

## SUPPLEMENTARY MATERIAL 1. THE PROMOTER SEGMENT OF THE ESPL1 GENE

>HPRM47346  
NM\_012291;name=ESPL1;Entrez\_ID=9700;Genome=hg38;chr12+:5326689  
7-53268512;TSS=53268299;Upstream=1402,Downstream=213;Length=161  
6;

```
GAGCCTGCAACCACGCCCGCTAATTTTTGTATTTTAGTAGAGACGGGGTTCCACCAT
GTTGGCCAGGATTGTCTCGATCTCCTGACCTCGTGATCCGCCCGCCTCGGTCTCTCAAAG
TGCTGGGATTACAGGCGTGAGCCACCGCGCCCGCCTTTTTTTGGTTTTCTTTTTGAG
ACAGAGTCTTGCTCTGTCAACCAGACTGCAGTACAGTGGCGGGATCTAGCTCACTGCAA
CCTCCGCTTCCCGGTTCAAGCGATCCTCCAAGTAGCTGGGACTACAGGCCCCCGATGC
CACAGCAGCTAATTTTTGTATTTTAGTAGAGATGGGGTTCCACCATGTTGGTCAGGCTG
GTTCTCAAGTGATCCACCACCTCGGCCTCTAAAGTGCTGGGATTATTAGGCGTGAGCA
CCGCGCCCGCCTTCTTTCTTTCTTTTACAAAAAATCTTCCCTGCTAGATTCTCAA
CTCATAAAGAGCTCTATGATGATGGAGAAGGATGAGTTATCCAGTAGAGTTCATCAGCG
ACAAGCTGATAACCACTTTTGAGCTGAATCTTTGGTGGAGGAAGAAAGAGACAGCTGA
ATCTGTGTTTGGGAAGTGGTTAGTACTTAAAAACATAAGCCATTAAAGACTGTGAAATA
TCCCAGGGAATGAATTTCCATAGTTCTTCTGCTACTCACAACTCCACCCCAACCCACT
ACCCTCTCTCCCCATCGAAGAGCACCAGATCTTGCTTTTCTATACAACCAATAGAAGG
AGTAAGGCTGGAAGGCAGAGAGAGAGCTGGAGGTCGCTACGGGTACTCATTGTAGTTCC
CTAGAAAACCATCTTTAAATAATTCGTAGGAAGTTGGGCGTGGCGGTGCACGCCGTA
GTCAGCACTTTGGGAGGCTGAGGTGGGAGGATCACTTAAGCCGGGAGTTTGAAGCTGCA
GTGAGCTGTGATCACGCCACTGCACTCCAGCCTGTGTGTCAGAGCAAGACCCTATCAAAA
AAAAAATTCGTAGAAGTCTAAGCCCTTTTTTTCTAGTAACCAAACCGGTGAGTTCCTA
AGTTCTTTTTGTTATTTCTTCTCTTGAACCTTAACTCTTGCCTGAGCTCTGAAGATA
AAGGAGGAAAAGGGTGGCATTACCGATAGCGACTAAGCGACAGGTAGCTGAGAACTGA
GCTCTGACTGGAAAAAGGGGAAACCCGCACCCCAAGAGGCCCTAACGCGCAGAGCAG
CAAGACCTCCGGGGGCCCGGGAGCGCAGCGCGGGGTAACCTACAACCTCCAGC
GTGCCGCGCGCCCGGTTGCGCCGCGCCGCTGATTGGCAGCCCGGATATTTGAAAGG
AGGGTCTGGCGGGAAAACGAAGGGTTACATTTGGATCCTCGCGGAGTACTGGTCAGGCG
GTTAAGTCTGTACTAGGAAAGAGGGCGAGCTCTGGGGCGGTAAGGCCGAAGGGGACTC
GTGAGCGTGGGTACGTGCTGAAGTGAAGGGATCCCCAGCGCTGACGCGAGGAGAGGCGT
GGGTGGCTCTGGAGGGAGTGTCGGGAGGCCTTGGGACTGCCCGGGCCGCTGAAG
```

SUPPLEMENTARY TABLES

**Supplementary Table 1:** The Pearson's correlation coefficients between *ESPL1* expression and the activity of 1387 constituent PARADIGM pathways in LMS cases from the TCGA-SARC dataset.

Constituent PARADIGM pathways	Corr with <i>ESPL1</i> in LMS
Mitotic_Prometaphase	0.86
Kinesins	0.84
E2F_transcription_factor_network	0.84
Resolution_of_Sister_Chromatid_Cohesion	0.83
Aurora_B_signaling	0.83
PLK1_signaling_events	0.82
FOXM1_transcription_factor_network	0.82
E2F_mediated_regulation_of_DNA_replication	0.82
G1/S-Specific_Transcription	0.82
Mitotic_Metaphase/Anaphase_Transition	0.81
Separation_of_Sister_Chromatids	0.81
Inhibition_of_the_proteolytic_activity_of_APC/C_required_for_the_onset_of_anaphase_by_mitotic_spindle_checkpoint_components	0.80
Activation_of_the_pre-replicative_complex	0.79
E2F-enabled_inhibition_of_pre-replication_complex_formation	0.79
Unwinding_of_DNA	0.78
Condensation_of_Prometaphase_Chromosomes	0.78
G0_and_Early_G1	0.78
Cyclin_B2_mediated_events	0.78
CDC6_association_with_the_ORC_origin_complex	0.78
Aurora_A_signaling	0.78
Phosphorylation_of_Emi1	0.78
Inhibition_of_replication_initiation_of_damaged_DNA_by_RB1/E2F1	0.77
Mitotic_Telophase/Cytokinesis	0.77
Activation_of_ATR_in_response_to_replication_stress	0.77
Polo-like_kinase_mediated_events	0.77
APC/C_Cdc20_mediated_degradation_of_mitotic_proteins	0.77
ATR_signaling_pathway	0.76
Removal_of_licensing_factors_from_origins	0.76

(Contd...)

**Supplementary Table 1:** (Continued).

Constituent PARADIGM pathways	Corr with <i>ESPL1</i> in LMS
role_of_ran_in_mitotic_spindle_regulation	0.76
Cyclin_A/B1_associated_events_during_G2/M_transition	0.75
Fanconi_anemia_pathway	0.75
Chk1/Chk2(Cds1)_mediated_inactivation_of_Cyclin_B_Cdk1_complex	0.75
G2/M_DNA_replication_checkpoint	0.75
p53-Independent_DNA_Damage_Response	0.75
Inactivation_of_APC/C_via_direct_inhibition_of_the_APC/C_complex	0.75
G2_Phase	0.75
cyclins_and_cell_cycle_regulation	0.75
Assembly_of_the_pre-replicative_complex	0.75
cell_cycle_g1/s_check_point	0.74
Regulation_of_APC/C_activators_between_G1/S_and_early_anaphase	0.74
cyclin_e_destruction_pathway	0.73
e2f1_destruction_pathway	0.73
regulation_of_p27_phosphorylation_during_cell_cycle_progression	0.73
Cyclin_D_associated_events_in_G1	0.73
Fanconi_Anemia_pathway	0.73
Association_of_licensing_factors_with_the_pre-replicative_complex	0.72
Activation_of_NOXA_and_translocation_to_mitochondria	0.72
Deposition_of_New_CENPA-containing_Nucleosomes_at_the_Centromere	0.72
DNA_replication_initiation	0.71
Telomere_C-strand_synthesis_initiation	0.70
Polymerase_switching_on_the_C-strand_of_the_telomere	0.70
cdk_regulation_of_dna_replication	0.70
Regulation_of_retinoblastoma_protein	0.70
sonic_hedgehog_receptor_ptc1_regulates_cell_cycle	0.70
Polymerase_switching	0.69
p73_transcription_factor_network	0.69

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
estrogen_responsive_protein_efp_controls_cell_cycle_and_breast_tumors_growth	0.69
BARD1_signaling_events	0.68
Activation_of_PUMA_and_translocation_to_mitochondria	0.68
Cyclin_E_associated_events_during_G1/S_transition	0.68
Phosphorylation_of_the_APC/C	0.68
Cyclin_A_Cdk2-associated_events_at_S_phase_entry	0.68
APC-Cdc20_mediated_degradation_of_Nek2A	0.67
Phosphorylation_of_proteins_involved_in_the_G2/M_transition_by_Cyclin_A_Cdc2_complexes	0.67
Rev-mediated_nuclear_export_of_HIV-1_RNA	0.67
Repair_synthesis_for_gap-filling_by_DNA_polymerase_in_TC-NER	0.66
Repair_synthesis_of_patch_27-30_bases_long_by_DNA_polymerase	0.66
Meiotic_Recombination	0.66
cycling_of_ran_in_nucleocytoplasmic_transport	0.66
Leading_Strand_Synthesis	0.65
Removal_of_the_Flap_Intermediate	0.65
Nuclear_import_of_Rev_protein	0.65
influence_of_ras_and_rho_proteins_on_g1_to_s_transition	0.64
Activation_of_NIMA_Kinases_NEK9__NEK6__NEK7	0.64
Aurora_C_signaling	0.64
Switching_of_origins_to_a_post-replicative_state	0.64
Processive_synthesis_on_the_lagging_strand	0.64
Phosphorylation_of_proteins_involved_in_G1/S_transition_by_active_Cyclin_E_Cdk2_complexes	0.63
MASTL_Facilitates_Mitotic_Progression	0.62
role_of_brca1_brca2_and_atr_in_cancer_susceptibility	0.62
Regulation_of_Glucokinase_by_Glucokinase_Regulatory_Protein	0.62
APC/C_Cdc20_mediated_degradation_of_Cyclin_B	0.62

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Loss_of_Nlp_from_mitotic centrosomes	0.61
the_prc2_complex_sets_long-term_gene_silencing_through_modification_of_histone_tails	0.61
Loss_of_proteins_required_for_interphase_microtubule_organization__from_the centrosome	0.61
rb_tumor_suppressor/checkpoint_signaling_in_response_to_dna_damage	0.61
Transport_of_the_SLBP_Dependant_Mature_mRNA	0.60
mechanism_of_protein_import_into_the_nucleus	0.60
Assembly_of_the_RAD51-ssDNA_nucleoprotein_complex	0.60
Recruitment_of_NuMA_to_mitotic centrosomes	0.59
Orc1_removal_from_chromatin	0.59
p53-Dependent_G1_DNA_Damage_Response	0.58
Pyrimidine_biosynthesis	0.58
how_progesterone_initiates_the_oocyte_maturation	0.58
Transport_of_Mature_mRNA_Derived_from_an_Intronless_Transcript	0.58
snRNP_Assembly	0.57
Gap-filling_DNA_repair_synthesis_and_ligation_in_TC-NER	0.57
Gap-filling_DNA_repair_synthesis_and_ligation_in_GG-NER	0.57
Recruitment_of_mitotic centrosome_proteins_and_complexes	0.56
Removal_of_the_Flap_Intermediate_from_the_C-strand	0.56
Transport_of_Mature_mRNA_derived_from_an_Intron-Containing_Transcript	0.55
p53_signaling_pathway	0.55
Transport_of_the_SLBP_independent_Mature_mRNA	0.55
Assembly_of_the_ORC_complex_at_the_origin_of_replication	0.55
Clearance_of_Nuclear_Envelope_Membranes_from_Chromatin	0.54
PLK2_and_PLK4_events	0.54

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
NEP/NS2_Interacts_with_the_Cellular_Export_Machinery	0.54
Conversion_from_APC/C_Cdc20_to_APC/C_Cdh1_in_late_anaphase	0.54
Establishment_of_Sister_Chromatid_Cohesion	0.53
p53_pathway	0.53
Metabolism_of_folate_and_pterines	0.52
Initiation_of_Nuclear_Envelope_Reformation	0.52
Processive_synthesis_on_the_C-strand_of_the_telomere	0.51
Activation_of_caspases_through_apoptosome-mediated_cleavage	0.51
Cohesin>Loading_onto_Chromatin	0.51
Amplification_of_signal_from_unattached_kinetochores_via_a_MAD2_inhibitory_signal	0.50
SCF(Skp2)-mediated_degradation_of_p27/p21	0.50
Breakdown_of_the_nuclear_lamina	0.50
mRNA_Decay_by_5__to_3__Exoribonuclease	0.49
Vpr-mediated_nuclear_import_of_PICs	0.49
Presynaptic_phase_of_homologous_DNA_pairing_and_strand_exchange	0.48
PP2A-mediated_dephosphorylation_of_key_metabolic_factors	0.48
C-MYC_pathway	0.48
Cdc20_Phospho-APC/C_mediated_degradation_of_Cyclin_A	0.48
Cytosolic_Iron-sulfur_Cluster_Assembly	0.48
Telomere_C-strand_(Lagging_Strand)_Synthesis	0.48
ATM_pathway	0.47
Cleavage_of_Growing_Transcript_in_the_Termination_Region	0.47
APC/C_Cdh1_mediated_degradation_of_Cdc20_and_other_APC/C_Cdh1_targeted_proteins_in_late_mitosis/early_G1	0.46
caspase_cascade_in_apoptosis	0.45
mRNA_3__end_processing	0.45
NADE_modulates_death_signalling	0.44
Transport_of_Ribonucleoproteins_into_the_Host_Nucleus	0.44
cell_cycle_g2/m_checkpoint	0.44

