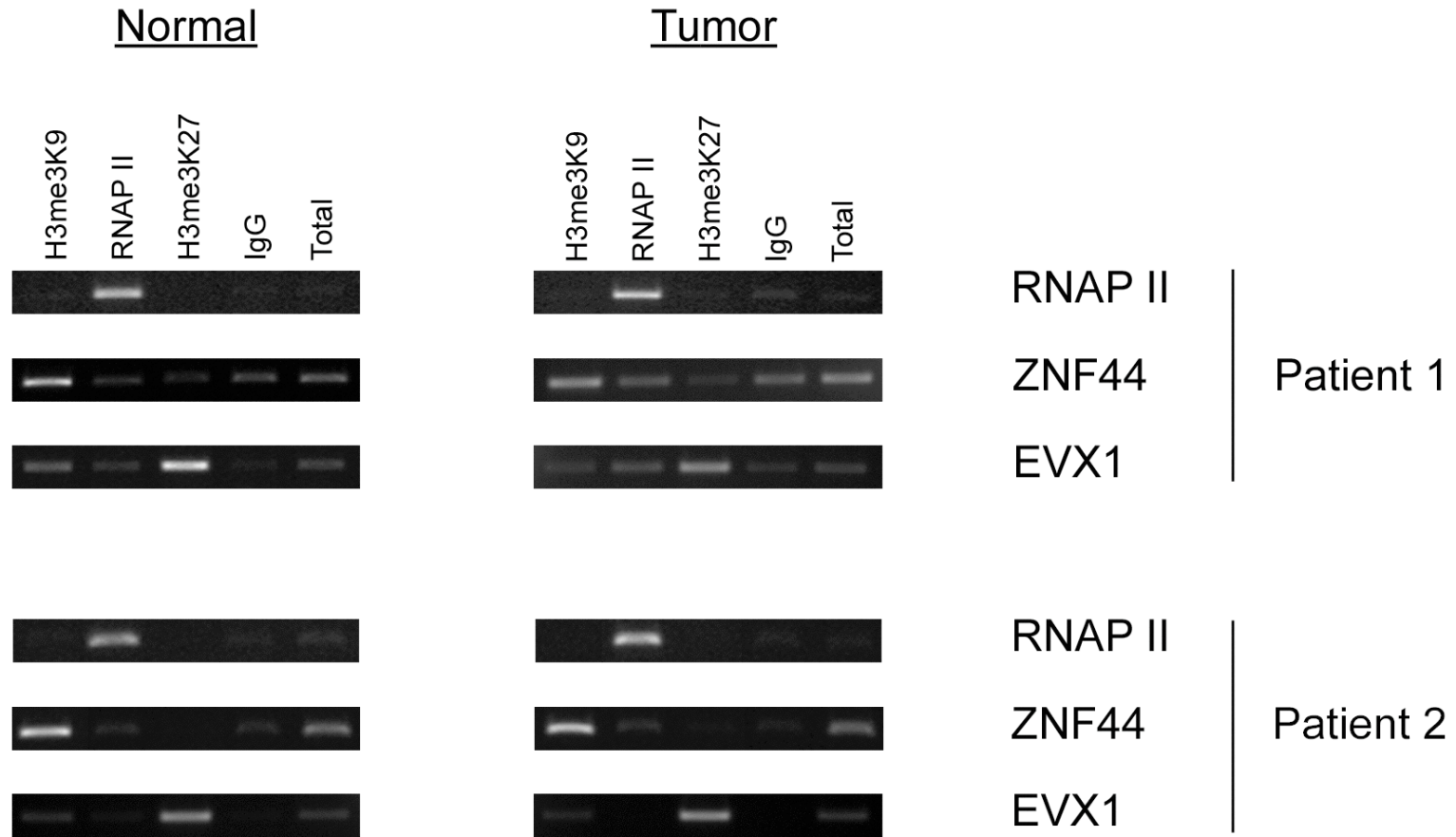


Figure S1



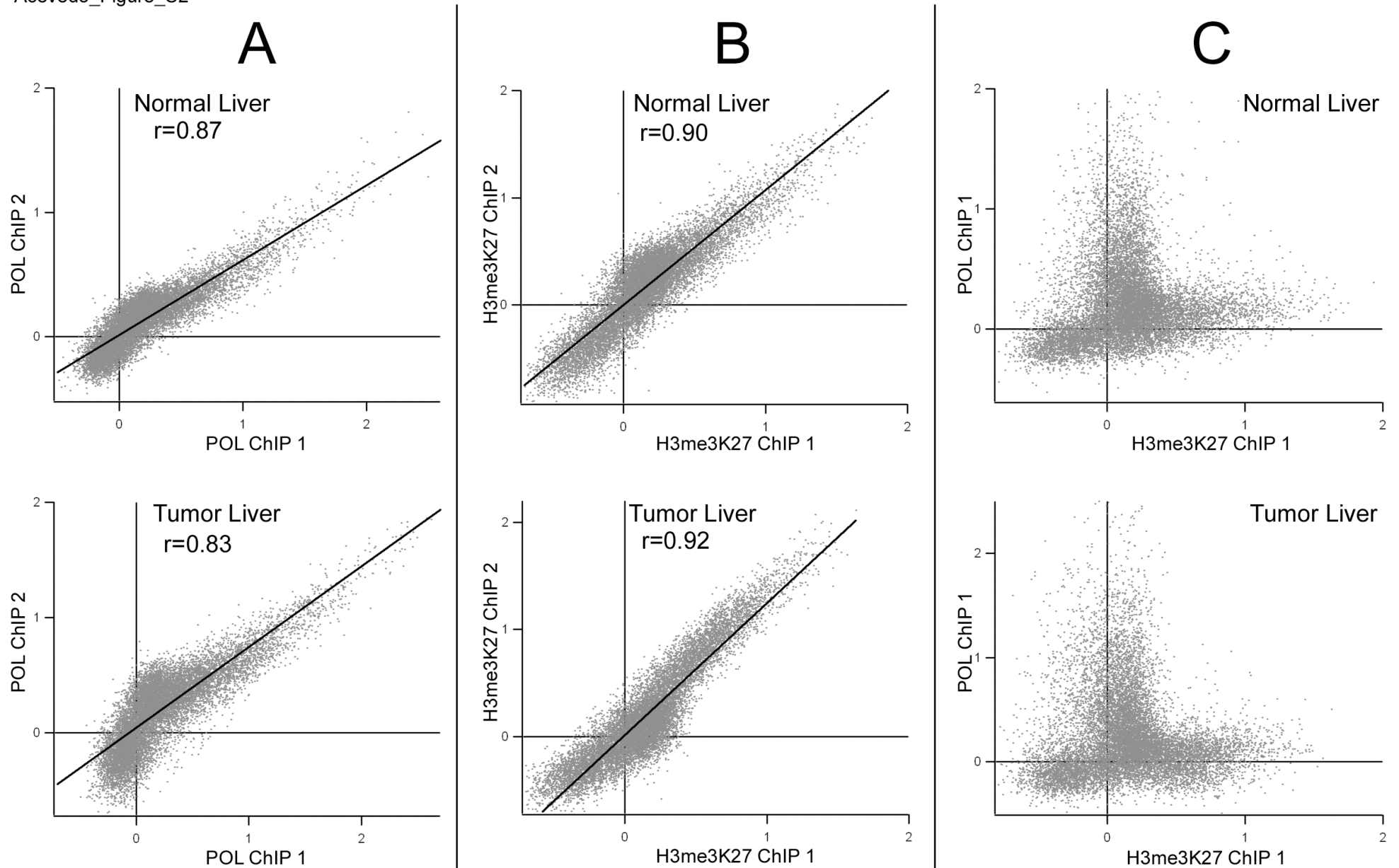


Figure S2. Reproducibility of the ChIP technique. RNAPII and H3me3K27 ChIP-chip experiments were performed in duplicate using normal and tumor liver samples. The Maxfour values for each promoter on the duplicate arrays are plotted for RNAPII (A) or H3me3K27 (B) to show reproducibility of the assay. For comparison, the values for each promoter in the RNAPII vs. the H3me3K27 arrays are also shown (C).

