	1.756668
HMMR	0.047745	1.755569
EGF	0.000855	1.721539
SLC7A11	0.002616	1.720378
GPX3	0.038056	1.71857
SAR1B	0.020355	1.684864
HSDL2	0.01576	1.677435
C14orf149	0.018637	1.670776
CTH	0.01306	1.66072
SCML2	0.002251	1.655009
MFAP3	0.010227	1.644087
RWDD2B	0.007148	1.642076
TMEM64	0.01109	1.63594
GLIPR1	0.003392	1.632322
PHF11	0.029983	1.630393
PAPPA	0.043226	1.630003
GNAQ	0.027839	1.628429
SERPINB5	0.020585	1.627878
CDC6	0.014046	1.619322
VGLL3	0.022233	1.613095
PCGF5	0.038693	1.608963
LRP8	0.02336	1.608455
SLC16A12	0.041824	1.604049
TMEM194B	0.010153	1.602314
EPB41L4B	0.008986	1.601983
TLR6	0.019051	1.597534
NUP210	0.015042	1.58929
ARL5B	0.018423	1.585456
SEC23A	0.029234	1.568435
NETO1	0.047937	1.562103
GK	0.044246	1.557671
C1orf97	0.036366	1.556133
MOSC1	0.033985	1.552395
HECW1	0.01288	1.548718
CALB2	0.015228	1.547633
HTATIP2	0.024344	1.538195
TRIM16	0.040463	1.53376
TMEM194B	0.008796	1.523502
RECK	0.041932	1.521872
ASPH	0.007729	1.519095
WDR69	0.0443	1.51645
CHORDC1	0.038267	1.509755
DIRC2	0.036011	1.507962
CHST4	0.040687	1.507233
DPY19L1	0.005768	1.505088
SLC26A2	0.019055	1.503375
RMND5A	0.01387	1.500242

CDK9-HU vs NT-HU Downregulated (> 1.5 FC, P < 0.05)

Gene	P Value	FC
CDK9	2.5E-09	-3.894835
SEMA3A	6.62E-10	-3.183837
HRSP12	8.85E-08	-3.031601
COL5A2	2.61E-09	-2.756143
SEPP1	9.77E-05	-2.701809
CFH	9.97E-08	-2.70052
CFI	2.29E-07	-2.621053
SLC40A1	1.08E-06	-2.611364
OLR1	4.84E-08	-2.424885
FBXO32	2E-07	-2.393501
C3AR1	6.73E-08	-2.378275
NOV	4.78E-07	-2.344247
COL3A1	4.93E-08	-2.237979
C4orf18	9.88E-08	-2.199312
PCDHB5	7.32E-08	-1.999496
PLXDC2	1.34E-07	-1.992466
KLHL24	1.37E-06	-1.986137
PRR16	9.91E-05	-1.983301
TRIB2	2.2E-07	-1.970495
RCAN2	7.63E-08	-1.969182
COL6A3	8.1E-06	-1.968324
NAV3	1.34E-07	-1.96173
PCDHB12	7.46E-06	-1.954908
TCP11L2	1.37E-05	-1.940063
RGS4	1.74E-06	-1.909203
ZNF354B	0.000135	-1.906793
KCNA1	2.69E-07	-1.906636
PCDHB11	1.46E-06	-1.894356
BAMBI	1.4E-06	-1.891722
ID2	0.000817	-1.889275
HAS2	5.47E-06	-1.878788
PCDHB16	9.41E-06	-1.875992
BMP4	3.51E-06	-1.874667
PCDH18	1.02E-05	-1.848271
PCDHB2	6.97E-07	-1.842822
TMTC2	3.29E-06	-1.835365
TXNIP	6.83E-07	-1.830029
PGM2L1	1.69E-06	-1.825465
IFIT1	2.53E-05	-1.821213
CXCL14	3.2E-06	-1.814765
AHNAK2	3.01E-07	-1.812088
LRRN1	9.23E-07	-1.80285
RORB	6.99E-07	-1.792289
MAOB	3.13E-06	-1.78889
A2M	9.97E-07	-1.767853
MMP2	1.47E-06	-1.761615
PCDHB3	0.000899	-1.759581
FN1	3.1E-06	-1.750297
FER1L3	5.99E-07	-1.749797
TSHZ2	3.53E-07	-1.741246
TUBA1A	7.16E-07	-1.740297
HSD17B3	2.67E-06	-1.737192
ADAMTS5	2.23E-05	-1.722494
TSHZ2	1.56E-06	-1.720786
SFRP1	6.07E-06	-1.718555
FLG	0.000489	-1.717105
GJA1	3.61E-06	-1.696043
PDE5A	1.14E-05	-1.69559
RDH10	6.17E-06	-1.692526
SLC1A3	3.26E-05	-1.685935
KLK6	4.89E-07	-1.682824
PLEKHG1	0.000135	-1.680593
VAMP1	3.22E-06	-1.671029
FAM46C	9.87E-07	-1.670981
SNORD59B	0.00015	-1.666935
ESM1	1.25E-05	-1.665918
P4HB	1.39E-06	-1.66589
PCDH7	5.69E-05	-1.660022
DOCK4	5.85E-06	-1.659426
SLC16A2	2.13E-06	-1.654708
SYTL2	2.69E-06	-1.643225
SGK1	1.39E-06	-1.630228
FZD7	1.5E-05	-1.628322
TBX3	1.39E-06	-1.627989
P4HB	3.85E-06	-1.625335
URM1	7.96E-06	-1.615669
TNFRSF11B	1.19E-05	-1.611439
MAPK3	3.92E-06	-1.606711
DACT1	4.89E-05	-1.599281