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Meiotic_Synapsis	0.44
Removal_of_DNA_patch_containing_abasic_residue	0.44
CDT1_association_with_the_CDC6_ORC_origin_complex	0.43
Signaling_events_mediated_by_PRL	0.43
Validated_targets_of_C-MYC_transcriptional_activation	0.43
tnf/stress_related_signaling	0.42
Sumoylation_by_RanBP2_regulates_transcriptional_repression	0.42
Processing_of_Intronless_Pre-mRNAs	0.42
Apoptotic_cleavage_of_cellular_proteins	0.41
brca1_dependent_ub_ligase_activity	0.41
Synthesis_of_PIPs_at_the_ER_membrane	0.41
mechanisms_of_transcriptional_repression_by_dna_methylation	0.40
protein_kinase_a_at_the_centrosome	0.40
polyadenylation_of_mrna	0.40
Recycling_pathway_of_L1	0.39
EPHB_forward_signaling	0.39
U2_Dependent_Splicing	0.39
Formation_of_apoptosome	0.39
SMAD2/SMAD3_SMAD4_heterotrimer_regulates_transcription	0.38
Golgi_Cisternae_Pericentriolar_Stack_Reorganization	0.38
west_nile_virus	0.37
hiv-1_nef__negative_effector_of_fas_and_tnf	0.37
Resolution_of_AP_sites_via_the_multiple-nucleotide_patch_replacement_pathway	0.37
Role_of_DCC_in_regulating_apoptosis	0.37
telomeres_telomerase_cellular_aging_and_immortality	0.36
Role_of_Calcineurin-dependent_NFAT_signaling_in_lymphocytes	0.36
RNA_Polymerase_III_Transcription_Initiation_From_Type_1_Promoter	0.36
SLBP_Dependent_Processing_of_Replication-Dependent_Histone_Pre-mRNAs	0.35

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
RNA_Polymerase_III_Transcription_Initiation_From_Type_2_Promoter	0.35
p75NTR_negatively_regulates_cell_cycle_via_SC1	0.35
pkc-catalyzed_phosphorylation_of_inhibitory_phosphoprotein_of_myosin_phosphatase	0.35
apoptotic_dna-fragmentation_and_tissue_homeostasis	0.35
Post-chaperonin_tubulin_folding_pathway	0.35
spliceosomal_assembly	0.35
SHC1_events_in_EGFR_signaling	0.35
SMAC_binds_to_IAPs	0.35
ERK1_activation	0.34
Regulation_of_CDC42_activity	0.34
Pre-NOTCH_Transcription_and_Translation	0.34
SMAC-mediated_dissociation_of_IAP_caspase_complexes	0.34
Activation_of_DNA_fragmentation_factor	0.34
apoptotic_signaling_in_response_to_dna_damage	0.34
Formation_of_tubulin_folding_intermediates_by_CCT/TriC	0.34
Calmodulin_induced_events	0.34
Assembly_of_the_RAD50-MRE11-NBS1_complex_at_DNA_double-strand_breaks	0.34
Caspase_Cascade_in_Apoptosis	0.33
Telomere_Extension_By_Telomerase	0.33
SLBP_independent_Processing_of_Histone_Pre-mRNAs	0.33
APC/C_Cdc20_mediated_degradation_of_Securin	0.33
Stabilization_of_mRNA_by_HuR	0.33
regulation_of_splicing_through_sam68	0.33
Integrin-linked_kinase_signaling	0.33
mTOR_signaling_pathway	0.32
Purine_ribonucleoside_monophosphate_biosynthesis	0.32
RNA_Polymerase_II_Transcription_Initiation_And_Promoter_Clearance	0.32
Processing_of_DNA_double-strand_break_ends	0.32
Gluconeogenesis	0.32

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
RNA_Polymerase_II_Transcription_Pre-Initiation_And_Promoter_Opening	0.32
Deadenylation_of_mRNA	0.32
cdc25_and_chk1_regulatory_pathway_in_response_to_dna_damage	0.32
Signaling_mediated_by_p38-gamma_and_p38-delta	0.32
RNA_Polymerase_I_Promoter_Escape	0.31
internal_ribosome_entry_pathway	0.31
MicroRNA_(miRNA)_Biogenesis	0.31
Classical_Kir_channels	0.31
Validated_transcriptional_targets_of_TAp63_isoforms	0.30
Carnitine_synthesis	0.30
g-secretase_mediated_erbB4_signaling_pathway	0.30
Transcription_of_the_HIV_genome	0.30
Packaging_Of_Telomere_Ends	0.30
EGFR_Transactivation_by_Gastrin	0.30
Internalization_of_ErbB1	0.29
RNA_Polymerase_II_Promoter_Escape	0.29
HIV-1_Transcription_Initiation	0.29
Negative_regulation_of_the_PI3K/AKT_network	0.29
RNA_Polymerase_II_Transcription_Initiation	0.29
Regulation_of_nuclear_SMAD2/3_signaling	0.29
regulation_of_ck1/cdk5_by_type_1_glutamate_receptors	0.29
Reelin_signaling_pathway	0.29
RNA_Polymerase_I_Transcription_Initiation	0.29
RNA_Polymerase_II_HIV-1_Promoter_Escape	0.29
Conversion_of_palmitic_acid_to_very_long_chain_fatty_acyl-CoAs	0.29
Synthesis_and_interconversion_of_nucleotide_di-_and_triphosphates	0.28
FoxO_family_signaling	0.28
Generic_Transcription_Pathway	0.28
Noncanonical_Wnt_signaling_pathway	0.28
SHC-mediated_signalling	0.28
Resolution_of_AP_sites_via_the_single-nucleotide_replacement_pathway	0.27

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Coregulation_of_Androgen_receptor_activity	0.27
CDC42_signaling_events	0.27
Fatty_Acyl-CoA_Biosynthesis	0.27
RNA_Polymerase_I_Promoter_Opening	0.27
Processing_of_Capped_Intron-Containing_Pre-mRNA	0.27
Zinc_efflux_and_compartmentalization_by_the_SLC30_family	0.27
SCF-beta-TrCP_mediated_degradation_of_Emi1	0.27
GRB2_events_in_EGFR_signaling	0.27
RNA_Polymerase_II_Pre-transcription_Events	0.26
chromatin_remodeling_by_hswi/snf_atp-dependent_complexes	0.26
CDK-mediated_phosphorylation_and_removal_of_Cdc6	0.26
proteolysis_and_signaling_pathway_of_notch	0.26
Highly_calcium_permeable_postsynaptic_nicotinic_acetylcholine_receptors	0.26
mRNA_Splicing_-_Minor_Pathway	0.26
Activation_of_Genes_by_ATF4	0.26
btg_family_proteins_and_cell_cycle_regulation	0.26
stress_induction_of_hsp_regulation	0.26
ISG15_antiviral_mechanism	0.26
DAG_and_IP3_signaling	0.25
MRN_complex_relocalizes_to_nuclear_foci	0.25
MHC_class_II_antigen_presentation	0.25
Metabolism_of_polyamines	0.25
fas_signaling_pathway_(cd95)	0.25
akap95_role_in_mitosis_and_chromosome_dynamics	0.25
Downregulation_of_SMAD2/3_SMAD4_transcriptional_activity	0.25
Highly_calcium_permeable_nicotinic_acetylcholine_receptors	0.25
Validated_transcriptional_targets_of_deltaNp63_isoforms	0.25
Glycolysis	0.25
Antigen_processing_Ubiqitination____Proteasome_degradation	0.25
Galactose_catabolism	0.24

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Release_of_eIF4E	0.24
er_associated_degradation_(erad)_pathway	0.24
Notch-mediated_HES/HEY_network	0.24
ion_channels_and_their_functional_role_in_vascular_endothelium	0.24
Association_of_TriC/CCT_with_target_proteins_during_biosynthesis	0.24
the_41bb-dependent_immune_response	0.24
regulation_of_cell_cycle_progression_by_plk3	0.23
Molybdenum_cofactor_biosynthesis	0.23
overview_of_telomerase_rna_component_gene_hterc_transcriptional_regulation	0.23
tnfr1_signaling_pathway	0.23
RNA_Polymerase_I_Transcription_Termination	0.23
Destabilization_of_mRNA_by_KSRP	0.23
Signaling_events_mediated_by_HDAC_Class_II	0.23
ionomycin_and_phorbol_ester_signaling_pathway	0.22
effects_of_calcineurin_in_keratinocyte_differentiation	0.22
Integration_of_energy_metabolism	0.22
Organic_anion_transporters	0.22
PKA-mediated_phosphorylation_of_key_metabolic_factors	0.22
Direct_p53_effectors	0.22
Pyrimidine_salvage_reactions	0.22
Insulin-mediated_glucose_transport	0.22
Acyl_chain_remodelling_of_PG	0.22
t(4_14)_translocations_of_FGFR3	0.22
Activation_of_RAS_in_B_Cells	0.22
E-cadherin_signaling_in_the_nascent_adherens_junction	0.22
Cholesterol_biosynthesis	0.22
MEK_activation	0.21
Insulin_Processing	0.21
Amino_acid_and_oligopeptide_SLC_transporters	0.21
Transport_of_inorganic_cations/anions_and_amino_acids/oligopeptides	0.21

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Response_to_elevated_platelet_cytosolic_Ca2_	0.21
L1CAM_interactions	0.21
Hedgehog_signaling_events_mediated_by_Gli_proteins	0.21
Activation_of_Gene_Expression_by_SREBP_(SREBF)	0.21
PLK3_signaling_events	0.21
Regulation_of_Cholesterol_Biosynthesis_by_SREBP_(SREBF)	0.21
trka_receptor_signaling_pathway	0.21
Inhibition_of_PKR	0.21
Signaling_by_NODAL	0.20
Folding_of_actin_by_CCT/TriC	0.20
Regulation_of_ornithine_decarboxylase_(ODC)	0.20
Prefoldin_mediated_transfer_of_substrate_to_CCT/TriC	0.20
Signalling_to_RAS	0.20
Asparagine_N-linked_glycosylation	0.20
Reduction_of_cytosolic_Ca_levels	0.20
Vitamin_B5_(pantothenate)_metabolism	0.20
Neurotrophic_factor-mediated_Trk_receptor_signaling	0.20
c-src_mediated_regulation_of_Cx43_function_and_closure_of_gap_junctions	0.20
RAF_phosphorylates_MEK	0.20
links_between_pyk2_and_map_kinases	0.20
Dual_incision_reaction_in_GG-NER	0.19
Autodegradation_of_Cdh1_by_Cdh1_APC/C	0.19
p75(NTR)-mediated_signaling	0.19
Regulation_of_nuclear_beta_catenin_signaling_and_target_gene_transcription	0.19
proteasome_complex	0.19
Rho_GTPase_cycle	0.19
BH3-only_proteins_associate_with_and_inactivate_anti-apoptotic_BCL-2_members	0.19
atm_signaling_pathway	0.19
Stimulation_of_the_cell_death_response_by_PAK-2p34	0.19
Beta-catenin_phosphorylation_cascade	0.19

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
RNA_Polymerase_III_Abortive_And_Retractive_Initiation	0.19
Formation_of_incision_complex_in_GG-NER	0.19
Amyloids	0.19
CDO_in_myogenesis	0.19
Base-free_sugar-phosphate_removal_via_the_single-nucleotide_replacement_pathway	0.18
Circadian_rhythm_pathway	0.18
Regulation_of_PLK1_Activity_at_G2/M_Transition	0.18
RNA_Polymerase_III_Transcription_Initiation_From_Type_3_Promoter	0.18
Early_Phase_of_HIV_Life_Cycle	0.18
Glypican_2_network	0.18
induction_of_apoptosis_through_dr3_and_dr4/5_death_receptors	0.18
Muscarinic_acetylcholine_receptors	0.18
Degradation_of_beta-catenin_by_the_destruction_complex	0.18
Chondroitin_sulfate_biosynthesis	0.18
Synthesis_Secretion_and_Inactivation_of_Glucagon-like_Peptide-1_(GLP-1)	0.18
Epidermal_Growth_Factor_Receptor_(EGFR)_signaling	0.18
Lissencephaly_gene_(LIS1)_in_neuronal_migration_and_development	0.17
Serotonin_receptors	0.17
segmentation_clock	0.17
Binding_of_RNA_by_Insulin-like_Growth_Factor-2_mRNA_Binding_Proteins_(IGF2BPs/IMPs/VICKZs)	0.17
CS/DS_degradation	0.17
Disinhibition_of_SNARE_formation	0.17
PLC_beta_mediated_events	0.17
Signaling_by_activated_point_mutants_of_FGFR3	0.17
The_proton_buffering_model	0.17
Canonical_Wnt_signaling_pathway	0.17
Signaling_by_FGFR4_mutants	0.17
Regulation_of_RhoA_activity	0.17
Caspase-mediated_cleavage_of_cytoskeletal_proteins	0.17

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
calcium_signaling_by_hbx_of_hepatitis_b_virus	0.17
Transport_of_connexins_along_the_secretory_pathway	0.16
Oligomerization_of_connexins_into_connexons	0.16
COPII_(Coat_Protein_2)_Mediated_Vesicle_Transport	0.16
tumor_suppressor_arf_inhibits_ribosomal_biogenesis	0.16
vegf_hypoxia_and_angiogenesis	0.16
Activation_of_BIM_and_translocation_to_mitochondria	0.16
Microtubule-dependent_trafficking_of_connexons_from_Golgi_to_the_plasma_membrane	0.16
Sodium/Proton_exchangers	0.16
Gap_junction_assembly	0.16
Inhibition_of_Host_mRNA_Processing_and_RNA_Silencing	0.16
Synthesis_of_UDP-N-acetyl-glucosamine	0.16
a6b1_and_a6b4_Integrin_signaling	0.15
sumoylation_by_ranbp2_regulates_transcriptional_repression	0.15
Formation_of_annular_gap_junctions	0.15
trefoil_factors_initiate_mucosal_healing	0.15
Signalling_to_p38_via_RIT_and_RIN	0.15
Unblocking_of_NMDA_receptor_glutamate_binding_and_activation	0.15
Elevation_of_cytosolic_Ca2_levels	0.15
Validated_nuclear_estrogen_receptor_beta_network	0.15
generation_of_amyloid_b-peptide_by_ps1	0.15
Formation_of_HIV-1_elongation_complex_in_the_absence_of_HIV-1_Tat	0.15
Formation_of_RNA_Pol_II_elongation_complex	0.15
Tat-mediated_elongation_of_the_HIV-1_transcript	0.15
SOS-mediated_signalling	0.15
ErbB2/ErbB3_signaling_events	0.15
Trafficking_of_GluR2-containing_AMPA_receptors	0.15

