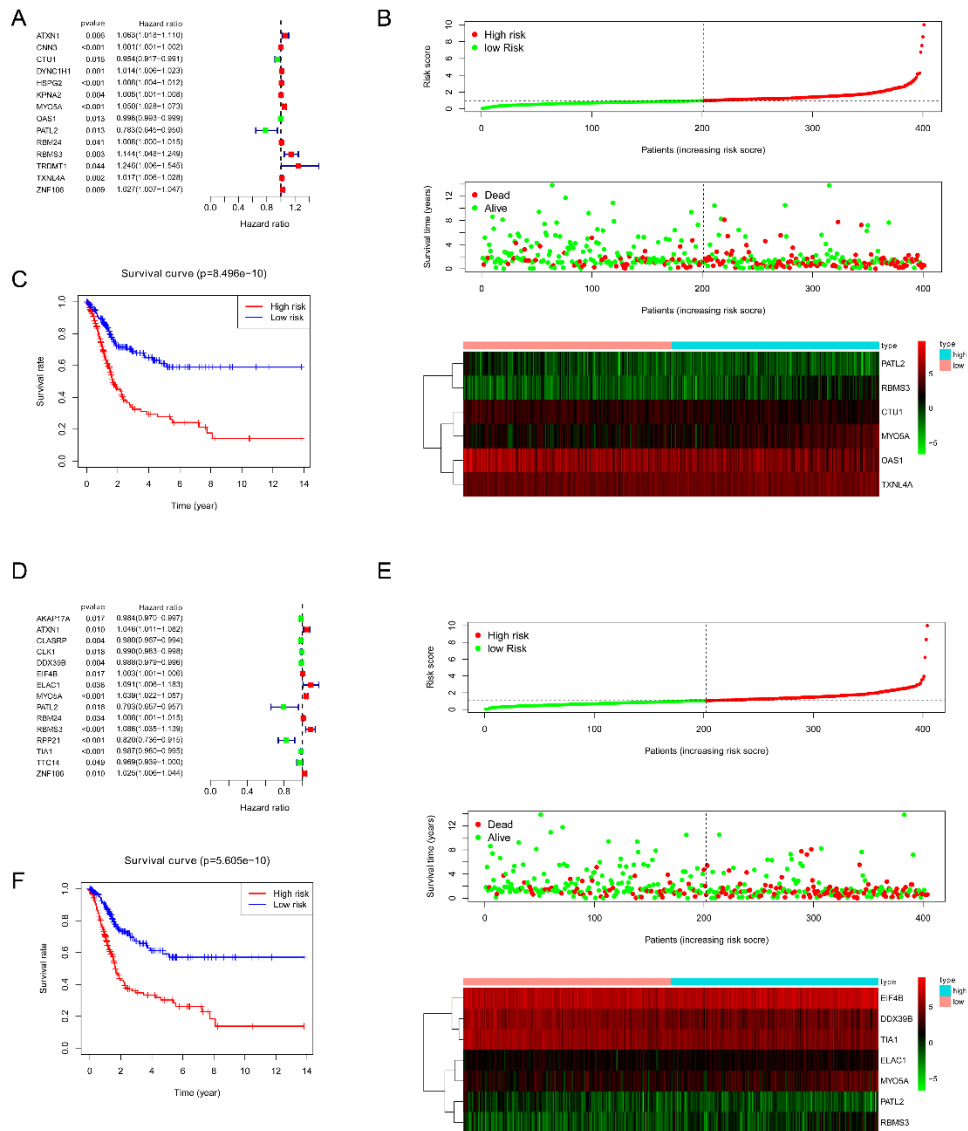
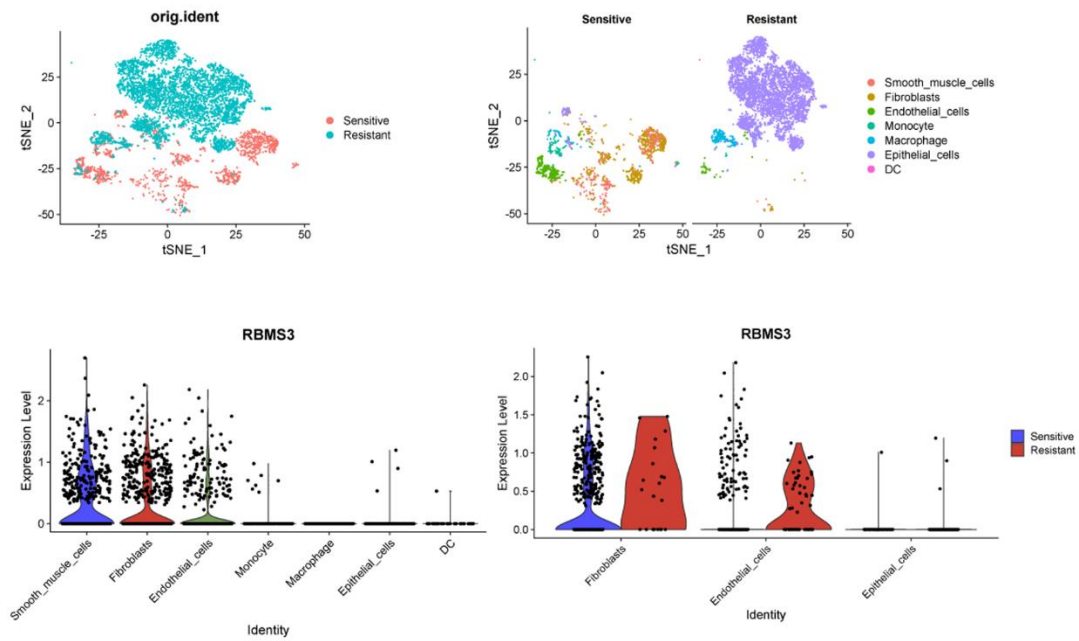


Supplementary figure 1. Heatmap of the 111 DERBPs between the normal and tumor groups.



Supplementary figure 2. Construction of the prognostic miRNA-correlated and lncRNA-correlated RBPs signature. (A) Survival related miRNA-correlated and (D) lncRNA-correlated RBPs were obtained by uni Cox regression, $p < 0.05$. The prognostic miRNA-correlated RBPs were visualized by forest plot. (B) Risk score model, survival status and expression of the 6 miRNA-correlated RBP genes and (E) 7 lncRNA-correlated RBPs in TCGA-BLCA cancer patients. (C) Kaplan-Meier survival analysis of TCGA-BLCA cancer patients based on the miRNA-correlated RBP risk score and (F) lncRNA-correlated RBP risk score.



Supplementary figure 3. RBMS3 expression was increased in recurrent bladder cancer tissue.

scRNA-Seq data (GSE192575) which containing chemotherapy-sensitive and resistant human bladder cancers was obtained from the GEO. (A) tSNE plot of cells from the two tissue samples. (B) tSNE plot of the cell clusters split according to origin. (C) VlnPlot of RBMS3 expression according to cell type. (D) RBMS3 expression in epithelial, endothelial, and fibroblast cells split according to origin.