CDK9-HU vs NT-HU Upregulated (> 1.5 FC, P < -0.05)

Gene	P Value	FC
CD274	4.8E-06	2.737874
LCP1	4.03E-09	2.690708
SPP1	8.77E-09	2.586951
KRT75	3.76E-07	2.480893
PLSCR4	6.15E-07	2.20656
FAM70A	9.53E-08	2.119262
CLGN	2.48E-05	2.117351
TRY6	0.001342	2.098406
TMEM40	4.55E-07	2.044354
DMBT1	1.23E-06	2.031809
KIAA0825	7.5E-06	1.948709
KIAA0825	3.29E-06	1.947714
TFEC	6.43E-06	1.934805
FLJ13744	0.000666	1.933195
NXPH2	3.56E-07	1.925765
PRKACB	1.13E-07	1.91373
HIST1H2BK	5.54E-06	1.903644
CASP7	1.36E-07	1.890039
CCL4L1	1.99E-05	1.878538
CCL4L1	1.99E-05	1.878538
LOC645261	4.51E-05	1.859556
MLLT11	1.46E-07	1.845877
NPPB	6.43E-06	1.843622
IL8	1.37E-06	1.841857
ADHFE1	1.42E-05	1.841214
CCDC148	2.82E-06	1.839543
PAPPA	2.53E-06	1.834992
SCML2	5.2E-06	1.791915
CYP24A1	1.2E-05	1.791264
FBXO4	1.62E-06	1.787666
SAR1B	5.79E-07	1.787419
TNFSF15	5.28E-06	1.777391
MFAP3	2.03E-06	1.769236
MYBL1	1.71E-05	1.768044
KRCC1	8.16E-05	1.764462
HSDL2	8.64E-07	1.761313
SCEL	7.89E-05	1.757984
PRSS2	0.000186	1.749755
KLHDC1	7.18E-06	1.749536
HADH	6.63E-06	1.747039
CHRNB1	1.14E-06	1.745397
WDR69	2.42E-06	1.744831
LAPTM5	8.07E-06	1.744128
GPX3	2E-06	1.74225
SCML1	7.83E-06	1.736888
AKR1B10	0.000928	1.722736
TGM4	2.56E-06	1.715128
PSG5	4.43E-06	1.714449
SLC1A4	7.67E-07	1.706964
RNF157	6.86E-05	1.693157
CRYAB	4.93E-07	1.687456
ANKRD46	1.1E-05	1.685326
NUP210	2.65E-06	1.684152
RASEF	1.28E-06	1.681839
CCL4L1	5.25E-05	1.678797
SERPINB5	1.6E-05	1.674265
PSG4	6.2E-06	1.666654
EPB41L4B	2.25E-05	1.664578
PRRG4	0.000115	1.655344
C9orf46	1.43E-05	1.653366
RND3	6.49E-07	1.653348
GLP2R	2.12E-06	1.649659
LOC128102	4.81E-05	1.636683
ANXA3	1.18E-05	1.62787
LPL	6.48E-06	1.627416
IDH1	4.38E-06	1.626439
FST	4.37E-06	1.622643
MYH15	1.8E-05	1.621003
PDGFC	6.22E-06	1.616506
ARHGDIB	0.000155	1.616154
CYP4F11	1.85E-05	1.609601
TRIM16L	1.91E-06	1.609431
ITGB3	3.71E-06	1.603358
C5	3.56E-06	1.59791
GPR126	0.000157	1.596574
KCNJ15	0.00032	1.595138
GNAQ	0.002037	1.591135
C10orf88	5.74E-05	1.581955
RECK	3E-05	1.581377