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
mRNA_Capping	0.14
Retrograde_neurotrophin_signalling	0.14
Tetrahydrobiopterin_(BH4)_synthesis_recycling_salvage_and_regulation	0.14
Processing_of_DNA_ends_prior_to_end_rejoining	0.14
gamma-aminobutyric_acid_receptor_life_cycle_pathway	0.14
Hyaluronan_uptake_and_degradation	0.14
Gap_junction_degradation	0.14
mRNA_Decay_by_3_to_5_Exoribonuclease	0.14
mTOR_signalling	0.14
Dermatan_sulfate_biosynthesis	0.14
Formation_of_HIV-1_elongation_complex_containing_HIV-1_Tat	0.14
multi-step_regulation_of_transcription_by_pitx2	0.14
Glycoprotein_hormones	0.14
Signaling_by_FGFR3_mutants	0.14
fibrinolysis_pathway	0.13
RNA_Polymerase_II_Transcription_Elongation	0.13
Transcriptional_activation_of_cell_cycle_inhibitor_p21	0.13
SHC1_events_in_ERBB2_signaling	0.13
Ubiquitin-dependent_degradation_of_Cyclin_D1	0.13
dicer_pathway	0.13
Autodegradation_of_the_E3_ubiquitin_ligase_COP1	0.13
srebp_control_of_lipid_synthesis	0.13
Recruitment_of_repair_and_signaling_proteins_to_double-strand_breaks	0.13
Ubiquinol_biosynthesis	0.13
DNA_Damage_Recognition_in_GG-NER	0.13
Trafficking_of_AMPA_receptors	0.13
Posttranslational_regulation_of_adherens_junction_stability_and_disassembly	0.13
S6K1-mediated_signalling	0.13
G-protein_activation	0.13
Inactivation_of_Cdc42_and_Rac	0.13
Signaling_by_constitutively_active_EGFR	0.13

(Contd...)



**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Tight_junction_interactions	0.13
Digestion_of_dietary_lipid	0.13
Destabilization_of_mRNA_by_Tristetraprolin_(TTP)	0.13
Activation_of_Chaperone_Genes_by_ATF6-alpha	0.13
Activation_of_Chaperones_by_ATF6-alpha	0.13
signal_dependent_regulation_of_myogenesis_by_corepressor_mitr	0.13
Hippo_signaling_cascade	0.12
CREB_phosphorylation_through_the_activation_of_CaMKII	0.12
Triacylglycerol_biosynthesis	0.12
Aromatic_amines_can_be_N-hydroxylated_or_N-dealkylated_by_CYP1A2	0.12
phosphorylation_of_mek1_by_cdk5/p35_down_regulates_the_map_kinase_pathway	0.12
PERK_regulated_gene_expression	0.12
bioactive_peptide_induced_signaling_pathway	0.12
Regulation_of_PAK-2p34_activity_by_PS-GAP/RHG10	0.12
epo_signaling_pathway	0.12
Regulation_of_RAC1_activity	0.12
Ephrin_B_reverse_signaling	0.12
Viral_RNP_Complexes_in_the_Host_Cell_Nucleus	0.12
Proton-coupled_monocarboxylate_transport	0.12
mets_affect_on_macrophage_differentiation	0.12
wnt_signaling_pathway	0.12
Ceramide_signalling	0.11
Branched-chain_amino_acid_catabolism	0.11
egf_signaling_pathway	0.11
Canonical_NF-kappaB_pathway	0.11
Notch_signaling_pathway	0.11
Regulation_of_the_Fanconi_anemia_pathway	0.11
NGF_processing	0.11
basic_mechanisms_of_sumoylation	0.11
SHC1_events_in_ERBB4_signaling	0.11
Formation_of_editosomes_by_ADAR_proteins	0.11
NRAGE_signals_death_through_JNK	0.11

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Proteolytic_cleavage_of_SNARE_complex_proteins	0.11
SHC-related_events_triggered_by_IGF1R	0.11
Constitutive_Signaling_by_NOTCH1_t(7_9)(NOTCH1_M1580_K2555)_Translocation_Mutant	0.11
granzyme_a_mediated_apoptosis_pathway	0.11
RhoA_signaling_pathway	0.11
G_beta_gamma_signalling_through_PLC_beta	0.11
Regulation_of_Signaling_by_NODAL	0.11
betaKlotho-mediated_ligand_binding	0.10
Small_Interfering_RNA_(siRNA)_Biogenesis	0.10
Ras_activation_uopn_Ca2_influx_through_NMDA_receptor	0.10
Regulation_of_gene_expression_in_endocrine-committed_(NEUROG3_)_progenitor_cells	0.10
C-MYB_transcription_factor_network	0.10
Frs2-mediated_activation	0.10
Fc-epsilon_receptor_I_signaling_in_mast_cells	0.10
transcription_factor_creb_and_its_extracellular_signals	0.10
Netrin-1_signaling	0.10
Basigin_interactions	0.10
Thromboxane_signalling_through_TP_receptor	0.10
Activation_of_BMF_and_translocation_to_mitochondria	0.10
Regulation_of_activated_PAK-2p34_by_proteasome_mediated_degradation	0.10
ca-calmodulin-dependent_protein_kinase_activation	0.10
NFG_and_proNGF_binds_to_p75NTR	0.09
Activation_of_G_protein_gated_Potassium_channels	0.09
Inhibition_of_voltage_gated_Ca2_channels_via_Gbeta/gamma_subunits	0.09
Regulation_of_Androgen_receptor_activity	0.09
Regulation_of_signaling_by_CBL	0.09
Activation_translocation_and_oligomerization_of_BAX	0.09
Effects_of_PIP2_hydrolysis	0.09
Glypican_3_network	0.09

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Adenosine_P1_receptors	0.09
Tat-mediated_HIV-1_elongation_arrest_and_recovery	0.09
Signaling_events_mediated_by_HDAC_Class_III	0.09
The_fatty_acid_cycling_model	0.09
map_kinase_inactivation_of_smrt_corepressor	0.09
GRB2_events_in_ERBB2_signaling	0.09
RAF_activation	0.09
alk_in_cardiac_myocytes	0.08
CD28_dependent_Vav1_pathway	0.08
Synthesis_of_PIPs_at_the_early_endosome_membrane	0.08
Cori_Cycle_(interconversion_of_glucose_and_lactate)	0.08
RNA_Pol_II_CTD_phosphorylation_and_interaction_with_CE	0.08
rac1_cell_motility_signaling_pathway	0.08
RNA_Pol_II_CTD_phosphorylation_and_interaction_with_CE_1	0.08
Highly_sodium_permeable_acetylcholine_nicotinic_receptors	0.08
Pausing_and_recovery_of_Tat-mediated_HIV-1_elongation	0.08
Histamine_receptors	0.08
anthrax_toxin_mechanism_of_action	0.08
Relaxin_receptors	0.08
ER_Quality_Control_Compartment_(ERQC)	0.08
Ubiquitin_Mediated_Degradation_of_Phosphorylated_Cdc25A	0.08
Destabilization_of_mRNA_by_Butyrate_Response_Factor_1_(BRF1)	0.08
Golgi_Associated_Vesicle_Biogenesis	0.08
Pausing_and_recovery_of_HIV-1_elongation	0.08
C6_deamination_of_adenosine	0.08
Synthesis_Secretion_and_Inactivation_of_Glucose-dependent_Insulinotropic_Polypeptide_(GIP)	0.08
thrombin_signaling_and_protease-activated_receptors	0.08
SHC_activation	0.08

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
neuroregulin_receptor_degredation_protein-1_controls_erb3_receptor_recycling	0.08
pelp1_modulation_of_estrogen_receptor_activity	0.07
Leukotriene_receptors	0.07
vRNA_Synthesis	0.07
COPI_Mediated_Transport	0.07
HIV-1_elongation_arrest_and_recovery	0.07
Degradation_of_beta_catenin	0.07
GABA_synthesis	0.07
Activation_and_oligomerization_of_BAK_protein	0.07
cRNA_Synthesis	0.07
ChREBP_activates_metabolic_gene_expression	0.07
Synthesis_of_bile_acids_and_bile_salts_via_7alpha-hydroxycholesterol	0.07
alpha-linolenic_acid_(ALA)_metabolism	0.07
Elongation_arrest_and_recovery	0.07
lissencephaly_gene_(lis1)_in_neuronal_migration_and_development	0.07
Pre-NOTCH_Processing_in_Golgi	0.07
RNA_Polymerase_III_Chain_Elongation	0.07
Pre-NOTCH_Processing_in_the_Endoplasmic_Reticulum	0.07
Nef_mediated_downregulation_of_MHC_class_I_complex_cell_surface_expression	0.07
mitochondrial_fatty_acid_beta-oxidation_of_unsaturated_fatty_acids	0.07
TRKA_activation_by_NGF	0.07
Dual_incision_reaction_in_TC-NER	0.06
Formation_of_transcription-coupled_NER_(TC-NER)_repair_complex	0.06
actions_of_nitric_oxide_in_the_heart	0.06
Activation_of_the_mRNA_upon_binding_of_the_cap-binding_complex_and_eIFs_and_subsequent_binding_to_43S	0.06
Post-transcriptional_Silencing_By_Small_RNAs	0.06
Linoleic_acid_(LA)_metabolism	0.06
NICD_traffics_to_nucleus	0.06
Notch-HLH_transcription_pathway	0.06

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Signaling_events_mediated_by_the_Hedgehog_family	0.06
Oxygen-dependent_Proline_Hydroxylation_of_Hypoxia-inducible_Factor_Alpha	0.06
sumoylation_as_a_mechanism_to_modulate_ctbp-dependent_gene_responses	0.06
Sema3A_PAK_dependent_Axon_repulsion	0.06
Effects_of_Botulinum_toxin	0.06
N-glycan_trimming_in_the_ER_and_Calnexin/Calreticulin_cycle	0.06
Vif-mediated_degradation_of_APOBEC3G	0.06
Regulation_of_Ras_family_activation	0.06
ARMS-mediated_activation	0.05
Downregulation_of_TGF-beta_receptor_signaling	0.05
regulation_of_eif2	0.05
Calnexin/calreticulin_cycle	0.05
Integration_of_provirus	0.05
CRMPs_in_Sema3A_signaling	0.05
Apoptotic_cleavage_of_cell_adhesion_proteins	0.05
Class_I_P13K_signaling_events_mediated_by_Akt	0.05
NOSIP_mediated_eNOS_trafficking	0.05
role_of_mal_in_rho-mediated_activation_of_srf	0.05
vRNP_Assembly	0.05
double_stranded_rna_induced_gene_expression	0.05
Receptor-ligand_binding_initiates_the_second_proteolytic_cleavage_of_Notch_receptor	0.05
Synthesis_of_PA	0.05
Regulation_of_cytoplasmic_and_nuclear_SMAD2/3_signaling	0.05
Beta-oxidation_of_very_long_chain_fatty_acids	0.05
Beta-oxidation_of_pristanoyl-CoA	0.05
Activation_of_Chaperones_by_IRE1alpha	0.05
phospholipase_c_signaling_pathway	0.04
Signaling_by_FGFR1_fusion_mutants	0.04
Axonal_growth_stimulation	0.04
RAC1_signaling_pathway	0.04

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Rapid_glucocorticoid_signaling	0.04
PLC-gamma1_signalling	0.04
nitric_oxide_signaling_pathway	0.04
Signaling_by_FGFR1_amplification_mutants	0.04
deregulation_of_cdk5_in_alzheimers_disease	0.04
TRAIL_signaling	0.04
skeletal_muscle_hypertrophy_is_regulated_via_akt-mtor_pathway	0.04
RNA_Polymerase_III_Transcription_Termination	0.04
EGFR_downregulation	0.04
antisense_pathway	0.04
b_cell_survival_pathway	0.04
sodd/tnfr1_signaling_pathway	0.04
Formation_of_the_HIV-1_Early_Elongation_Complex	0.04
Thyroxine_biosynthesis	0.04
nerve_growth_factor_pathway_(ngf)	0.04
Formation_of_the_Early_Elongation_Complex	0.04
ER-Phagosome_pathway	0.04
Inhibition_of_HSL	0.04
PDE3B_signalling	0.04
AKT_phosphorylates_targets_in_the_cytosol	0.04
S1P5_pathway	0.04
Plasma_membrane_estrogen_receptor_signaling	0.04
il-2_receptor_beta_chain_in_t_cell_activation	0.03
nuclear_receptors_coordinate_the_activities_of_chromatin_remodeling_complexes_and_coactivators_to_facilitate_initiation_of_transcription_in_carcinoma_cells	0.03
Autointegration_results_in_viral_DNA_circles	0.03
Utilization_of_Ketone_Bodies	0.03
Integration_of_viral_DNA_into_host_genomic_DNA	0.03
Recycling_of_eIF2_GDP	0.03
HIF-2-alpha_transcription_factor_network	0.03
y_branching_of_actin_filaments	0.03
Signaling_by_activated_point_mutants_of_FGFR1	0.03