Acevedo\_Figure\_S3

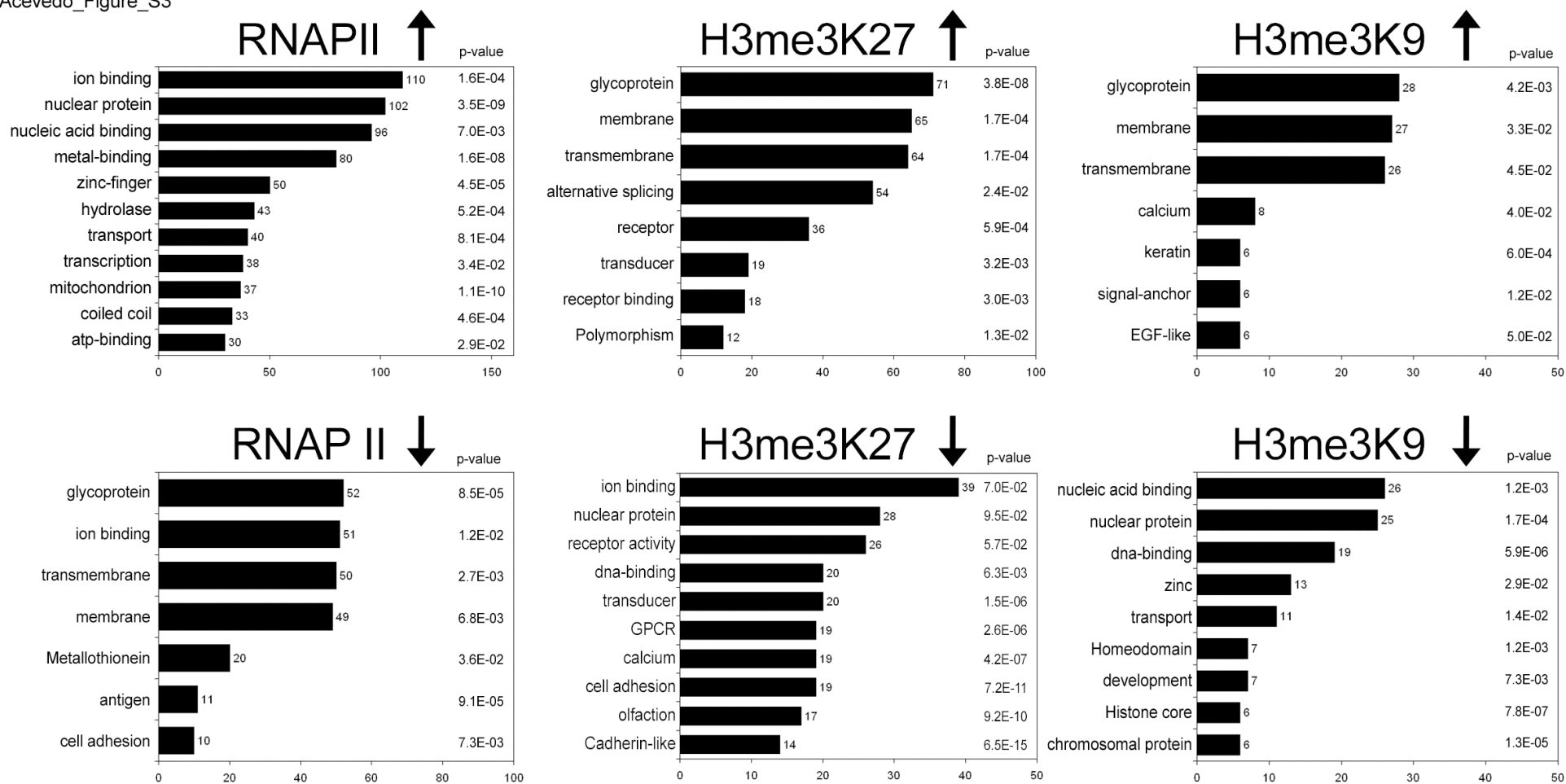


Figure S3. Gene ontology analysis of deregulated gene promoters using DAVID (<http://david.abcc.ncifcrf.gov/>) functional annotation from tables S23-S25. Up arrow indicates increased binding and down arrow indicates decreased binding by RNA Polymerase II (RNAP II), Histone H3me3K27 and H3me3K9. X axis indicates the number of genes in each category.