Supplementary table 1. Gsea report for high-risk group

NAME	GS follow link to MSigDB	SIZE	FDR q-val
KEGG_FOCAL_ADHESION	KEGG_FOCAL_ADHESION	196	0
KEGG_REGULATION_OF_ACTIN_ CYTOSKELETON	KEGG_REGULATION_OF_ACTIN_CYTOSKE LETON	211	0
KEGG_MELANOMA	KEGG_MELANOMA	71	3.35E- 04
KEGG_ADHERENS_JUNCTION	KEGG_ADHERENS_JUNCTION	68	2.52E- 04
KEGG_GAP_JUNCTION	KEGG_GAP_JUNCTION	88	2.01E- 04
KEGG_ECM_RECEPTOR_INTERACTION	KEGG_ECM_RECEPTOR_INTERACTION	84	1.68E- 04
KEGG_RENAL_CELL_CARCINOMA	KEGG_RENAL_CELL_CARCINOMA	66	1.44E- 04
KEGG_DILATED_CARDIOMYOPATHY	KEGG_DILATED_CARDIOMYOPATHY	90	1.26E- 04
KEGG_PATHWAYS_IN_CANCER	KEGG_PATHWAYS_IN_CANCER	322	2.24E- 04
KEGG_HYPERTROPHIC_CARDIOMYOPAT HY_HCM	KEGG_HYPERTROPHIC_CARDIOMYOPAT HY_HCM	83	5.15E- 04
KEGG_TGF_BETA_SIGNALING_PATHWAY	KEGG_TGF_BETA_SIGNALING_PATHWAY	85	4.68E- 04
KEGG_PROGESTERONE_MEDIATED_OOC YTE_MATURATION	KEGG_PROGESTERONE_MEDIATED_OOC YTE_MATURATION	85	4.29E- 04
KEGG_COLORECTAL_CANCER	KEGG_COLORECTAL_CANCER	62	3.96E- 04
KEGG_ARRHYTHMOGENIC_RIGHT_VENTR ICULAR_CARDIOMYOPATHY_ARVC	KEGG_ARRHYTHMOGENIC_RIGHT_VENTR ICULAR_CARDIOMYOPATHY_ARVC	74	4.38E- 04
KEGG_GLIOMA	KEGG_GLIOMA	65	4.09E- 04
KEGG_WNT_SIGNALING_PATHWAY	KEGG_WNT_SIGNALING_PATHWAY	150	3.83E- 04
KEGG_OOCYTE_MEIOSIS	KEGG_OOCYTE_MEIOSIS	111	4.20E- 04
KEGG_PANCREATIC_CANCER	KEGG_PANCREATIC_CANCER	69	6.82E- 04
KEGG_LONG_TERM_POTENTIATION	KEGG_LONG_TERM_POTENTIATION	70	8.89E- 04
KEGG_AXON_GUIDANCE	KEGG_AXON_GUIDANCE	128	8.44E- 04
KEGG_PATHOGENIC_ESCHERICHIA_COLI_ INFECTION	KEGG_PATHOGENIC_ESCHERICHIA_COLI_ INFECTION	56	8.04E- 04

KEGG_PURINE_METABOLISM	KEGG_PURINE_METABOLISM	153	0.0010 69991
KEGG_CELL_CYCLE	KEGG_CELL_CYCLE	124	0.0011 99281
KEGG_CHRONIC_MYELOID_LEUKEMIA	KEGG_CHRONIC_MYELOID_LEUKEMIA	73	0.0012 48657
KEGG_MELANOGENESIS	KEGG_MELANOGENESIS	101	0.0011 98711
KEGG_MAPK_SIGNALING_PATHWAY	KEGG_MAPK_SIGNALING_PATHWAY	266	0.0013 18439
KEGG_TIGHT_JUNCTION	KEGG_TIGHT_JUNCTION	127	0.0016 2522
KEGG_SNARE_INTERACTIONS_IN_VESICULAR_TRANSPORT	KEGG_SNARE_INTERACTIONS_IN_VESICULAR_TRANSPORT	38	0.0021 35719
KEGG_LEUKOCYTE_TRANSENDOTHELIAL_MIGRATION	KEGG_LEUKOCYTE_TRANSENDOTHELIAL_MIGRATION	114	0.0022 21169