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Opsins	0.03
Axonal_growth_inhibition_(RHOA_activation)	0.03
gata3_participate_in_activating_the_th2_cytokine_genes_expression	0.03
Signaling_events_mediated_by_HDAC_Class_I	0.03
The_canonical_retinoid_cycle_in_rods_(twilight_vision)	0.03
Lysosome_Vesicle_Biogenesis	0.03
Inhibition_of_IFN-beta	0.02
cbl_mediated_ligand-induced_downregulation_of_egf_receptors_pathway	0.02
Destabilization_of_mRNA_by_AUF1_(hnRNP_D0)	0.02
Glycogen_synthesis	0.02
stathmin_and_breast_cancer_resistance_to_antimicrotubule_agents	0.02
Defensins	0.02
Activation_of_AMPA_receptors	0.02
Signaling_by_Activin	0.02
regulation_of_spermatogenesis_by_crem	0.02
NOTCH2_Activation_and_Transmission_of_Signal_to_the_Nucleus	0.02
Plus-strand_DNA_synthesis	0.02
Regulation_of_Telomerase	0.02
FGFR3b_ligand_binding_and_activation	0.02
Orexin_and_neuropeptides_FF_and_QRFP_bind_to_their_respective_receptors	0.02
phospholipase_c-epsilon_pathway	0.02
ATM_mediated_phosphorylation_of_repair_proteins	0.02
Vpu_mediated_degradation_of_CD4	0.02
Uncoating_of_the_HIV_Virion	0.02
Apoptotic_execution_phase	0.02
multiple_antiapoptotic_pathways_from_igf-1r_signaling_lead_to_bad_phosphorylation	0.02
Sphingolipid_de_novo_biosynthesis	0.02
Transferrin_endocytosis_and_recycling	0.02
Neurofascin_interactions	0.02
Syndecan-3-mediated_signaling_events	0.02
Signaling_by_FGFR_mutants	0.02

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
PLCG1_events_in_ERBB2_signaling	0.02
overview_of_telomerase_protein_component_gene_htert_transcriptional_regulation	0.02
Degradation_of_collagen	0.02
activation_of_camp-dependent_protein_kinase_pka	0.02
Synthesis_of_IP2_IP_and_Ins_in_the_cytosol	0.02
control_of_gene_expression_by_vitamin_d_receptor	0.01
Ligand-gated_ion_channel_transport	0.01
GABA_A_receptor_activation	0.01
Purine_salvage	0.01
JNK_(c-Jun_kinases)_phosphorylation_and_activation_mediated_by_activated_human_TAK1	0.01
p38_signaling_mediated_by_MAPKAP_kinases	0.01
Nephrin/Neph1_signaling_in_the_kidney_podocyte	0.01
Nongenotropic_Androgen_signaling	0.01
Activation_of_Chaperone_Genes_by_XBP1(S)	0.01
DCC_mediated_attractive_signaling	0.01
Attachment_of_GPI_anchor_to_uPAR	0.01
Synthesis_and_organization_of_GAG_GAGPOL_polyproteins	0.01
GABA_synthesis_release_reuptake_and_degradation	0.01
Synthesis_of_IPs_in_the_nucleus	0.01
Keratan_sulfate_degradation	0.01
FGFR4_ligand_binding_and_activation	0.01
SHC-mediated_cascade	0.01
EPO_signaling_pathway	0.01
Cross-presentation_of_soluble_exogenous_antigens_(endosomes)	0.01
Sphingosine_1-phosphate_(S1P)_pathway	0.01
A_tetrasaccharide_linker_sequence_is_required_for_GAG_synthesis	0.01
role_of_mitochondria_in_apoptotic_signaling	0.01
Nectin_adhesion_pathway	0.01
Olfactory_Signaling_Pathway	0.01

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Amino_acid_synthesis_and_interconversion_(transamination)	0.01
Nephrin_interactions	0.01
IRS-related_events_triggered_by_IGF1R	0.01
FGFR1c_ligand_binding_and_activation	0.01
Validated_transcriptional_targets_of_API_family_members_Fra1_and_Fra2	0.01
role_of_egf_receptor_transactivation_by_gpcrs_in_cardiac_hypertrophy	0.00
Heme_biosynthesis	0.00
G_alpha_(12/13)_signalling_events	0.00
EGFR_interacts_with_phospholipase_C-gamma	0.00
PAR1-mediated_thrombin_signaling_events	0.00
Presenilin_action_in_Notch_and_Wnt_signaling	0.00
adp-ribosylation_factor	0.00
CTLA4_inhibitory_signaling	0.00
rna_polymerase_iii_transcription	0.00
ADP_signalling_through_P2Y_purinoceptor_12	0.00
BoNT_Light_Chain_Types_A_C1_E_cleave SNAP-25	0.00
control_of_skeletal_myogenesis_by_hdac_and_calcium/calmodulin-dependent_kinase_(camk)	0.00
Catecholamine_biosynthesis	0.00
signaling_pathway_from_g-protein_families	0.00
Trk_receptor_signaling_mediated_by_the_MAPK_pathway	0.00
Adherens_junctions_interactions	0.00
Acyl_chain_remodelling_of_PC	0.00
akt_signaling_pathway	0.00
Activation_of_BAD_and_translocation_to_mitochondria	0.00
Phenylalanine_and_tyrosine_catabolism	0.00
NrCAM_interactions	-0.01
Nectin/Necl_trans_heterodimerization	-0.01
yaci_and_bcma_stimulation_of_b_cell_immune_responses	-0.01
FRS2-mediated_cascade	-0.01
IL2_signaling_events_mediated_by_STAT5	-0.01

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
hop_pathway_in_cardiac_development	-0.01
Glutamate_Neurotransmitter_Release_Cycle	-0.01
Packaging_of_Eight_RNA_Segments	-0.01
Antigen_Presentation_Folding_assembly_and_peptide_loading_of_class_I_MHC	-0.01
Neurotoxicity_of_Botulinum_toxins	-0.01
growth_hormone_signaling_pathway	-0.01
Hydrolysis_of_LPC	-0.01
Activation_of_Matrix_Metalloproteinases	-0.01
Viral_Messenger_RNA_Synthesis	-0.01
EGF_receptor_(ErbB1)_signaling_pathway	-0.01
Translocation_of_BoNT_Light_chain	-0.01
PAR4-mediated_thrombin_signaling_events	-0.01
2-LTR_circle_formation	-0.02
Electron_Transport_from_NADPH_to_Ferredoxin	-0.02
aspirin_blocks_signaling_pathway_involved_in_platelet_activation	-0.02
Activation_of_Rac	-0.02
Activation_of_PKB	-0.02
attenuation_of_gpcr_signaling	-0.02
EPHA2_forward_signaling	-0.02
Glucagon_signaling_in_metabolic_regulation	-0.02
Wnt_signaling_network	-0.02
Signaling_by_BMP	-0.02
CD28_dependent_PI3K/Akt_signaling	-0.02
agrin_in_postsynaptic_differentiation	-0.02
Class_C/3_(Metabotropic_glutamate/pheromone_receptors)	-0.02
Acyl_chain_remodelling_of_PS	-0.02
Activation_of_Na-permeable_Kainate_Receptors	-0.02
ADP_signalling_through_P2Y_purinoceptor_1	-0.02
Nonhomologous_End-joining_(NHEJ)	-0.02
Regulation_of_Insulin_Secretion_by_Glucagon-like_Peptide-1	-0.02
Arf1_pathway	-0.02
Alpha-synuclein_signaling	-0.02
angiotensin_ii_mediated_activation_of_jnk_pathway_via_pyk2_dependent_signaling	-0.03

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
ALK2_signaling_events	-0.03
Glycogen_breakdown_(glycogenolysis)	-0.03
Mineralocorticoid_biosynthesis	-0.03
p38_mapk_signaling_pathway	-0.03
TCR_signaling_in_na_ve_CD8__T_cells	-0.03
Striated_Muscle_Contraction	-0.03
DNA-PK_pathway_in_nonhomologous_end_joining	-0.03
pdgf_signaling_pathway	-0.03
Collagen_biosynthesis_and_modifying_enzymes	-0.03
eNOS_activation	-0.03
the_igf-1_receptor_and_longevity	-0.03
HIV-1_Nef__Negative_effector_of_Fas_and_TNF-alpha	-0.03
Acetylcholine_Neurotransmitter_Release_Cycle	-0.03
Amine_ligand-binding_receptors	-0.03
chaperones_modulate_interferon_signaling_pathway	-0.03
Norepinephrine_Neurotransmitter_Release_Cycle	-0.04
Ephrin_A__reverse_signaling	-0.04
Entry_of_Influenza_Virion_into_Host_Cell_via_Endocytosis	-0.04
Facilitative_Na_-independent_glucose_transporters	-0.04
rho_cell_motility_signaling_pathway	-0.04
Endosomal/Vacuolar_pathway	-0.04
Removal_of_aminoterminal_propeptides_from_gamma-carboxylated_proteins	-0.04
Chylomicron-mediated_lipid_transport	-0.04
eukaryotic_protein_translation	-0.04
PI3K/AKT_activation	-0.04
corticosteroids_and_cardioprotection	-0.04
signal_transduction_through_il1r	-0.04
Regulation_of_Insulin_Secretion_by_Acetylcholine	-0.04
Glucose_transport	-0.04
Constitutive_Signaling_by_NOTCH1_HD_Domain_Mutants	-0.04

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
YAP1-_and_WWTR1_(TAZ)-stimulated_gene_expression	-0.04
Acyl_chain_remodelling_of_PE	-0.04
p38MAPK_events	-0.04
Prostacyclin_signalling_through_prostacyclin_receptor	-0.04
Synthesis_of_bile_acids_and_bile_salts_via_24-hydroxycholesterol	-0.04
role_of_erk5_in_neuronal_survival_pathway	-0.04
G_beta_gamma_signalling_through_Pi3Kgamma	-0.04
Abortive_elongation_of_HIV-1_transcript_in_the_absence_of_Tat	-0.04
Acyl_chain_remodeling_of_CL	-0.04
Platelet_sensitization_by_LDL	-0.04
Keratan_sulfate_biosynthesis	-0.04
IGF1_pathway	-0.04
Role_of_Abl_in_Robo-Slit_signaling	-0.04
how_does_salmonella_hijack_a_cell	-0.05
Antigen_Activates_B_Cell_Receptor_Leading_to_Generation_of_Second_Messengers	-0.05
Beta_oxidation_of_palmitoyl-CoA_to_myristoyl-CoA	-0.05
Glucagon-type_ligand_receptors	-0.05
Fructose_catabolism	-0.05
EGFR-dependent_Endothelin_signaling_events	-0.05
Interactions_of_Tat_with_host_cellular_proteins	-0.05
Synthesis_of_PIPs_at_the_Golgi_membrane	-0.05
Potassium_transport_channels	-0.05
Beta_oxidation_of_decanoyl-CoA_to_octanoyl-CoA-CoA	-0.05
Beta_oxidation_of_octanoyl-CoA_to_hexanoyl-CoA	-0.05
igf-1_signaling_pathway	-0.05
erythropoietin_mediated_neuroprotection_through_nf-kb	-0.05
Regulation_of_Lipid_Metabolism_by_Peroxisome_proliferator-activated_receptor_alpha_(PPARalpha)	-0.05
Neurophilin_interactions_with_VEGF_and_VEGFR	-0.05

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
LKB1_signaling_events	-0.05
SHP2_signaling	-0.05
keratinocyte_differentiation	-0.05
inhibition_of_matrix_metalloproteinases	-0.05
Signaling_events_mediated_by_Hepatocyte_Growth_Factor_Receptor_(c-Met)	-0.05
FGFR3c_ligand_binding_and_activation	-0.06
Amino_acid_transport_across_the_plasma_membrane	-0.06
mapkinase_signaling_pathway	-0.06
hypoxia-inducible_factor_in_the_cardiovascular_system	-0.06
prion_pathway	-0.06
Influenza_Life_Cycle	-0.06
bcr_signaling_pathway	-0.06
the_information_processing_pathway_at_the_ifn_beta_enhancer	-0.06
VEGF_binds_to_VEGFR_leading_to_receptor_dimerization	-0.06
Adenylate_cyclase_inhibitory_pathway	-0.06
fmlp_induced_chemokine_gene_expression_in_hmc-1_cells	-0.06
Signalling_to_STAT3	-0.06
PPARA_Activates_Gene_Expression	-0.06
IRAK2_mediated_activation_of_TAK1_complex	-0.06
IRAK2_mediated_activation_of_TAK1_complex_upon_TLR7/8_or_9_stimulation	-0.06
Release	-0.06
FGFR1c_and_Klotho_ligand_binding_and_activation	-0.06
pten_dependent_cell_cycle_arrest_and_apoptosis	-0.06
Caspase-8_activation	-0.06
Peptide_hormone_biosynthesis	-0.06
Signaling_events_regulated_by_Ret_tyrosine_kinase	-0.06
antigen_processing_and_presentation	-0.06
Trk_receptor_signaling_mediated_by_PI3K_and_PLC-gamma	-0.06

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Budding	-0.06
Uncoating_of_the_Influenza_Virion	-0.07
Signaling_by_ERBB2	-0.07
Transport_to_the_Golgi_and_subsequent_modification	-0.07
Regulation_of_gene_expression_in_late_stage_(branching_morphogenesis)_pancreatic_bud_precursor_cells	-0.07
Factors_involved_in_megakaryocyte_development_and_platelet_production	-0.07
Hexose_transport	-0.07
Assembly_of_collagen_fibrils_and_other_multimeric_structures	-0.07
FGFR2b_ligand_binding_and_activation	-0.07
Signaling_by_NOTCH3	-0.07
Interconversion_of_polyamines	-0.07
Downregulation_of_ERBB4_signaling	-0.07
role_of_nicotinic_acetylcholine_receptors_in_the_regulation_of_apoptosis	-0.07
Vasopressin-like_receptors	-0.07
Signalling_to_ERK5	-0.07
minus-strand_DNA_synthesis	-0.07
Activation_of_CaMK_IV	-0.07
Signaling_by_ERBB4	-0.07
Hormone_ligand-binding_receptors	-0.07
Fibronectin_matrix_formation	-0.07
Dimerization_of_procaspace-8	-0.07
Netrin-mediated_signaling_events	-0.07
Activation_myristoylation_of_BID_and_translocation_to_mitochondria	-0.07
APOBEC3G_mediated_resistance_to_HIV-1_infection	-0.08
Signaling_by_FGFR2_amplification_mutants	-0.08
Lysosphingolipid_and_LPA_receptors	-0.08
insulin_signaling_pathway	-0.08
Reversible_Hydration_of_Carbon_Dioxide	-0.08
Release_of_apoptotic_factors_from_the_mitochondria	-0.08
Regulation_of_gene_expression_in_beta_cells	-0.08