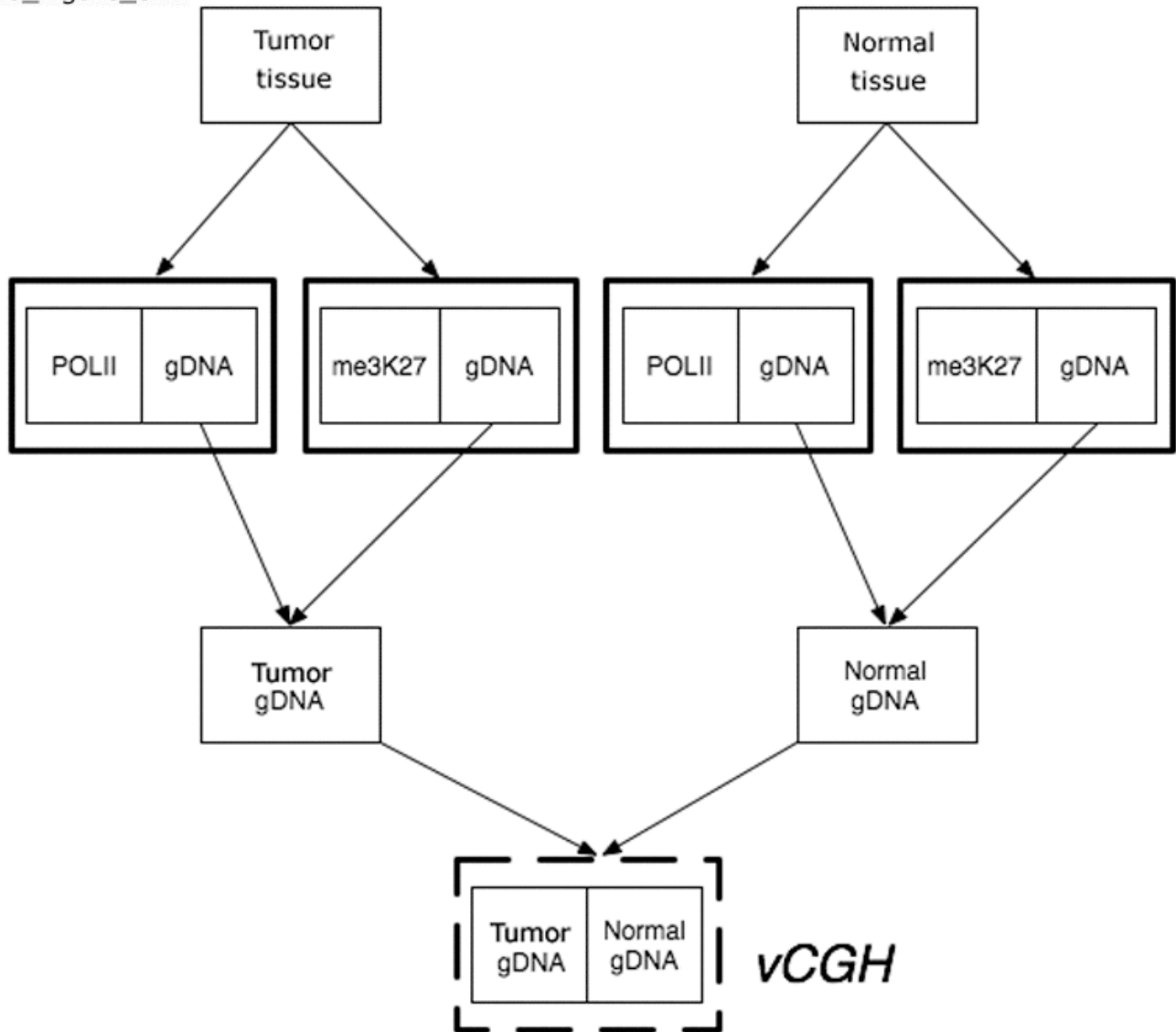


Figure S4. vCGH schematic. To perform a vCGH analysis, the data from the genomic (input) samples is extracted. For the analyses performed in this study, the input signals from two independent ChIP-chip experiments (POLII and me3K27) were used for both the tumor and normal samples. The genomic DNA channels of the "duplicate" arrays were quantile normalized (using the median values) to produce a single "merged" gDNA vector of values and then the average of all probes for a single promoter was calculated so that the promoter was represented by a single value. After calculation of the ratio of tumor/normal, the data was smoothed using a 21-point mean filter and displayed using the snapCGH package in R.