KEGG_AMINO_SUGAR_AND_NUCLEOTIDE_SUGAR_METABOLISM	KEGG_AMINO_SUGAR_AND_NUCLEOTIDE_SUGAR_METABOLISM	42	0.0021 4713
KEGG_VEGF_SIGNALING_PATHWAY	KEGG_VEGF_SIGNALING_PATHWAY	76	0.0021 18252
KEGG_PRION_DISEASES	KEGG_PRION_DISEASES	35	0.0026 78719
KEGG_NEUROTROPHIN_SIGNALING_PATHWAY	KEGG_NEUROTROPHIN_SIGNALING_PATHWAY	125	0.0027 94859
KEGG_CHEMOKINE_SIGNALING_PATHWAY	KEGG_CHEMOKINE_SIGNALING_PATHWAY	186	0.0028 13148
KEGG_CELL_ADHESION_MOLECULES_CAMFS	KEGG_CELL_ADHESION_MOLECULES_CAMFS	128	0.0027 32772
KEGG_GALACTOSE_METABOLISM	KEGG_GALACTOSE_METABOLISM	25	0.0031 60057
KEGG_PROSTATE_CANCER	KEGG_PROSTATE_CANCER	89	0.0032 80647
KEGG_ACUTE_MYELOID_LEUKEMIA	KEGG_ACUTE_MYELOID_LEUKEMIA	57	0.0032 72257
KEGG_ENDOMETRIAL_CANCER	KEGG_ENDOMETRIAL_CANCER	52	0.0033 04843
KEGG_GLYCOLYSIS_GLUONEOGENESIS	KEGG_GLYCOLYSIS_GLUONEOGENESIS	61	0.0036 20115
KEGG_N_GLYCAN_BIOSYNTHESIS	KEGG_N_GLYCAN_BIOSYNTHESIS	46	0.0036 34384
KEGG_GLYOXYLATE_AND_DICARBOXYLATE_METABOLISM	KEGG_GLYOXYLATE_AND_DICARBOXYLATE_METABOLISM	16	0.0038 38852
KEGG_GLYCOSAMINOGLYCAN_BIOSYNTHESIS_CHONDROITIN_SULFATE	KEGG_GLYCOSAMINOGLYCAN_BIOSYNTHESIS_CHONDROITIN_SULFATE	22	0.0040 53847

KEGG_CALCIIUM_SIGNALING_PATHWAY	KEGG_CALCIIUM_SIGNALING_PATHWAY	177	0.0040 06905
KEGG_VIBRIO_CHOLERAЕ_INFECTION	KEGG_VIBRIO_CHOLERAЕ_INFECTION	54	0.0040 32578
KEGG_ENDOCYTOSIS	KEGG_ENDOCYTOSIS	179	0.0040 28366
KEGG_EPITHELIAL_CELL_SIGNALING_IN_H ELICOBACTER_PYLORI_INFECTION	KEGG_EPITHELIAL_CELL_SIGNALING_IN_H ELICOBACTER_PYLORI_INFECTION	68	0.0041 50936
KEGG_RENIN_ANGIOTENSIN_SYSTEM	KEGG_RENIN_ANGIOTENSIN_SYSTEM	17	0.0046 09982
KEGG_BLADDER_CANCER	KEGG_BLADDER_CANCER	41	0.0050 69366
KEGG_VASCULAR_SMOOTH_MUSCLE_CO NTRACTION	KEGG_VASCULAR_SMOOTH_MUSCLE_CO NTRACTION	112	0.0050 35191
KEGG_LONG_TERM_DEPRESSION	KEGG_LONG_TERM_DEPRESSION	68	0.0053 25111
KEGG_FC_GAMMA_R_MEDIATED_PHAGO CYTOSIS	KEGG_FC_GAMMA_R_MEDIATED_PHAGO CYTOSIS	96	0.0083 27182
KEGG_SMALL_CELL_LUNG_CANCER	KEGG_SMALL_CELL_LUNG_CANCER	84	0.0086 15434
KEGG_THYROID_CANCER	KEGG_THYROID_CANCER	29	0.0100 82968
KEGG_PYRIMIDINE_METABOLISM	KEGG_PYRIMIDINE_METABOLISM	97	0.0101 20555
KEGG_ERBB_SIGNALING_PATHWAY	KEGG_ERBB_SIGNALING_PATHWAY	86	0.0100 96646
KEGG_NON_SMALL_CELL_LUNG_CANCER	KEGG_NON_SMALL_CELL_LUNG_CANCER	54	0.0101 0354