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Signaling_events_mediated_by_VEGFR1_and_VEGFR2	-0.08
G2/M_DNA_damage_checkpoint	-0.08
AMPK_inhibits_chREBP_transcriptional_activation_activity	-0.08
Platelet_Aggregation_(Plug_Formation)	-0.08
GRB7_events_in_ERBB2_signaling	-0.08
ucalpain_and_friends_in_cell_spread	-0.08
FGFR1b_ligand_binding_and_activation	-0.08
AKT-mediated_inactivation_of_FOXO1A	-0.08
role_of_pi3k_subunit_p85_in_regulation_of_actin_organization_and_cell_migration	-0.08
MyD88_cascade_initiated_on_plasma_membrane	-0.08
Transport_of_HA_trimer__NA_tetramer_and_M2_tetramer_from_the_endoplasmic_reticulum_to_the_Golgi_Apparatus	-0.08
Activated_point_mutants_of_FGFR2	-0.08
Anchoring_fibril_formation	-0.08
p75NTR_recruits_signalling_complexes	-0.08
Acyl_chain_remodelling_of_PI	-0.08
opposing_roles_of_aif_in_apoptosis_and_cell_survival	-0.08
Glycosphingolipid_metabolism	-0.09
IL2_signaling_events_mediated_by_PI3K	-0.09
N-cadherin_signaling_events	-0.09
Fusion_of_the_Influenza_Virion_to_the_Host_Cell_Endosome	-0.09
PI-3K_cascade	-0.09
Regulation_of_actin_dynamics_for_phagocytic_cup_formation	-0.09
GAB1_signalosome	-0.09
Class_B/2_(Secretin_family_receptors)	-0.09
Nonsense_Mediated_Decay_Enhanced_by_the_Exon_Junction_Complex	-0.09
Translation_initiation_complex_formation	-0.09
Signaling_by_NOTCH4	-0.09
activated_TAK1_mediates_p38_MAPK_activation	-0.09
DARPP-32_events	-0.09

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
erk_and_pi-3_kinase_are_necessary_for_collagen_binding_in_corneal_epithelia	-0.09
Phospholipase_C-mediated_cascade	-0.09
Syndecan-1-mediated_signaling_events	-0.09
CaMK_IV-mediated_phosphorylation_of_CREB	-0.09
EPHA_forward_signaling	-0.09
Hypoxic_and_oxygen_homeostasis_regulation_of_HIF-1-alpha	-0.09
E-cadherin_signaling_in_keratinocytes	-0.09
Formation_of_the_ternary_complex__and_subsequently__the_43S_complex	-0.09
Urea_synthesis	-0.09
Generation_of_extrinsic_Factor_X_activating_complex	-0.09
Synthesis_of_PIPs_at_the_late_endosome_membrane	-0.09
TRAIL_signaling_pathway	-0.09
endocytotic_role_of_ndk_phosphins_and_dynamin	-0.09
Ribosomal_scanning_and_start_codon_recognition	-0.09
the_co-stimulatory_signal_during_t-cell_activation	-0.09
Transcriptional_Regulation_of_White_Adipocyte_Differentiation	-0.10
regulation_of_eif-4e_and_p70s6_kinase	-0.10
il_4_signaling_pathway	-0.10
Assembly_of_Viral_Components_at_the_Budding_Site	-0.10
Constitutive_Signaling_by_NOTCH1_PEST_Domain_Mutants	-0.10
downregulated_of_mta-3_in_er-negative_breast_tumors	-0.10
ccr3_signaling_in_eosinophils	-0.10
Regulation_of_KIT_signaling	-0.10
HIF-1-alpha_transcription_factor_network	-0.10
VEGF_ligand-receptor_interactions	-0.10
Signaling_by_Type_1_Insulin-like_Growth_Factor_1_Receptor_(IGF1R)	-0.10
Toll_Like_Receptor_9_(TLR9)_Cascade	-0.10

(Contd...)



**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
CREB_phosphorylation_through_the_activation_of_CaMKK	-0.10
The_retinoid_cycle_in_cones_(daylight_vision)	-0.10
ErbB1_downstream_signaling	-0.10
Import_of_palmitoyl-CoA_into_the_mitochondrial_matrix	-0.10
Presynaptic_function_of_Kainate_receptors	-0.10
VEGFR3_signaling_in_lymphatic_endothelium	-0.10
regulation_of_pgc-1a	-0.10
Stabilization_of_p53	-0.10
Common_Pathway	-0.10
Voltage_gated_Potassium_channels	-0.10
Scavenging_of_Heme_from_Plasma	-0.10
Mitochondrial_Iron-Sulfur_Cluster_Biogenesis	-0.10
SRP-dependent_cotranslational_protein_targeting_to_membrane	-0.11
Translocation_of GLUT4_to_the_Plasma_Membrane	-0.11
Methylation	-0.11
Alpha4_beta1_integrin_signaling_events	-0.11
cxcr4_signaling_pathway	-0.11
PI3K_Cascade	-0.11
Nef_Mediated_CD8_Down-regulation	-0.11
Vitamin_C_(ascorbate)_metabolism	-0.11
CREB_phosphorylation_through_the_activation_of_Adenylate_Cyclase	-0.11
GABA_B_receptor_activation	-0.11
Lectin_pathway_of_complement_activation	-0.11
Constitutive_Signaling_by_NOTCH1_HD_PEST_Domain_Mutants	-0.11
Synthesis_of_PE	-0.11
Insulin_receptor_mediated_signaling	-0.11
IRF3_mediated_activation_of_type_1_IFN	-0.11
il12_and_stat4_dependent_signaling_pathway_in_th1_development	-0.11
Insulin_Pathway	-0.11
BMP_receptor_signaling	-0.11
Retinoid_metabolism_and_transport	-0.11
Transcription-coupled_NER_(TC-NER)	-0.11

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
tpo_signaling_pathway	-0.11
phospholipids_as_signalling_intermediaries	-0.11
Citric_acid_cycle_(TCA_cycle)	-0.11
chrebp_regulation_by_carbohydrates_and_camp	-0.11
g-protein_signaling_through_tubby_proteins	-0.11
PI3K_events_in_ERBB2_signaling	-0.11
Mitochondrial_Protein_Import	-0.11
Sulfur_amino_acid_metabolism	-0.11
CaM_pathway	-0.11
Growth_hormone_receptor_signaling	-0.11
Xenobiotics	-0.12
HS-GAG_biosynthesis	-0.12
oxidative_stress_induced_gene_expression_via_nrf2	-0.12
Gamma-carboxylation_of_protein_precursors	-0.12
Nitric_oxide_stimulates_guanylate_cyclase	-0.12
Alpha-defensins	-0.12
Downregulation_of_ERBB2_ERBB3_signaling	-0.12
Role_of_second_messengers_in_netrin-1_signaling	-0.12
Endosomal_Sorting_Complex_Required_For_Transport_(ESCRT)	-0.12
erk1/erk2_mapk_signaling_pathway	-0.12
Hormone-sensitive_lipase_(HSL)-mediated_triacylglycerol_hydrolysis	-0.12
Thrombin_signalling_through_proteinase_activated_receptors_(PARs)	-0.12
IL8_and_CXCR1-mediated_signaling_events	-0.12
Androgen_biosynthesis	-0.12
Dopamine_clearance_from_the_synaptic_cleft	-0.12
O-linked_glycosylation_of_mucins	-0.12
Stabilization_and_expansion_of_the_E-cadherin_adherens_junction	-0.12
metabolism_of_anandamide_an_endogenous_cannabinoid	-0.12
Signaling_by_Robo_receptor	-0.12
p130Cas_linkage_to_MAPK_signaling_for_integrins	-0.12
GP1b-IX-V_activation_signalling	-0.12

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Regulation_of_gene_expression_in_early_pancreatic_precursor_cells	-0.12
HDL-mediated_lipid_transport	-0.12
Displacement_of_DNA_glycosylase_by__APE1	-0.12
A_third_proteolytic_cleavage_releases_NICD	-0.12
Regulation_of_AMPK_activity_via_LKB1	-0.12
Prolactin_receptor_signaling	-0.12
Insulin_receptor_recycling	-0.12
Costimulation_by_the_CD28_family	-0.12
fosb_gene_expression_and_drug_abuse	-0.13
BoNT_Light_Chain_Types_B_D_and_F_cleave_VAMP/Synaptobrevin	-0.13
Toll_Like_Receptor_7/8_(TLR7/8)_Cascade	-0.13
NRIF_signals_cell_death_from_the_nucleus	-0.13
Elastic_fibre_formation	-0.13
Sema4D_in_semaphorin_signaling	-0.13
CXCR3-mediated_signaling_events	-0.13
MyD88_dependent_cascade_initiated_on_endosome	-0.13
ERKs_are_inactivated	-0.13
Visual_signal_transduction__Cones	-0.13
Validated_targets_of_C-MYC_transcriptional_repression	-0.13
no2-dependent_il-12_pathway_in_nk_cells	-0.13
Regulation_of_Gene_Expression_by_Hypoxia-inducible_Factor	-0.13
CYP2E1_reactions	-0.13
Rap1_signalling	-0.13
Transport_of_gamma-carboxylated_protein_precursors_from_the_endoplasmic_reticulum_to_the_Golgi_apparatus	-0.13
RSK_activation	-0.13
TCR_signaling_in_na_ve_CD4_T_cells	-0.13
platelet_amyloid_precursor_protein_pathway	-0.13
Opioid_Signalling	-0.13
inhibition_of_huntingtons_disease_neurodegeneration_by_histone_deacetylase_inhibitors	-0.13
Synthesis_of_bile_acids_and_bile_salts	-0.13
Antagonism_of_Activin_by_Follistatin	-0.13

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Ras_signaling_in_the_CD4_TCR_pathway	-0.14
Signaling_by_SCF-KIT	-0.14
Integrin_alphaIb_beta3_signaling	-0.14
IL8_and_CXCR2-mediated_signaling_events	-0.14
integrin_signaling_pathway	-0.14
il_3_signaling_pathway	-0.14
il_2_signaling_pathway	-0.14
PI3K_events_in_ERBB4_signaling	-0.14
L13a-mediated_translational_silencing_of_Ceruloplasmin_expression	-0.14
inhibition_of_cellular_proliferation_by_gleevec	-0.14
tgf_beta_signaling_pathway	-0.14
Signal_attenuation	-0.14
Na_/Cl-_dependent_neurotransmitter_transporters	-0.14
Regulation_of_p38-alpha_and_p38-beta	-0.14
Role_of_phospholipids_in_phagocytosis	-0.14
inactivation_of_gsk3_by_akt_causes_accumulation_of_b-catenin_in_alveolar_macrophages	-0.14
Calcineurin-regulated_NFAT-dependent_transcription_in_lymphocytes	-0.14
Synthesis_of_Ketone_Bodies	-0.14
hypoxia_and_p53_in_the_cardiovascular_system	-0.14
PDGFR-alpha_signaling_pathway	-0.14
Late_Phase_of_HIV_Life_Cycle	-0.14
Synthesis_of_bile_acids_and_bile_salts_via_27-hydroxycholesterol	-0.14
Ceramide_signaling_pathway	-0.14
Adenylate_cyclase_activating_pathway	-0.14
Circadian_Repression_of_Expression_by_REV-ERBA	-0.14
Regulation_of_Insulin_Secretion	-0.14
Regulation_of_Insulin_Secretion_by_Fatty_Acids_Bound_to_GPR40_(FFAR1)	-0.14
AP-1_transcription_factor_network	-0.14
ERK_activation	-0.14
ctcf_first_multivalent_nuclear_factor	-0.14
Glucuronidation	-0.14

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
phospho-PLA2_pathway	-0.14
Membrane_binding_and_targetting_of_GAG_proteins	-0.14
Membrane_binding_and_targetting_of_GAG_proteins_1	-0.14
NOD1/2_Signaling_Pathway	-0.14
ahr_signal_transduction_pathway	-0.14
Transport_of_fatty_acids	-0.14
Respiratory_electron_transport	-0.14
Inhibition_of_Insulin_Secretion_by_Adrenaline/Noradrenaline	-0.15
Peptide_ligand-binding_receptors	-0.15
GTP_hydrolysis_and_joining_of_the_60S_ribosomal_subunit	-0.15
Arf6_trafficking_events	-0.15
ifn_alpha_signaling_pathway	-0.15
sprouty_regulation_of_tyrosine_kinase_signals	-0.15
il-10_anti-inflammatory_signaling_pathway	-0.15
Beta_oxidation_of_hexanoyl-CoA_to_butanoyl-CoA	-0.15
Beta_oxidation_of_butanoyl-CoA_to_acetyl-CoA	-0.15
Beta_oxidation_of_lauroyl-CoA_to_decanoyl-CoA-CoA	-0.15
Transfer_of_LPS_from_LBP_carrier_to_CD14	-0.15
HS-GAG_degradation	-0.15
Synthesis_of_PIPs_at_the_plasma_membrane	-0.15
Regulation_of_Rheb_GTPase_activity_by_AMPK	-0.15
Sema4D_mediated_inhibition_of_cell_attachment_and_migration	-0.15
G_alpha_(z)_signalling_events	-0.15
Recycling_of_bile_acids_and_salts	-0.15
mcalpain_and_friends_in_cell_motility	-0.15
Vitamin_B2_(riboflavin)_metabolism	-0.15
regulation_of_map_kinase_pathways_through_dual_specificity_phosphatases	-0.15
extrinsic_prothrombin_activation_pathway	-0.15
DAI_mediated_induction_of_type_I_IFNs	-0.15
Regulation_of_IFNA_signaling	-0.16