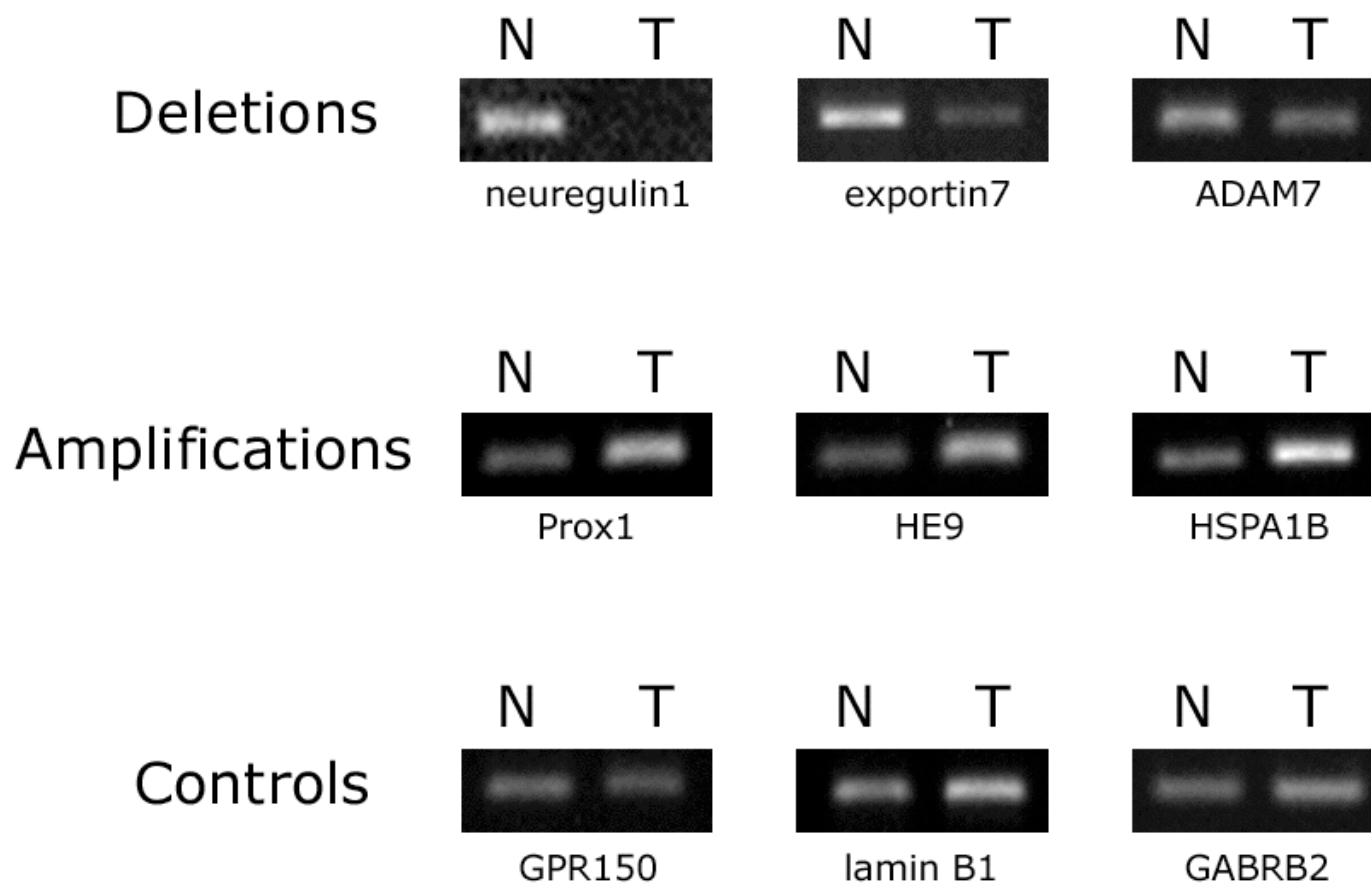


Figure S5. PCR confirmations of vCGH data. Semiquantitative PCR reactions were performed using specific primers for the promoter region of the indicated genes. Deletions represent loss of copy number in tumor. Amplifications depict gain of copy number in tumor. Controls represent regions with no change in copy number.