KEGG_GLYCOSAMINOGLYCAN_BIOSYNT HESIS_HEPARAN_SULFATE	KEGG_GLYCOSAMINOGLYCAN_BIOSYNT HESIS_HEPARAN_SULFATE	26	0.0108 86219
KEGG_UBIQUITIN_MEDIATED_PROTEOLY SIS	KEGG_UBIQUITIN_MEDIATED_PROTEOLY SIS	130	0.0117 45364
KEGG_MTOR_SIGNALING_PATHWAY	KEGG_MTOR_SIGNALING_PATHWAY	51	0.0118 41347
KEGG_NOD_LIKE_RECEPTOR_SIGNALING_ PATHWAY	KEGG_NOD_LIKE_RECEPTOR_SIGNALING_ PATHWAY	61	0.0117 52124
KEGG_NEUROACTIVE_LIGAND_RECEPTO R_INTERACTION	KEGG_NEUROACTIVE_LIGAND_RECEPTO R_INTERACTION	271	0.0119 22025
KEGG_PENTOSE_PHOSPHATE_PATHWAY	KEGG_PENTOSE_PHOSPHATE_PATHWAY	27	0.0119 62085
KEGG_PROTEIN_EXPORT	KEGG_PROTEIN_EXPORT	24	0.0121 71063
KEGG_AMYOTROPHIC_LATERAL_SCLERO SIS_ALS	KEGG_AMYOTROPHIC_LATERAL_SCLERO SIS_ALS	53	0.0123 4357

KEGG_VIRAL_MYOCARDITIS	KEGG_VIRAL_MYOCARDITIS	68	0.0121 78154
KEGG_VASOPRESSIN_REGULATED_WATER_REABSORPTION	KEGG_VASOPRESSIN_REGULATED_WATER_REABSORPTION	44	0.0121 14894
KEGG_RNA_POLYMERASE	KEGG_RNA_POLYMERASE	28	0.0119 96194
KEGG_MISMATCH_REPAIR	KEGG_MISMATCH_REPAIR	23	0.0122 24978
KEGG_INSULIN_SIGNALING_PATHWAY	KEGG_INSULIN_SIGNALING_PATHWAY	136	0.0123 65364
KEGG_LYSINE_DEGRADATION	KEGG_LYSINE_DEGRADATION	42	0.0124 33794
KEGG_NUCLEOTIDE_EXCISION_REPAIR	KEGG_NUCLEOTIDE_EXCISION_REPAIR	44	0.0132 63881
KEGG_BASAL_TRANSCRIPTION_FACTORS	KEGG_BASAL_TRANSCRIPTION_FACTORS	35	0.0162 18513
KEGG_GNRH_SIGNALING_PATHWAY	KEGG_GNRH_SIGNALING_PATHWAY	101	0.0174 6596
KEGG_T_CELL_RECEPTOR_SIGNALING_PATHWAY	KEGG_T_CELL_RECEPTOR_SIGNALING_PATHWAY	107	0.0174 24906
KEGG_LYSOSOME	KEGG_LYSOSOME	120	0.0172 87163
KEGG_BIOSYNTHESIS_OF_UNSATURATED_FATTY_ACIDS	KEGG_BIOSYNTHESIS_OF_UNSATURATED_FATTY_ACIDS	22	0.0175 90927
KEGG_CITRATE_CYCLE_TCA_CYCLE	KEGG_CITRATE_CYCLE_TCA_CYCLE	31	0.0202 44308
KEGG_HEDGEHOG_SIGNALING_PATHWAY	KEGG_HEDGEHOG_SIGNALING_PATHWAY	56	0.0201 23597
KEGG_GLYCOSAMINOGLYCAN_DEGRADATION	KEGG_GLYCOSAMINOGLYCAN_DEGRADATION	21	0.0201 60934
KEGG_P53_SIGNALING_PATHWAY	KEGG_P53_SIGNALING_PATHWAY	67	0.0199 12034
KEGG_DNA_REPLICATION	KEGG_DNA_REPLICATION	36	0.0206 02332
KEGG_B_CELL_RECEPTOR_SIGNALING_PATHWAY	KEGG_B_CELL_RECEPTOR_SIGNALING_PATHWAY	75	0.0205 66657
KEGG_PYRUVATE_METABOLISM	KEGG_PYRUVATE_METABOLISM	40	0.0207 86535