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Nonsense_Mediated_Decay_Independent_of_the_Exon_Junction_Complex	-0.16
FGFR2c_ligand_binding_and_activation	-0.16
Formation_of_a_pool_of_free_40S_subunits	-0.16
Viral_mRNA_Translation	-0.16
Atypical_NF-kappaB_pathway	-0.16
NOTCH1_Intracellular_Domain_Regulates_Transcription	-0.16
Toll_Like_Receptor_10_(TLR10)_Cascade	-0.16
Signaling_events_mediated_by_Stem_cell_factor_receptor_(c-Kit)	-0.16
Calcitonin-like_ligand_receptors	-0.16
Downstream_signal_transduction	-0.16
il_6_signaling_pathway	-0.16
acetylation_and_deacetylation_of_rela_in_nucleus	-0.16
CHL1_interactions	-0.16
TNF_signaling	-0.16
FAS_(CD95)_signaling_pathway	-0.16
BMAL1_CLOCK/NPAS2_Activates_Circadian_Expression	-0.16
Peptide_chain_elongation	-0.16
cd40l_signaling_pathway	-0.16
Ca2__activated_K_channels	-0.16
lck_and_fyn_tyrosine_kinases_in_initiation_of_trc_activation	-0.17
TRAF6_mediated_induction_of_NFkB_and_MAP_kinases_upon_TLR7/8_or_9_activation	-0.17
FasL/_CD95L_signaling	-0.17
Stimuli-sensing_channels	-0.17
Formation_of_ATP_by_chemiosmotic_coupling	-0.17
CXCR4-mediated_signaling_events	-0.17
Negative_regulation_of_FGFR_signaling	-0.17
Glutathione_synthesis_and_recycling	-0.17
Glucocorticoid_receptor_regulatory_network	-0.17
Signal_transduction_by_L1	-0.17
Crosslinking_of_collagen_fibrils	-0.17
GRB2_SOS_provides_linkage_to_MAPK_signaling_for_Intergrins	-0.17

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Class_IB_PI3K_non-lipid_kinase_events	-0.17
phosphoinositides_and_their_downstream_targets	-0.17
Transport_of_organic_anions	-0.17
Beta2_integrin_cell_surface_interactions	-0.17
Regulation_of_Commissural_axon_pathfinding_by_Slit_and_Robo	-0.17
regulators_of_bone_mineralization	-0.17
Eukaryotic_Translation_Termination	-0.17
IRAK1_recruits_IKK_complex	-0.17
IRAK1_recruits_IKK_complex_upon_TLR7/8_or_9_stimulation	-0.17
PKA_activation	-0.17
ifn_gamma_signaling_pathway	-0.17
NGF-independant_TRKA_activation	-0.17
Retinoic_acid_receptors-mediated_signaling	-0.17
Cleavage_of_the_damaged_purine	-0.17
Clathrin_derived_vesicle_budding	-0.17
Pyrimidine_catabolism	-0.17
PKA_activation_in_glucagon_signalling	-0.17
DSCAM_interactions	-0.18
Vpr-mediated_induction_of_apoptosis_by_mitochondrial_outer_membrane_permeabilization	-0.18
cell_to_cell_adhesion_signaling	-0.18
Alpha9_beta1_integrin_signaling_events	-0.18
CD28_co-stimulation	-0.18
Dissolution_of_Fibrin_Clot	-0.18
PDGFR-beta_signaling_pathway	-0.18
Vitamin_D_(calciferol)_metabolism	-0.18
Synthesis_of_pyrophosphates_in_the_cytosol	-0.18
fc_epsilon_receptor_i_signaling_in_mast_cells	-0.18
rho-selective_guanine_exchange_factor_akap13_mediates_stress_fiber_formation	-0.18
Recognition_and_association_of_DNA_glycosylase_with_site_containing_an_affected_purine	-0.18
Dopamine_receptors	-0.18
Inhibition_of_TSC_complex_formation_by_PKB	-0.18
IRS_activation	-0.18

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Synthesis_of_12-eicosatetraenoic_acid_derivatives	-0.18
Advanced_glycosylation_endproduct_receptor_signaling	-0.18
a4b7_Integrin_signaling	-0.18
Hydrolysis_of_LPE	-0.18
Interleukin-6_signaling	-0.18
NCAM1_interactions	-0.18
Interaction_between_L1_and_Ankyrins	-0.18
The_NLRP1_inflammasome	-0.18
Syndecan-4-mediated_signaling_events	-0.18
Interferon_alpha/beta_signaling	-0.18
p38_MAPK_signaling_pathway	-0.18
TGF-beta_receptor_signaling	-0.18
carm1_and_regulation_of_the_estrogen_receptor	-0.19
Oxygen-dependent_Asparagine_Hydroxylation_of_Hypoxia-inducible_Factor_Alpha	-0.19
ERK/MAPK_targets	-0.19
Abnormal_metabolism_in_phenylketonuria	-0.19
ATF-2_transcription_factor_network	-0.19
FCGR_activation	-0.19
S1P2_pathway	-0.19
Activation_of_Ca-permeable_Kainate_Receptor	-0.19
RORA_Activates_Circadian_Expression	-0.19
The_AIM2_inflammasome	-0.19
Regulated_proteolysis_of_p75NTR	-0.19
Synthesis_of_15-eicosatetraenoic_acid_derivatives	-0.19
Osteopontin-mediated_events	-0.19
TGF-beta_receptor_signaling_activates_SMADs	-0.19
Signaling_events_mediated_by_TCPTP	-0.19
S1P1_pathway	-0.20
nfat_and_hypertrophy_of_the_heart	-0.20
ceramide_signaling_pathway	-0.20
Interleukin-1_processing	-0.20
Signaling_by_PDGF	-0.20

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Beta_defensins	-0.20
VEGFR1_specific_signals	-0.20
Signaling_events_mediated_by_focal_adhesion_kinase	-0.20
Serotonin_Neurotransmitter_Release_Cycle	-0.20
Type_I_hemidesmosome_assembly	-0.20
Prostanoid_ligand_receptors	-0.20
Dopamine_Neurotransmitter_Release_Cycle	-0.20
visceral_fat_deposits_and_the_metabolic_syndrome	-0.20
IL27-mediated_signaling_events	-0.20
Sema4D_induced_cell_migration_and_growth-cone_collapse	-0.20
GPVI-mediated_activation_cascade	-0.20
Influenza_Virus_Induced_Apoptosis	-0.20
d4gdi_signaling_pathway	-0.20
regulation_of_bad_phosphorylation	-0.20
ERK2_activation	-0.20
Activated_NOTCH1_Transmits_Signal_to_the_Nucleus	-0.20
Interleukin-1_signaling	-0.21
STING_mediated_induction_of_type_1_IFN	-0.21
Other_semaphorin_interactions	-0.21
Glucocorticoid_biosynthesis	-0.21
Ion_transport_by_P-type_ATPases	-0.21
AKT_phosphorylates_targets_in_the_nucleus	-0.21
human_cytomegalovirus_and_map_kinase_pathways	-0.21
il-7_signal_transduction	-0.21
Fatty_acids	-0.21
PIP3_activates_AKT_signaling	-0.21
Class_I_P13K_signaling_events	-0.21
Validated_nuclear_estrogen_receptor_alpha_network	-0.21
NF-kB_activation_through_FADD/RIP-1_pathway_mediated_by_caspase-8_and_-10	-0.21
TNF_receptor_signaling_pathway	-0.21
IL2-mediated_signaling_events	-0.21
Classical_antibody-mediated_complement_activation	-0.22

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
tsp-1_induced_apoptosis_in_microvascular_endothelial_cell	-0.22
il22_soluble_receptor_signaling_pathway	-0.22
PDGF_receptor_signaling_network	-0.22
Eukaryotic_Translation_Elongation	-0.22
Phagosomal_maturation_(early_endosomal_stage)	-0.22
Creatine_metabolism	-0.22
Netrin_mediated_repulsion_signals	-0.22
LDL-mediated_lipid_transport	-0.22
Free_fatty_acid_receptors	-0.22
Initial_triggering_of_complement	-0.22
Endogenous_sterols	-0.22
IL12_signaling_mediated_by_STAT4	-0.22
Endothelins	-0.22
IL23-mediated_signaling_events	-0.22
Interferon_gamma_signaling	-0.22
Regulation_of_IFNG_signaling	-0.22
cadmium_induces_dna_synthesis_and_proliferation_in_macrophages	-0.22
Downstream_signaling_in_na_ve_CD8_T_cells	-0.23
Constitutive_P13K/AKT_Signaling_in_Cancer	-0.23
COX_reactions	-0.23
ATM_mediated_response_to_DNA_double-strand_break	-0.23
transcription_regulation_by_methyltransferase_of_carm1	-0.23
Regulation_of_Water_Balance_by_Renal_Aquaporins	-0.23
Activation_of_NF-kappaB_in_B_Cells	-0.23
DAP12_interactions	-0.23
Arf6_downstream_pathway	-0.23
Signaling_mediated_by_p38-alpha_and_p38-beta	-0.23
TRAF3-dependent_IRF_activation_pathway	-0.23
melanocyte_development_and_pigmentation_pathway	-0.23
Synthesis_of_Hepoxilins_(HX)_and_Trioxilins_(TrX)	-0.23
Passive_Transport_by_Aquaporins	-0.23

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Urokinase-type_plasminogen_activator_(uPA)_and_uPAR-mediated_signaling	-0.23
Depolarization_of_the_Presynaptic_Terminal_Triggers_the_Opening_of_Calcium_Channels	-0.23
Visual_signal_transduction__Rods	-0.23
Adrenoceptors	-0.23
GMCSF-mediated_signaling_events	-0.23
hiv-1_defeats_host-mediated_resistance_by_cem15	-0.24
Activation_of_the_AP-1_family_of_transcription_factors	-0.24
ATP_sensitive_Potassium_channels	-0.24
eicosanoid_metabolism	-0.24
stat3_signaling_pathway	-0.24
Synthesis_of_5-eicosatetraenoic_acids	-0.24
LPA_receptor_mediated_events	-0.24
amb2_Integrin_signaling	-0.24
Signal_regulatory_protein_(SIRP)_family_interactions	-0.24
CREB_phosphorylation	-0.24
Formyl_peptide_receptors_bind_formyl_peptides_and_many_other_ligands	-0.24
Termination_of_O-glycan_biosynthesis	-0.24
S1P4_pathway	-0.24
alpha-synuclein_and_parkin-mediated_proteolysis_in_parkinson_s_disease	-0.24
ras_signaling_pathway	-0.24
Heme_degradation	-0.24
Eicosanoids	-0.24
Interleukin-2_signaling	-0.24
t_cell_receptor_signaling_pathway	-0.24
hemoglobins_chaperone	-0.24
TGF-beta_receptor_signaling_in_EMT_(epithelial_to_mesenchymal_transition)	-0.24
Abacavir_transmembrane_transport	-0.24
activation_of_csk_by_camp-dependent_protein_kinase_inhibits_signaling_through_the_t_cell_receptor	-0.24
IL6-mediated_signaling_events	-0.24
Tie2_Signaling	-0.24

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
LPA4-mediated_signaling_events	-0.25
Toll_Like_Receptor_TLR1_TLR2_Cascade	-0.25
Nef_Mediated_CD4_Down-regulation	-0.25
G_alpha_(s)_signalling_events	-0.25
Plexin-D1_Signaling	-0.25
Localization_of_the_PINCH-ILK-PARVIN_complex_to_focal_adhesions	-0.25
Eicosanoid_ligand-binding_receptors	-0.25
reversal_of_insulin_resistance_by_leptin	-0.25
The_NLRP3_inflammasome	-0.25
S1P3_pathway	-0.25
Immunoregulatory_interactions_between_a_Lymphoid_and_a_non-Lymphoid_cell	-0.25
role_of_ppar-gamma_coactivators_in_obesity_and_thermogenesis	-0.25
G_alpha_(i)_signaling_events	-0.25
bone_remodeling	-0.25
mtor_signaling_pathway	-0.25
Nef_mediated_downregulation_of_CD28_cell_surface_expression	-0.26
mechanism_of_acetaminophen_activity_and_toxicity	-0.26
Alternative_complement_activation	-0.26
Abacavir_metabolism	-0.26
FOXA1_transcription_factor_network	-0.26
TRAF6_mediated_IRF7_activation_in_TLR7/8_or_9_signaling	-0.26
pertussis_toxin-insensitive_ccr5_signaling_in_macrophage	-0.26
Proteoglycan_syndecan-mediated_signaling_events	-0.26
Nuclear_signaling_by_ERBB4	-0.26
Toll_Like_Receptor_TLR6_TLR2_Cascade	-0.26
Mtb_iron_assimilation_by_chelation	-0.26
FOXA2_and_FOXA3_transcription_factor_networks	-0.26
The_IPAF_inflammasome	-0.26
Activation_of_C3_and_C5	-0.26
PKA-mediated_phosphorylation_of_CREB	-0.26
cGMP_effects	-0.26