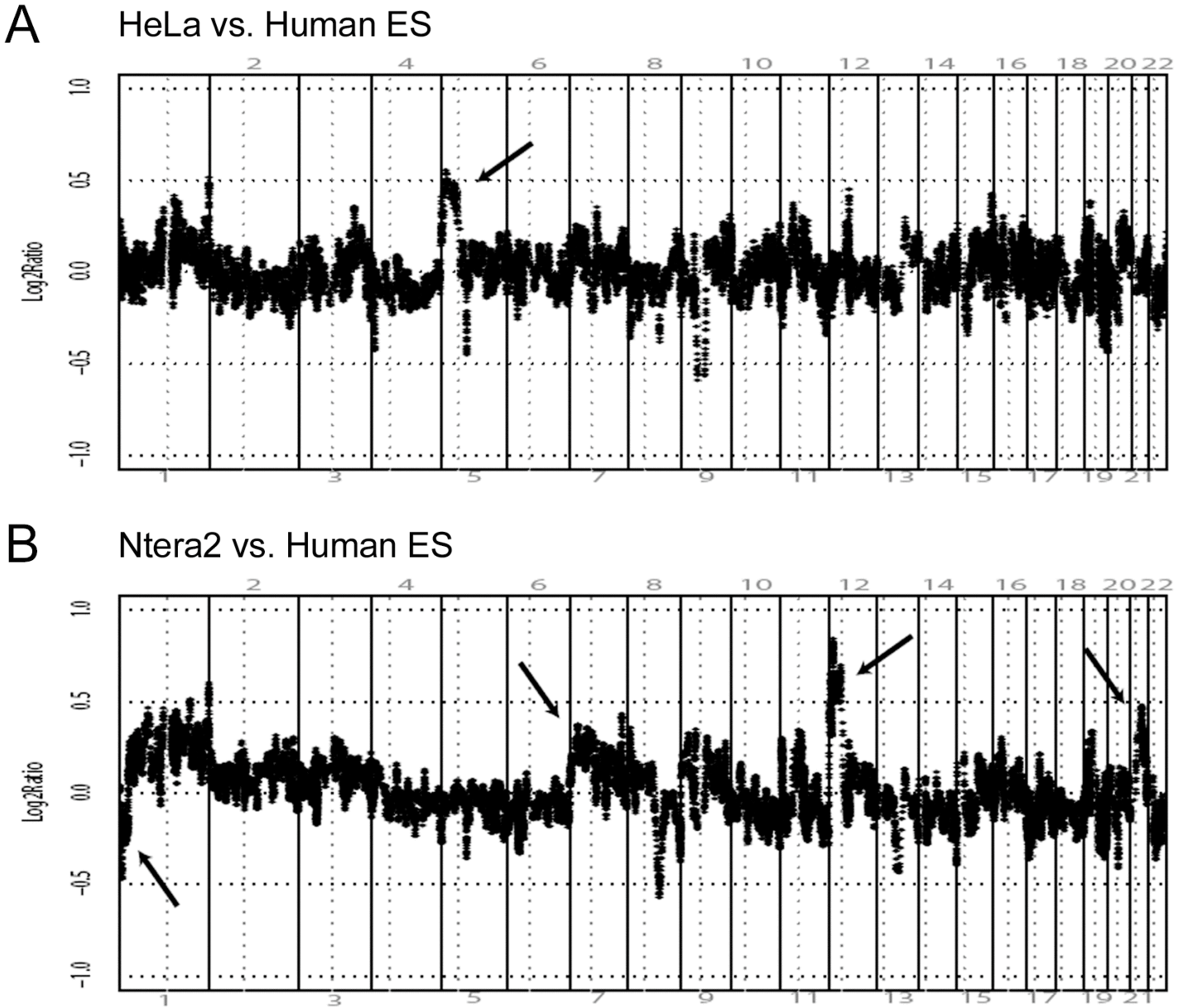


Figure S6. vCGH analysis of HeLa and Ntera Cells across the 22 autosomal chromosomes. (A) The genomic DNA channels from HeLa S3 ChIP-chip experiments was compared to genomic DNA channels from human ES cell (normal cell) ChIP-chip experiments. Same procedure was used as in main text, except that “cell line” was used in place of tumor (see RESULTS and METHODS for vCGH procedure description). Arrow indicates the large amplification in 5p, consistent with published studies using SKY and conventional CGH (see RESULTS). (B) Same procedure as A, except that genomic DNA channels from Ntera ChIP-chip experiments was used as “tumor” sample. Arrows indicate copy number changes observed in these experiments that are frequently observed in testicular carcinomas. Note that the patterns differ greatly between Ntera and HeLa cells. The source of all of this data was 1.5 kb promoter array datasets, illustrating that the vCGH procedure can be used with both 5 kb array platforms (as in patient data in main text) and for other array designs.

**chromosome organization and biogenesis (25)**

86 actin-like 6a  
 8260 ard1 homolog a, n-acetyltransferase  
 23492 chromobox homolog 7  
 9126 chondroitin sulfate proteoglycan 6  
 3014 h2a histone family, member x  
 3015 h2a histone family, member z  
 54145 h2b histone family, member s  
 440093 similar to h3 histone, family 3b  
 8370 h4 histone, family 2  
 3006 histone 1, h1c  
 8334 histone 1, h2ac  
 8349 histone 1, h2bb  
 85236 histone 1, h2bk  
 8337 histone 2, h2aa  
 8338 histone 2, h2ac  
 3148 high-mobility group box 2  
 9643 mortality factor 4 like 2  
 51203 nucleolar and spindle associated protein 1  
 648 polcomb group ring finger 4  
 10856 ruvb-like 2  
 6418 set translocation (myeloid leukemia-associated)  
 6599 swi/snf related, actin dependent regulator of chromatin, c1  
 6839 suppressor of variegation 3-9 homolog 1  
 7014 telomeric repeat binding factor 2  
 26277 terf1 (trf1)-interacting nuclear factor 2

**nucleocytoplasmic transport (12)**

79711 importin 4  
 55705 importin 9  
 3838 karyopherin alpha 2 (rag cohort 1, importin alpha 1)  
 4116 mago-nashi homolog, proliferation-associated  
 22916 nuclear cap binding protein subunit 2, 20kda  
 7122 nucleoporin 107kda  
 55746 nucleoporin 133kda  
 23165 nucleoporin 205kda  
 11097 nucleoporin like 2  
 754 pituitary tumor-transforming 1 interacting protein  
 6418 set translocation (myeloid leukemia-associated)  
 7514 exportin 1 (crm1 homolog)