KEGG_FRUCTOSE_AND_MANNOSE_METABOLISM	KEGG_FRUCTOSE_AND_MANNOSE_METABOLISM	32	0.0207 6772
KEGG_ONE_CARBON_POOL_BY_FOLATE	KEGG_ONE_CARBON_POOL_BY_FOLATE	17	0.0215 3782
KEGG_STEROID_BIOSYNTHESIS	KEGG_STEROID_BIOSYNTHESIS	17	0.0215 6662

KEGG_NOTCH_SIGNALING_PATHWAY	KEGG_NOTCH_SIGNALING_PATHWAY	47	0.0249 1319
KEGG_PROTEASOME	KEGG_PROTEASOME	45	0.0265 40082
KEGG_BASAL_CELL_CARCINOMA	KEGG_BASAL_CELL_CARCINOMA	55	0.0262 67914
KEGG_LEISHMANIA_INFECTION	KEGG_LEISHMANIA_INFECTION	70	0.0269 74931
KEGG_TOLL_LIKE_RECEPTOR_SIGNALING_PATHWAY	KEGG_TOLL_LIKE_RECEPTOR_SIGNALING_PATHWAY	102	0.0274 59627
KEGG_BETA_ALANINE_METABOLISM	KEGG_BETA_ALANINE_METABOLISM	22	0.0280 019
KEGG_CYTOKINE_CYTOKINE_RECEPTOR_INTERACTION	KEGG_CYTOKINE_CYTOKINE_RECEPTOR_INTERACTION	263	0.0278 90474
KEGG_TRYPTOPHAN_METABOLISM	KEGG_TRYPTOPHAN_METABOLISM	39	0.0317 79572
KEGG_ARGININE_AND_PROLINE_METABOLISM	KEGG_ARGININE_AND_PROLINE_METABOLISM	53	0.0323 00405
KEGG_ADIPOCYTOKINE_SIGNALING_PATHWAY	KEGG_ADIPOCYTOKINE_SIGNALING_PATHWAY	66	0.0325 0321
KEGG_HEMATOPOIETIC_CELL_LINEAGE	KEGG_HEMATOPOIETIC_CELL_LINEAGE	85	0.0333 74105
KEGG_APOPTOSIS	KEGG_APOPTOSIS	87	0.0336 73424
KEGG_AMINOACYL_TRNA_BIOSYNTHESIS	KEGG_AMINOACYL_TRNA_BIOSYNTHESIS	22	0.0355 44258
KEGG_RNA_DEGRADATION	KEGG_RNA_DEGRADATION	53	0.0364 4445
KEGG_ALDOSTERONE_REGULATED_SODIUM_REABSORPTION	KEGG_ALDOSTERONE_REGULATED_SODIUM_REABSORPTION	42	0.0361 47423
KEGG_GLYCEROLIPID_METABOLISM	KEGG_GLYCEROLIPID_METABOLISM	49	0.0366 27796
KEGG_SPHINGOLIPID_METABOLISM	KEGG_SPHINGOLIPID_METABOLISM	38	0.0391 17854
KEGG_GLUTATHIONE_METABOLISM	KEGG_GLUTATHIONE_METABOLISM	49	0.0414 104
KEGG_JAK_STAT_SIGNALING_PATHWAY	KEGG_JAK_STAT_SIGNALING_PATHWAY	155	0.0438 71686
KEGG_GLYCOSAMINOGLYCAN_BIOSYNTHESIS_KERATAN_SULFATE	KEGG_GLYCOSAMINOGLYCAN_BIOSYNTHESIS_KERATAN_SULFATE	15	0.0470 23352
KEGG_TYPE_II_DIABETES_MELLITUS	KEGG_TYPE_II_DIABETES_MELLITUS	47	0.0480 1458
KEGG_FC_EPSILON_RI_SIGNALING_PATHWAY	KEGG_FC_EPSILON_RI_SIGNALING_PATHWAY	79	0.0492 10586

KEGG_SYSTEMIC_LUPUS_ERYTHEMATOSUS	KEGG_SYSTEMIC_LUPUS_ERYTHEMATOSUS	55	0.050063107
KEGG_SPLICEOSOME	KEGG_SPLICEOSOME	127	0.050077144
KEGG_DORSO_VENTRAL_AXIS_FORMATION	KEGG_DORSO_VENTRAL_AXIS_FORMATION	24	0.05445706