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
multi-drug_resistance_factors	-0.26
DAP12_signaling	-0.26
ErbB4_signaling_events	-0.26
Terminal_pathway_of_complement	-0.27
Translocation_of_ZAP-70_to_Immunological_synapse	-0.27
role_of_mef2d_in_t-cell_apoptosis	-0.27
Calcium_signaling_in_the_CD4_TCR_pathway	-0.27
Spry_regulation_of_FGF_signaling	-0.27
FGF_signaling_pathway	-0.27
role_of_parkin_in_ubiquitin-proteasomal_pathway	-0.27
MyD88_Mal_cascade_initiated_on_plasma_membrane	-0.27
S6K1_signalling	-0.27
Monoamines_are_oxidized_to_aldehydes_by_MAOA_and_MAOB__producing_NH3_and_H2O2	-0.27
Phosphorylation_of_CD3_and_TCR_zeta_chains	-0.27
Regulation_of_pyruvate_dehydrogenase_(PDH)_complex	-0.27
Transport_of_Glycerol_from_Adipocytes_to_the_Liver_by_Aquaporins	-0.27
Gastrin-CREB_signalling_pathway_via_PKC_and_MAPK	-0.27
IFN-gamma_pathway	-0.27
cardiac_protection_against_ros	-0.27
role_of_erbB2_in_signal_transduction_and_oncology	-0.27
Nicotinamide_salvaging	-0.27
IL12-mediated_signaling_events	-0.27
Nef_and_signal_transduction	-0.27
ras-independent_pathway_in_nk_cell-mediated_cytotoxicity	-0.27
IL1-mediated_signaling_events	-0.27
PECAM1_interactions	-0.27
intrinsic_prothrombin_activation_pathway	-0.27
P2Y_receptors	-0.27
CREB_phosphorylation_through_the_activation_of_Ras	-0.28

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
PD-1_signaling	-0.28
ABC-family_proteins_mediated_transport	-0.28
Toll_Like_Receptor_4_(TLR4)_Cascade	-0.28
Miscellaneous_substrates	-0.28
Integrin_cell_surface_interactions	-0.28
Proton/oligonucleotide_cotransporters	-0.28
ABCA_transporters_in_lipid_homeostasis	-0.28
Synthesis_of_epoxy_(EET)_and_dihydroyeicosatrienoic_acids_(DHET)	-0.28
Alcohol_catabolism	-0.29
Circadian_Clock	-0.29
Interleukin-7_signaling	-0.29
role_of_-arrestins_in_the_activation_and_targeting_of_map_kinases	-0.29
TAK1_activates_NFkB_by_phosphorylation_and_activation_of_IKKs_complex	-0.29
Cytosolic_sulfonation_of_small_molecules	-0.29
Alternative_NF-kappaB_pathway	-0.29
PLC-mediated_hydrolysis_of_PIP2	-0.29
activation_of_pkc_through_g-protein_coupled_receptors	-0.29
Fibroblast_Growth_Factor_Receptor_(FGFR)_signaling	-0.29
Adrenaline_signalling_through_Alpha-2_adrenergic_receptor	-0.29
tnfr2_signaling_pathway	-0.29
IL3-mediated_signaling_events	-0.29
Downstream_TCR_signaling	-0.29
Binding_and_entry_of_HIV_virion	-0.30
Uptake_of_Carbon_Dioxide_and_Release_of_Oxygen_by_Erythrocytes	-0.30
Uptake_of_Oxygen_and_Release_of_Carbon_Dioxide_by_Erythrocytes	-0.30
JNK_signaling_in_the_CD4_TCR_pathway	-0.30
Arf6_signaling_events	-0.30
Synthesis_of_IP3_and_IP4_in_the_cytosol	-0.30
_arrestins_in_gpcr_desensitization	-0.30
Platelet_Adhesion_to_exposed_collagen	-0.30
NF-kB_is_activated_and_signals_survival	-0.30
Chemokine_receptors_bind_chemokines	-0.30

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Cross-presentation_of_particulate_exogenous_antigens_(phagosomes)	-0.30
Toll_Like_Receptor_3_(TLR3)_Cascade	-0.30
Inflammasomes	-0.30
TRAF6_mediated_IRF7_activation	-0.30
Synthesis_of_Prostaglandins_(PG)_and_Thromboxanes_(TX)	-0.30
Generation_of_second_messenger_molecules	-0.30
roles_of__arrestin_dependent_recruitment_of_src_kinases_in_gpcr_signaling	-0.31
IL5-mediated_signaling_events	-0.31
Syndecan-2-mediated_signaling_events	-0.31
G_alpha_(q)_signaling_events	-0.31
repression_of_pain_sensation_by_the_transcriptional_regulator_dream	-0.31
toll-like_receptor_pathway	-0.31
alternative_complement_pathway	-0.31
Generation_of_intrinsic_Factor_X_activating_complex	-0.32
Tachykinin_receptors_bind_tachykinins	-0.32
Toll_Like_Receptor_5_(TLR5)_Cascade	-0.32
Synthesis_of_PC	-0.32
Neurotransmitter_Clearance_In_The_Synaptic_Cleft	-0.32
Purine_catabolism	-0.32
nfbk_activation_by_nontypeable_hemophilus_influenzae	-0.32
Interleukin-3_5_and_GM-CSF_signaling	-0.32
Cam-PDE_1_activation	-0.32
Integrins_in_angiogenesis	-0.33
SEMA3A-Plexin_repulsion_signaling_by_inhibiting_Integrin_adhesion	-0.33
RIG-I/MDA5_mediated_induction_of_IFN-alpha/beta_pathways	-0.33
Metabolism_of_Angiotensinogen_to_Angiotensins	-0.33
nf-kb_signaling_pathway	-0.33
Cell_surface_interactions_at_the_vascular_wall	-0.33
Class_A/1_(Rhodopsin-like_receptors)	-0.33
phospholipase_c_delta_in_phospholipid_associated_cell_signaling	-0.34

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Signaling_events_mediated_by_PTP1B	-0.34
Synthesis_of_Lipoxins_(LX)	-0.34
Glutathione_conjugation	-0.34
Thromboxane_A2_receptor_signaling	-0.34
Interleukin_receptor_SHC_signaling	-0.34
Trafficking_and_processing_of_endosomal_TLR	-0.35
regulation_of_transcriptional_activity_by_pml	-0.35
cystic_fibrosis_transmembrane_conductance_regulator_(cftr)_and_beta_2_adrenergic_receptor_(b2ar)_pathway	-0.35
BCR_signaling_pathway	-0.35
NOSTRIN_mediated_eNOS_trafficking	-0.35
IL4-mediated_signaling_events	-0.35
Smooth_Muscle_Contraction	-0.35
Negative_regulators_of_RIG-I/MDA5_signaling	-0.35
NCAM_signaling_for_neurite_out-growth	-0.36
basic_mechanism_of_action_of_ppara_pparb(d)_and_pparg_and_effects_on_gene_expression	-0.36
Nuclear_Receptor_transcription_pathway	-0.36
Synthesis_of_PG	-0.36
Endogenous_TLR_signaling	-0.37
Angiopietin_receptor_Tie2-mediated_signaling	-0.37
Molecules_associated_with_elastic_fibres	-0.37
visual_signal_transduction	-0.37
transcriptional_activation_of_dbpb_from_mrna	-0.37
mechanism_of_gene_regulation_by_peroxisome_proliferators_via_ppara	-0.37
RXR_and_RAR_heterodimerization_with_other_nuclear_receptor	-0.37
Synthesis_of_(16-20)-hydroxyeicosatetraenoic_acids_(HETE)	-0.37
lectin_induced_complement_pathway	-0.38
ALK1_signaling_events	-0.38
Regulation_of_Insulin-like_Growth_Factor_(IGF)_Transport_and_Uptake_by_Insulin-like_Growth_Factor_Binding_Proteins_(IGFBPs)	-0.38

(Contd...)



**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
TRAF6_mediated_NF-kB_activation	-0.39
CD40/CD40L_signaling	-0.39
Metal_ion_SLC_transporters	-0.39
EphrinA-EPHA_pathway	-0.40
Platelet_degranulation	-0.40
Arachidonic_acid_metabolism	-0.40
Synthesis_of_Leukotrienes_(LT)_and_Eoxins_(EX)	-0.40
Glypican_1_network	-0.41
Cell-extracellular_matrix_interactions	-0.41
Regulation_of_cytoskeletal_remodeling_and_cell_spreading_by_IPP_complex_components	-0.42

(Contd...)

**Supplementary Table 1: (Continued).**

Constituent PARADIGM pathways	Corr with ESPL1 in LMS
Iron_uptake_and_transport	-0.42
TRIF-mediated_programmed_cell_death	-0.42
RIP-mediated_NFkB_activation_via_DAI	-0.42
Regulation_of_Complement_cascade	-0.43
Synthesis_Secretion_and_Deacylation_of_Ghrelin	-0.43
Activation_of_IRF3/IRF7_mediated_by_TBK1/IKK_epsilon	-0.44
MyD88-independent_cascade	-0.45
TRAF6_mediated_induction_of_TAK1_complex	-0.48
classical_complement_pathway	-0.51
IKK_complex_recruitment_mediated_by_RIP1	-0.55
Cellular_roles_of_Anthrax_toxin	-0.55

**Supplementary Table 2:** 200 chromatin regulators and transcription factors that potentially bind to the *ESPL1* promoter within 1 kb of the transcription start site.

GSM_ID	Factor	Biosource	RP_score
ENCSR076EZB_2	KLF9	HEK293; Epithelium; Embryonic Kidney	0.96037847
GSM1937943	CREB1	KG1; Acute myeloid leukemia	0.95678675
GSM1305211	RELA	Endothelial Cell; Umbilical Vein	0.884357
GSM1038271	BRD4	MM1.S; B Lymphocyte; Blood	0.8600192
ENCSR125ZYC_1	KLF9	MCF-7; Epithelium; Breast	0.85530543
GSM317582	H2AZ	Haematopoietic Progenitor Cell; Bone Marrow	0.8261098
ENCSR462FWS_1	ZNF101	HEK293; Epithelium; Embryonic Kidney	0.82363474
GSM2330560	EP300	SUM159PT; Mammary carcinoma cell; Breast	0.8208556
GSM566161	GATAD1	HeLa; Epithelium; Cervix	0.8057041
GSM1634922	HIF1A	HeLa; Epithelium; Cervix	0.80186856
GSM945604	IRF5	Monocyte; Blood	0.7771577
GSM2628094	NFKB1	GM12878; Lymphoblastoid	0.76077586
ENCSR000HPG_2	SMC3	IMR90; Fibroblast; Lung	0.7472481
GSM417820	H2AZ	T Lymphocyte; Blood	0.7443769
GSM1920690	ARNTL	U2OS; Osteosarcoma cell	0.7380772
GSM614613	RAD21	MCF-7; Epithelium; Breast	0.7334963
GSM941218	SMC1A	LCL; Lymphoblastoid; Blood	0.7263242
GSM1922079	JMJD6	IN528	0.72535497
GSM896988	MYC	BJ; Fibroblast; Skin	0.7206001
ENCSR426MDV_2	MIER1	K562; Erythroblast; Bone Marrow	0.7181818
GSM1517095	EP300	HeLa; Epithelium; Cervix	0.7067138

(Contd...)

**Supplementary Table 2: (Continued).**

GSM_ID	Factor	Biosource	RP_score
GSM2628090	RELB	GM12878; Lymphoblastoid	0.70551676
GSM763402	BCL6	OCI-Ly1; B cell lymphoma; Bone Marrow	0.7009909
GSM803390	IRF4	GM12878; B Lymphocyte; Blood	0.6962323
GSM1463465	POLR2A	VCaP; Epithelium; Prostate	0.69609374
GSM717401	HDAC2	VCaP; Epithelium; Prostate	0.6939324
GSM1622607	SUMO2	K562; Erythroblast; Bone Marrow	0.6926441
GSM803454	GABPA	HeLa-S3; Epithelium; Cervix	0.69251543
GSM486318	RELA	GM12878; B Lymphocyte; Blood	0.68800306
GSM486283	RELA	GM19099; Lymphoblastoid; Blood	0.6874528
GSM2065879	SP1	HCT-116; Colon cancer cell; Colon	0.6860691
GSM1010897	YY1	SK-N-SH; Neuroblastoma cell; Brain	0.6843532
GSM2436683	MKL2	A673; Polygonal; Muscle	0.6835536
GSM803399	POLR2A	GM12891; Lymphoblastoid; Blood	0.6827262
GSM1777598	SUMO2	VCaP; Epithelium; Prostate	0.68038744
GSM2419820	RELA	Detroit 562; Detroit 562 cells	0.6768034
GSM566155	GATAD1	HeLa; Epithelium; Cervix	0.6749049
GSM830122	TP63	Keratinocyte	0.6736449
GSM1622626	SUMO2	VCaP; Epithelium; Prostate	0.6736322
GSM2642504	POLR2A	HeLa; Epithelium; Cervix	0.6734075
GSM486308	RELA	GM18951; Lymphoblastoid; Blood	0.673106
GSM935411	JUN	K562; Erythroblast; Bone Marrow	0.6726391
GSM487425	JUN	K562; Erythroblast; Bone Marrow	0.6726391
ENCSR400FSM_2	POLR2H	K562; Erythroblast; Bone Marrow	0.66906476
GSM1480741	T	TSU-1621-MT	0.6681631
GSM1057011	STAT1	Monocyte; Blood	0.66722125
GSM971335	SMARCA4	Blood	0.6648271
GSM588928	TFAP2A	MCF-7; Epithelium; Breast	0.6637135
ENCSR224QDY_1	ZNF121	HEK293; Epithelium; Embryonic Kidney	0.66331995
GSM1442890	RB1	IMR90; Fibroblast; Lung	0.6625242
ENCSR400FSM_1	POLR2H	K562; Erythroblast; Bone Marrow	0.6624416
GSM520384	PHF8	Hs68; Fibroblast; Foreskin	0.66019046
ENCSR382GSF_1	INSM2	HEK293; Epithelium; Embryonic Kidney	0.65740746
GSM2103048	RELA	BEAS-2B; Epithelium; Lung	0.6568005
GSM486322	RELA	GM12891; Lymphoblastoid; Blood	0.6510685
ENCSR744XTG_1	SUZ12	GM12878; B Lymphocyte; Blood	0.65000004
ENCSR862QUL_1	ZNF382	HEK293; Epithelium; Embryonic Kidney	0.6477946
ENCSR091GVJ_1	ATF1	K562; Erythroblast; Bone Marrow	0.64534885
ENCSR293QAR_1	MTA2	GM12878; B Lymphocyte; Blood	0.64234054

(Contd...)