**transcription (67)**

86 actin-like 6a  
 328 apex nuclease 1  
 689 basic transcription factor 3  
 23492 chromobox homolog 7  
 988 cdc5 cell division cycle 5-like (s. pombe)  
 85406 cytokine induced protein 29 kda  
 79191 iroquois homeobox protein 3  
 9443 cofactor for sp1 transcriptional activation, subunit 9  
 10664 ccctc-binding factor (zinc finger protein)  
 1786 dna (cytosine-5-)-methyltransferase 1  
 163049 hypothetical protein loc163049  
 2296 forkhead box c1  
 94234 forkhead box q1  
 2958 general transcription factor iia, 2, 12kda  
 2968 general transcription factor iih, polypeptide 4, 52kda  
 2976 general transcription factor iic, polypeptide 2, beta  
 23462 hairy/enhancer-of-split related with yrw motif 1  
 3148 high-mobility group box 2  
 3608 interleukin enhancer binding factor 2, 45kda  
 3664 interferon regulatory factor 6  
 80345 zinc finger protein 435  
 3720 jumonji, at rich interactive domain 2  
 51621 kruppel-like factor 13  
 28999 kruppel-like factor 15  
 9935 v-maf oncogene homolog b  
 4172 mcm3 minichromosome maintenance deficient 3  
 4173 mcm4 minichromosome maintenance deficient 4  
 4174 mcm5 minichromosome maintenance deficient 5  
 9643 mortality factor 4 like 2  
 4520 metal-regulatory transcription factor 1  
 23054 nuclear receptor coactivator 6  
 23636 nucleoporin 62kda  
 142 poly (adp-ribose) polymerase family, member 1  
 648 polcomb group ring finger 4  
 8544 pirin (iron-binding nuclear protein)  
 64764 camp responsive element binding protein 3-like 2  
 5432 polymerase (rna) ii (dna directed) polypeptide c, 33kda  
 5437 polymerase (rna) ii (dna directed) polypeptide h  
 55718 polymerase (rna) iii (dna directed) polypeptide e (80kd)  
 57645 poqo transposable element with krab domain  
 5813 purine-rich element binding protein a  
 5987 ret finger protein  
 5993 regulatory factor x, 5 (influences hla class ii expression)  
 10856 ruvb-like 2  
 23314 satb family member 2  
 23541 sec14-like 2 (s. cerevisiae)  
 6599 swi/snf related, actin dependent regulator of chromatin, c1  
 9580 sry (sex determining region y)-box 13  
 54345 sry (sex determining region y)-box 18  
 6668 sp2 transcription factor  
 6721 sterol regulatory element binding transcription factor 2  
 6827 suppressor of ty 4 homolog 1  
 6883 taf12 rna polymerase ii, (tbp)-associated factor, 20kda  
 6921 transcription elongation factor b (siii) (15kda, elonqin c)  
 10732 transcription factor-like 5 (basic helix-loop-helix)  
 8463 tea domain family member 2  
 7008 thymotrophic embryonic factor  
 7014 telomeric repeat binding factor 2  
 7027 transcription factor dp-1  
 8914 timeless homolog  
 9325 thyroid hormone receptor interactor 4  
 2547 x-ray repair complementing defective repair (ku 70kda)  
 221504 zinc finger and btb domain containing 9  
 23051 zinc fingers and homeoboxes 3  
 57567 zinc finger protein 319  
 84313 vacuolar protein sorting 25  
 7553 zinc finger protein 7 (kox 4, clone hf.16)

**zinc ion binding (38)**

27301 apex nuclease 2  
 283489 kiaa1802 protein  
 10664 ccctc-binding factor (zinc finger protein)  
 1786 dna (cytosine-5-)-methyltransferase 1  
 163049 hypothetical protein loc163049  
 51621 kruppel-like factor 13  
 28999 kruppel-like factor 15  
 4005 lim domain only 2 (rhombotin-like 1)  
 H4/O  
 55646 hypothetical protein flj20425  
 4520 metal-regulatory transcription factor 1  
 9972 nucleoporin 153kda  
 11097 nucleoporin like 2  
 142 poly (adp-ribose) polymerase family member 1  
 648 polycomb group ring finger 4  
 5437 polymerase (rna) ii (dna directed) polypeptide h  
 83759 rna binding motif protein 4b  
 5987 ret finger protein  
 64326 rina finger and wd repeat domain 2  
 79102 ring finger protein 26  
 6117 replication protein a1, 70kda  
 6631 small nuclear ribonucleoprotein polypeptide c  
 6668 sp2 transcription factor  
 6827 suppressor of ty 4 homolog 1  
 6839 suppressor of variegation 3-9 homolog 1  
 57215 thap domain containing 11  
 9325 thyroid hormone receptor interactor 4  
 64393 p53 target zinc finger protein  
 221504 zinc finger and btb domain containing 9  
 51538 zinc finger, cchc domain containing 17  
 285381 zinc finger, csl-type containing 2  
 23051 zinc fingers and homeoboxes 3  
 153527 zinc finger, matrin type 2  
 9204 zinc finger, mym-type 6  
 57567 zinc finger protein 319  
 79673 zinc finger protein 329  
 NUP2L  
 80345 zinc finger protein 435  
 144348 zinc finger protein 664  
 SET  
 7553 zinc finger protein 7 (kox 4, clone hf.16)