KEGG_PANTOTHENATE_AND_COA_BIOSYNTHESIS	KEGG_PANTOTHENATE_AND_COA_BIOSYNTHESIS	16	0.05655711
KEGG_O_GLYCAN_BIOSYNTHESIS	KEGG_O_GLYCAN_BIOSYNTHESIS	29	0.057227764
KEGG_NICOTINATE_AND_NICOTINAMIDE_METABOLISM	KEGG_NICOTINATE_AND_NICOTINAMIDE_METABOLISM	24	0.056944605
KEGG_GLYCOSPHINGOLIPID_BIOSYNTHESIS_LACTO_AND_NEOLACTO_SERIES	KEGG_GLYCOSPHINGOLIPID_BIOSYNTHESIS_LACTO_AND_NEOLACTO_SERIES	26	0.059741825
KEGG_PROPANOATE_METABOLISM	KEGG_PROPANOATE_METABOLISM	32	0.07479561
KEGG_NATURAL_KILLER_CELL_MEDIATED_CYTOTOXICITY	KEGG_NATURAL_KILLER_CELL_MEDIATED_CYTOTOXICITY	132	0.07657096
KEGG_COMPLEMENT_AND_COAGULATION_CASCADES	KEGG_COMPLEMENT_AND_COAGULATION_CASCADES	69	0.080177695
KEGG_TERPENOID_BACKBONE_BIOSYNTHESIS	KEGG_TERPENOID_BACKBONE_BIOSYNTHESIS	15	0.081446625
KEGG_CYSTEINE_AND_METHIONINE_METABOLISM	KEGG_CYSTEINE_AND_METHIONINE_METABOLISM	34	0.081674345
KEGG_HOMOLOGOUS_RECOMBINATION	KEGG_HOMOLOGOUS_RECOMBINATION	26	0.08944826
KEGG_INOSITOL_PHOSPHATE_METABOLISM	KEGG_INOSITOL_PHOSPHATE_METABOLISM	54	0.10013864
KEGG_BASE_EXCISION_REPAIR	KEGG_BASE_EXCISION_REPAIR	34	0.114441596
KEGG_ALZHEIMERS_DISEASE	KEGG_ALZHEIMERS_DISEASE	152	0.119668365
KEGG_GLYCOSPHINGOLIPID_BIOSYNTHESIS_GANGLIO_SERIES	KEGG_GLYCOSPHINGOLIPID_BIOSYNTHESIS_GANGLIO_SERIES	15	0.11983306
KEGG_STARCH_AND_SUCROSE_METABOLISM	KEGG_STARCH_AND_SUCROSE_METABOLISM	51	0.12238776
KEGG_PHOSPHATIDYLINOSITOL_SIGNALING_SYSTEM	KEGG_PHOSPHATIDYLINOSITOL_SIGNALING_SYSTEM	76	0.14640881
KEGG_BUTANOATE_METABOLISM	KEGG_BUTANOATE_METABOLISM	34	0.16141717
KEGG_FATTY_ACID_METABOLISM	KEGG_FATTY_ACID_METABOLISM	42	0.16915682
KEGG_REGULATION_OF_AUTOPHAGY	KEGG_REGULATION_OF_AUTOPHAGY	35	0.16989838

KEGG_ABC_TRANSPORTERS	KEGG_ABC_TRANSPORTERS	44	0.1710 7181
KEGG_GLYCEROPHOSPHOLIPID_METABOLISM	KEGG_GLYCEROPHOSPHOLIPID_METABOLISM	76	0.1785 1524
KEGG_HUNTINGTONS_DISEASE	KEGG_HUNTINGTONS_DISEASE	167	0.1827 0133
KEGG_ANTIGEN_PROCESSING_AND_PRESENTATION	KEGG_ANTIGEN_PROCESSING_AND_PRESENTATION	81	0.1965 2304
KEGG_SELENOAMINO_ACID_METABOLISM	KEGG_SELENOAMINO_ACID_METABOLISM	24	0.1965 2964
KEGG_PPAR_SIGNALING_PATHWAY	KEGG_PPAR_SIGNALING_PATHWAY	69	0.2120 1116