IRS1	1.7E-06	-1.590049
EPHA5	4.08E-05	-1.589325
DBP	3.93E-05	-1.585163
RAB35	5.06E-06	-1.577567
MEF2C	8.01E-05	-1.576921
IGF2	0.000218	-1.576789
CPE	3.89E-06	-1.576045
FAP	0.000762	-1.575621
IGFL2	8.15E-06	-1.570975
PDGFRA	5.96E-05	-1.570337
PCDHB8	0.000441	-1.569253
SOX4	1.61E-06	-1.565113
GTDC1	0.000105	-1.564769
PPIL3	1.82E-05	-1.563413
KRT23	3.98E-05	-1.554575
HMCN1	5.39E-05	-1.554401
EVI1	7.3E-05	-1.553799
SEMA3D	0.004603	-1.551266
PSMAL	7.81E-05	-1.544893
ENPP1	4.71E-05	-1.542921
TRIM59	0.001619	-1.542314
SLIT2	1.65E-05	-1.541595
ID1	5.43E-05	-1.536005
ORM2	0.022822	-1.530267
PCDHB10	0.000125	-1.528966
GNG2	0.000281	-1.528284
FOXO4	0.000135	-1.526368
RAB27B	0.0001	-1.526017
DOK5	3.52E-05	-1.525936
CDH6	4.53E-05	-1.524842
ZCCHC5	4.3E-05	-1.524151
GRAMD3	6.58E-05	-1.523937
LGR4	5.97E-05	-1.521714
IGFBP5	3.11E-06	-1.52036
SNORD25	0.002875	-1.520047
MICA	2.54E-05	-1.517975
ARHGEF3	2.79E-05	-1.51734
PAGE2B	4.24E-06	-1.51731
EPYC	3.2E-05	-1.515867
SNAI2	1.63E-05	-1.515434
TOX	0.002184	-1.515281
PRICKLE1	2.09E-06	-1.512513
TMEM150	6.4E-05	-1.512001
JARID1B	1.26E-05	-1.511829
CPM	0.00011	-1.510835
SAT1	0.00011	-1.51017
CAMK2D	8.23E-06	-1.508909
H1F0	4.24E-06	-1.505709
HIST1H1A	1.27E-05	-1.501856

SLC7A2	4.27E-06	1.581085
RP11-195B21	0.0002	1.579917
SLC4A4	2.9E-05	1.579522
ZNF483	0.00011	1.572603
GPD2	3.57E-05	1.568172
FRRS1	7.12E-06	1.562381
KLRA1	9.62E-05	1.558884
ARNTL	1.15E-05	1.555876
JPH1	8.22E-05	1.555216
C14orf149	4.25E-06	1.553782
TMEM116	1.46E-05	1.55312
LOC63920	0.001021	1.550884
ITGA6	6.18E-06	1.545318
LOC441233	0.114554	1.544316
SMAP2	4.35E-06	1.544106
GK	3.49E-06	1.542688
ADAMTS1	1.6E-05	1.542642
PCGF5	3.9E-06	1.539666
ACSL5	0.001133	1.539213
TTLL7	6.91E-06	1.538393
RNF146	1.14E-05	1.536979
ACTA2	0.000279	1.535381
STK31	1.87E-06	1.53527
PSG3	0.011505	1.534906
AP1S3	0.000102	1.533445
MAPK9	8.37E-06	1.533254
MAOA	3.16E-06	1.532269
GK	2.08E-05	1.531124
CEPT1	1.99E-05	1.529996
SLC22A5	1.26E-05	1.529462
NLRP10	1.74E-05	1.526777
C17orf39	4.17E-05	1.525584
TMEM64	2.15E-06	1.524959
SLC7A6	5.44E-06	1.524664
APOBEC3H	3.95E-05	1.522409
CCDC111	0.00018	1.521772
CDC6	3.71E-06	1.521393
AFAP1L2	2.26E-05	1.520509
CLCN4	6.15E-06	1.520031
CCNE2	3.63E-05	1.516388
C12orf39	0.000405	1.515734
PHF11	0.00074	1.515323
C14orf45	0.000332	1.515106
KBTBD8	0.00013	1.513992
ENO2	1.62E-05	1.513291
F2R	9.65E-06	1.512293
LRRN4	4.38E-06	1.511664
PKD2	5.25E-06	1.510593
SRR	0.000111	1.508
MAPRE3	1.96E-05	1.505874
C8orf46	0.000158	1.502249
DICER1	3.56E-06	1.501513
BLVRB	1.39E-05	1.500307
DPY19L2P2	0.001512	1.500037