APEX2  
 C13ORF8  
 CTCF  
 DNMT1  
 FLJ90396  
 KLF13  
 KLF15  
 LMO2  
 LYAR  
 MTF1  
 NUP153  
 NUP2L  
 PARP1  
 PCGF4  
 POLR2H  
 RBN4B  
 RFP  
 RFWF2  
 RNF26  
 RPA1  
 SNRPC  
 SP2  
 SUPT4H1  
 SUV39H1  
 THAP11  
 TRIP4  
 WIG1  
 ZBTB9  
 ZCCHC17  
 ZCCL2  
 ZHX3  
 ZMAT2  
 ZMYM6  
 ZNF319  
 ZNF329  
 ZNF435  
 ZNF664  
 ZNF7

**DNA repair and replication (24)**

328 apex nuclease 1  
 27301 apex nuclease 2  
 9126 chondroitin sulfate proteoglycan 6 (bamacan)  
 9521 eukaryotic translation elongation factor 1 epsilon 1  
 2968 general transcription factor iih, polypeptide 4, 52kda  
 3014 h2a histone family, member x  
 CIP29  
 3148 high-mobility group box 2  
 4172 mcm3 minichromosome maintenance deficient 3  
 4173 mcm4 minichromosome maintenance deficient 4  
 4174 mcm5 minichromosome maintenance deficient 5  
 9656 mediator of dna damage checkpoint 1  
 4292 mutl homolog 1, colon cancer, nonpolyposis type 2  
 2956 muts homolog 6 (e. coli)  
 23054 nuclear receptor coactivator 6  
 142 poly (adp-ribose) polymerase family, member 1  
 143 poly (adp-ribose) polymerase family, member 4  
 51659 dna replication complex gins protein psf2  
 5813 purine-rich element binding protein a  
 5984 replication factor c (activator 1) 4, 37kda  
 6117 replication protein a1, 70kda  
 6119 replication protein a3, 14kda  
 10856 ruvb-like 2  
 6418 set translocation (myeloid leukemia-associated)  
 2547 x-ray repair complementing defective repair (ku 70)

APEX1  
 APEX2  
 CSPG6  
 EEF1E1  
 GTF2H4  
 H2AFX  
 HMG82  
 MCM3  
 MCM4  
 MCM5  
 MDC1  
 MLH1  
 MSH6  
 NCOA6  
 PARP1  
 PARP4  
 PFS2  
 PURA  
 RFC4  
 RPA1  
 RPA3  
 RUVBL2  
 SET  
 XRCC6

**RNA metabolism (32)**

988 cdc5 cell division cycle 5-like  
 1478 cleavage stimulation factor, 3' pre-rna, subunit 2  
 9775 dead (asp-glu-ala-asp) box polypeptide 48  
 8449 deah (asp-glu-ala-his) box polypeptide 16  
 51010 exosome component 3  
 56915 exosome component 5  
 79833 gem (nuclear organelle) associated protein 6  
 10978 atp/gtp-binding protein  
 10236 heterogeneous nuclear ribonucleoprotein r  
 84967 lsm10, u7 small nuclear rna associated  
 27258 lsm3 homolog, u6 small nuclear rna associated  
 25804 lsm4 homolog, u6 small nuclear rna associated  
 4116 mago-nashi homolog, proliferation-associated  
 56339 methyltransferase like 3  
 22916 nuclear cap binding protein subunit 2, 20kda  
 4809 nhp2 non-histone chromosome protein 2-like 1  
 55651 nucleolar protein family a, member 2  
 55505 nucleolar protein family a, member 3  
 11097 nucleoporin like 2  
 83759 rna binding motif protein 4b  
 29102 ribonuclease iii, nuclear  
 79897 ribonuclease p 21kda subunit  
 8634 rna terminal phosphate cyclase domain 1  
 51639 splicing factor 3b, 14 kda subunit  
 10262 splicing factor 3b, subunit 4, 49kda  
 6732 sfrs protein kinase 1  
 6427 splicing factor, arginine/serine-rich 2  
 6428 splicing factor, arginine/serine-rich 3  
 6628 small nuclear ribonucleoprotein polypeptides b and 1  
 6631 small nuclear ribonucleoprotein polypeptide c  
 6636 small nuclear ribonucleoprotein polypeptide f  
 7514 exportin 1 (crm1 homolog)

CDC5L  
 CSTF2  
 DDX48  
 DHX16  
 EXOSC3  
 EXOSC5  
 GEMIN6  
 HEAB  
 HNRPR  
 LSM10  
 LSM3  
 LSM4  
 MAGOH  
 METTL3  
 NCBP2  
 NHP2L1  
 NOLA2  
 NOLA3  
 NUP2L  
 RBN4B  
 RNASEN  
 RPP21  
 RCTD1  
 SF3B14  
 SF3B4  
 sfrs  
 SFRS2  
 SFRS3  
 SNRPB  
 SNRPC  
 SRPK1  
 XPO1

**Acevedo Supplementary Figure S7. Categories of nuclear proteins upregulated in tumors.**