**Supplementary Table 2: (Continued).**

GSM_ID	Factor	Biosource	RP_score
GSM2676807	POLR2A	J-Lat A72	0.6401809
GSM2224584	TFAP4	COLO-320; Colorectal cancer cell line	0.6380241
GSM2676804	POLR2A	J-Lat A72	0.63630533
ENCSR411UYA_1	MTA2	K562; Erythroblast; Bone Marrow	0.6342711
GSM818008	H2AZ	IMR90; Fibroblast; Lung	0.63403386
GSM2212239	MED1	SEM; B Lymphocyte	0.63241863
ENCSR337NWW_2	HDAC2	HepG2; Epithelium; Liver	0.6322451
ENCSR075HTM_2	HDAC2	K562; Erythroblast; Bone Marrow	0.63141227
ENCSR698CKZ_1	H2AFZ	MM.1S; B Lymphoblast; Blood	0.6287425
GSM2670871	ESR1	LTED; Breast	0.6264151
GSM2670868	ESR1	SUM44; Breast	0.6238004
ENCSR004GKA_1	ZEB2	K562; Erythroblast; Bone Marrow	0.62114537
GSM2371331	DDX21	HeLa; Epithelium; Cervix	0.6209068
GSM1602667	GATA3	SH-SY5Y; Bone Marrow	0.62077594
ENCSR338DGO_1	SCRT2	HEK293; Epithelium; Embryonic Kidney	0.62077594
GSM1684573	CTCF	PANC-1; Pancreas	0.6203136
GSM733774	H2AZ	HepG2; Epithelium; Liver	0.62005377
ENCSR224QDY_2	ZNF121	HEK293; Epithelium; Embryonic Kidney	0.61991876
ENCSR091GVJ_2	ATF1	K562; Erythroblast; Bone Marrow	0.61926305
GSM1556334	RELB	L1236; Hodgkin Lymphoma Cell	0.6175131
ENCSR130PDE_2	NR4A1	K562; Erythroblast; Bone Marrow	0.61734027
ENCSR005NMT_2	ID3	K562; Erythroblast; Bone Marrow	0.6156417
GSM803334	PAX5	GM12892; Lymphoblastoid; Blood	0.6128059
ENCSR011CKE_2	ZNF2	HEK293; Epithelium; Embryonic Kidney	0.61258924
GSM1446926	POLR2A	Keratinocyte	0.6124771
GSM2029581	EP300	ZR-75-30	0.6123839
GSM2592805	POLR2A	Macrophage; Blood	0.61219144
GSM2977505	FOXA2	BJ; Fibroblast; Skin	0.61203194
GSM1177769	POLR2A	U2OS; Bone	0.611657
ENCSR157TCS_1	SMARCE1	K562; Erythroblast; Bone Marrow	0.6115336
ENCSR631WAA_2	ZBTB17	HEK293; Epithelium; Embryonic Kidney	0.61096776
ENCSR125ZYC_2	KLF9	MCF-7; Epithelium; Breast	0.6105344
ENCSR461ZJT_1	ZNF501	HEK293; Epithelium; Embryonic Kidney	0.6102988
ENCSR768HOH_2	ZNF324	HEK293; Epithelium; Embryonic Kidney	0.60980266
ENCSR125DNC_1	ZNF394	HEK293; Epithelium; Embryonic Kidney	0.6092965
GSM1574273	ELF3	CFPAC-1; Pancreatic ductal	0.6082589
GSM748554	POLR2A	K562; Erythroblast; Bone Marrow	0.6080662
ENCSR417VWF_2	ZEB2	HEK293; Epithelium; Embryonic Kidney	0.6080341

(Contd...)

**Supplementary Table 2: (Continued).**

GSM_ID	Factor	Biosource	RP_score
ENCSR130PDE_1	NR4A1	K562; Erythroblast; Bone Marrow	0.60784316
ENCSR494PWZ_1	ZC3H8	K562; Erythroblast; Bone Marrow	0.6073171
ENCSR744XTG_2	SUZ12	GM12878; B Lymphocyte; Blood	0.60674155
ENCSR115SMW_2	PKNOX1	K562; Erythroblast; Bone Marrow	0.60613495
GSM1642761	SPI1	786-O; Epithelium; Kidney	0.60582525
ENCSR462FWS_2	ZNF101	HEK293; Epithelium; Embryonic Kidney	0.60469544
GSM1233885	STAG1	GM10847; Lymphoblastoid; Blood	0.60459346
GSM2789805	POLR2A	K562; Leukemia	0.60446376
GSM1817193	NR2F1	Neural crest cell; Cranial	0.6019596
ENCSR715CCR_2	DPF2	K562; Erythroblast; Bone Marrow	0.60160595
ENCSR263DFP_1	PBX2	K562; Erythroblast; Bone Marrow	0.6013269
ENCSR004GKA_2	ZEB2	K562; Erythroblast; Bone Marrow	0.60096735
ENCSR093FKD_2	CREB3	K562; Erythroblast; Bone Marrow	0.6006061
ENCSR587OQL_1	SMARCA4	K562; Erythroblast; Bone Marrow	0.59975445
GSM1233931	STAG1	GM12890; Lymphoblastoid; Blood	0.5996321
ENCSR033VAZ_1	TARDBP	K562; Erythroblast; Bone Marrow	0.59951603
GSM1684574	CTCF	PANC-1; Pancreas	0.5993421
GSM1579357	POLR2A	Embryonic Stem Cell	0.59918886
GSM588927	TEAP2A	MCF-7; Epithelium; Breast	0.5990629
GSM2741777	ZFX	Kidney	0.5986532
ENCSR559IOZ_2	ZXDB	HEK293; Epithelium; Embryonic Kidney	0.59826946
ENCSR874AFU_1	IKZF1	GM12878; B Lymphocyte; Blood	0.5979
GSM1901547	JMJD1C	NB4; Promyelocytic cell; Blood	0.5976444
GSM1467734	TRIM28	Embryonic Stem Cell; Embryo	0.59739417
GSM1288792	TRIM28	Hematopoietic Stem Cell	0.5973011
ENCSR697CUP_2	HCFC1	MCF-7; Epithelium; Breast	0.5960832
ENCSR524BUE_2	RAD51	K562; Erythroblast; Bone Marrow	0.59532374
ENCSR157TCS_2	SMARCE1	K562; Erythroblast; Bone Marrow	0.5951929
GSM2687535	TET2	Monocyte; Blood	0.5946745
GSM2090921	BRD4	MOLT-4; T Lymphoblast	0.59436786
ENCSR966PJJ_1	WT1	HEK293; Epithelium; Embryonic Kidney	0.59422034
GSM2257956	H2AZ	A549; Epithelium; Lung	0.5931284
ENCSR418MKG_1	ZNF692	HEK293; Epithelium; Embryonic Kidney	0.5930372
ENCSR894CGX_2	SUPT5H	K562; Erythroblast; Bone Marrow	0.5923031
GSM763404	BCL6	OCI-Ly1; B cell lymphoma; Bone Marrow	0.59181356
ENCSR033VAZ_2	TARDBP	K562; Erythroblast; Bone Marrow	0.59175533
GSM2443987	ESR1	Breast	0.5916262
GSM1164245	POLR2A	GM18508; Lymphoblastoid; Blood	0.5916017

(Contd...)

**Supplementary Table 2: (Continued).**

GSM_ID	Factor	Biosource	RP_score
GSM1684572	CTCF	PANC-1; Pancreas	0.5913621
ENCSR559IOZ_1	ZXDB	HEK293; Epithelium; Embryonic Kidney	0.5911271
ENCSR189YYK_2	ZBTB40	GM12878; B Lymphocyte; Blood	0.5911004
ENCSR481FEC_1	ZBTB8A	HEK293; Epithelium; Embryonic Kidney	0.5908268
ENCSR936XTK_1	ZNF143	GM12878; B Lymphocyte; Blood	0.59071475
ENCSR031TFS_2	POLR2A	K562; Erythroblast; Bone Marrow	0.59044164
ENCSR675LRO_2	MLLT1	K562; Erythroblast; Bone Marrow	0.59029126
ENCSR587OQL_2	SMARCA4	K562; Erythroblast; Bone Marrow	0.590043
GSM1234059	STAG1	GM19099; Lymphoblastoid; Blood	0.589375
GSM1891656	NRF1	Epithelium	0.5887176
ENCSR017QBI_1	ZNF600	HEK293; Epithelium; Embryonic Kidney	0.5886654
ENCSR075HTM_1	HDAC2	K562; Erythroblast; Bone Marrow	0.5868077
ENCSR031TFS_1	POLR2A	K562; Erythroblast; Bone Marrow	0.58653843
GSM2090919	BRD4	MOLT-4; T Lymphoblast	0.5862478
ENCSR835XKS_2	TRIM22	GM12878; B Lymphocyte; Blood	0.58606064
ENCSR894CGX_1	SUPT5H	K562; Erythroblast; Bone Marrow	0.5855536
ENCSR106FRG_2	TAL1	K562; Erythroblast; Bone Marrow	0.5854592
GSM2113335	POLR2A	A549; Epithelium; Lung	0.58515024
GSM935606	TBP	HeLa-S3; Epithelium; Cervix	0.5847797
GSM2090923	CDK9	MOLT-4; T Lymphoblast	0.58435965
ENCSR381VYR_1	ZFP69B	HEK293; Epithelium; Embryonic Kidney	0.58426964
GSM1684571	CTCF	PANC-1; Pancreas	0.58383036
ENCSR835XKS_1	TRIM22	GM12878; B Lymphocyte; Blood	0.58373207
ENCSR413ABE_1	ZFP2	HEK293; Epithelium; Embryonic Kidney	0.58368075
GSM1905390	POLR2A	C4-2; Prostate	0.5828367
ENCSR966PJJ_2	WT1	HEK293; Epithelium; Embryonic Kidney	0.582566
ENCSR115SMW_1	PKNOX1	K562; Erythroblast; Bone Marrow	0.58151853
GSM2026055	TAL1	Kasumi-1; Acute myeloid leukemia	0.5812464
GSM2789809	FAM208A	K562; Leukemia	0.5811708
ENCSR936XTK_2	ZNF143	GM12878; B Lymphocyte; Blood	0.58056873
ENCSR302AWT_2	FOXK2	K562; Erythroblast; Bone Marrow	0.5803732
GSM2789804	POLR2A	K562; Leukemia	0.5798713
ENCSR141PZA_2	SP3	HEK293; Epithelium; Embryonic Kidney	0.57904196
ENCSR617IFZ_2	CTCF	HEK293; Epithelium; Embryonic Kidney	0.57894737
ENCSR159GFL_1	ZNF518A	HEK293; Epithelium; Embryonic Kidney	0.57856274
GSM2676810	POLR2A	J-Lat A72	0.5785276
ENCSR085QEV_2	NBN	K562; Erythroblast; Bone Marrow	0.5783718
ENCSR167JBG_2	DIDO1	K562; Erythroblast; Bone Marrow	0.5780591

(Contd...)

**Supplementary Table 2: (Continued).**

GSM_ID	Factor	Biosource	RP_score
GSM2643539	BRD4	LCL; Lymphoblastoid; Blood	0.5776614
GSM2741776	ZFX	Kidney	0.57766026
GSM2132552	E2F1	MM1.S; Multiple myeloma cell	0.5774156
GSM2443983	ESR1	Breast	0.5766687
ENCSR173AIR_1	CTCF	Stomach	0.57664675
GSM1976292	E2F1	Raji; B Lymphocyte; Blood	0.57596767
ENCSR234HEM_1	CTCF	Spleen	0.575776
GSM2090926	CDK9	MOLT-4; T Lymphoblast	0.5751634
GSM2643540	BRD4	LCL; Lymphoblastoid; Blood	0.5751596
GSM2364547	AFF1	SEM; B Lymphocyte	0.5750153
ENCSR106FRG_1	TAL1	K562; Erythroblast; Bone Marrow	0.5748825
GSM1587787	ZNF143	U937; Monocyte	0.57430434
ENCSR350XWY_2	C11orf30	K562; Erythroblast; Bone Marrow	0.5741969
GSM1234238	STAG1	MS1; Lymphoblastoid; Blood	0.5741379
GSM935592	TRIM28	HEK293; Epithelium; Embryonic Kidney	0.5739751
ENCSR524BUE_1	RAD51	K562; Erythroblast; Bone Marrow	0.5735646
ENCSR322CFO_1	ZEB2	K562; Erythroblast; Bone Marrow	0.5735204
ENCSR715CCR_1	DPF2	K562; Erythroblast; Bone Marrow	0.572973
GSM1234160	STAG1	GM2255; Lymphoblastoid; Blood	0.57282114
ENCSR331BDJ_2	NKRF	K562; Erythroblast; Bone Marrow	0.5726341
GSM2330549	BRD4	SUM159PT; Mammary carcinoma cell; Breast	0.57242584
GSM2670869	ESR1	SUM44; Breast	0.5720824
ENCSR237VLT_2	ZBTB40	K562; Erythroblast; Bone Marrow	0.5720141
ENCSR668HOP_1	ZNF580	HEK293; Epithelium; Embryonic Kidney	0.57194674
ENCSR948VFL_2	IKZF1	K562; Erythroblast; Bone Marrow	0.5719403
ENCSR322CFO_2	ZEB2	K562; Erythroblast; Bone Marrow	0.5715254
ENCSR692ILH_1	CTCF	Spleen	0.5715163