KEGG_OTHER_GLYCAN_DEGRADATION	KEGG_OTHER_GLYCAN_DEGRADATION	15	0.2133 3829
KEGG_TYPE_I_DIABETES_MELLITUS	KEGG_TYPE_I_DIABETES_MELLITUS	41	0.2324 2201
KEGG_INTESTINAL_IMMUNE_NETWORK_FOR_IGA_PRODUCTION	KEGG_INTESTINAL_IMMUNE_NETWORK_FOR_IGA_PRODUCTION	46	0.2332 9782
KEGG_ETHER_LIPID_METABOLISM	KEGG_ETHER_LIPID_METABOLISM	33	0.2540 1106
KEGG_HISTIDINE_METABOLISM	KEGG_HISTIDINE_METABOLISM	28	0.2765 3286
KEGG_PORPHYRIN_AND_CHLOROPHYLL_METABOLISM	KEGG_PORPHYRIN_AND_CHLOROPHYLL_METABOLISM	40	0.2968 8147
KEGG_ASTHMA	KEGG_ASTHMA	28	0.2972 8612
KEGG_VALINE_LEUCINE_AND_Isoleucine_DEGRADATION	KEGG_VALINE_LEUCINE_AND_Isoleucine_DEGRADATION	43	0.3032 7544
KEGG_CYTOSOLIC_DNA_SENSING_PATHWAY	KEGG_CYTOSOLIC_DNA_SENSING_PATHWAY	53	0.3046 3627
KEGG_GRAFT_VERSUS_HOST_DISEASE	KEGG_GRAFT_VERSUS_HOST_DISEASE	37	0.3031 1695
KEGG_RIG_I_LIKE_RECEPTOR_SIGNALING_PATHWAY	KEGG_RIG_I_LIKE_RECEPTOR_SIGNALING_PATHWAY	69	0.3147 662
KEGG_TYROSINE_METABOLISM	KEGG_TYROSINE_METABOLISM	40	0.3317 2
KEGG_ALLOGRAFT_REJECTION	KEGG_ALLOGRAFT_REJECTION	35	0.3546 971
KEGG_CARDIAC_MUSCLE_CONTRACTION	KEGG_CARDIAC_MUSCLE_CONTRACTION	78	0.3577 409
KEGG_GLYCINE_SERINE_AND_THREONINE_METABOLISM	KEGG_GLYCINE_SERINE_AND_THREONINE_METABOLISM	31	0.3591 9315
KEGG_GLYCOSYLPHOSPHATIDYLINOSITOL_GPI_ANCHOR_BIOSYNTHESIS	KEGG_GLYCOSYLPHOSPHATIDYLINOSITOL_GPI_ANCHOR_BIOSYNTHESIS	25	0.3797 126

KEGG_AUTOIMMUNE_THYROID_DISEASE	KEGG_AUTOIMMUNE_THYROID_DISEASE	50	0.4233 442
KEGG_PROXIMAL_TUBULE_BICARBONAT E_RECLAMATION	KEGG_PROXIMAL_TUBULE_BICARBONAT E_RECLAMATION	23	0.4360 737
KEGG_PRIMARY_BILE_ACID_BIOSYNTHESI S	KEGG_PRIMARY_BILE_ACID_BIOSYNTHESI S	16	0.4386 462
KEGG_TASTE_TRANSDUCTION	KEGG_TASTE_TRANSDUCTION	51	0.4388 3148
KEGG_ALANINE_ASPARTATE_AND_GLUT AMATE_METABOLISM	KEGG_ALANINE_ASPARTATE_AND_GLUT AMATE_METABOLISM	30	0.4458 396
KEGG_PHENYLALANINE_METABOLISM	KEGG_PHENYLALANINE_METABOLISM	17	0.5759 7494
KEGG_NITROGEN_METABOLISM	KEGG_NITROGEN_METABOLISM	23	0.5896 192
KEGG_PEROXISOME	KEGG_PEROXISOME	78	0.6168 8125
KEGG_PRIMARY_IMMUNODEFICIENCY	KEGG_PRIMARY_IMMUNODEFICIENCY	35	0.7205 889
KEGG_MATURITY_ONSET_DIABETES_OF_T HE_YOUNG	KEGG_MATURITY_ONSET_DIABETES_OF_T HE_YOUNG	25	0.7388 774
KEGG_RIBOSOME	KEGG_RIBOSOME	88	0.9402 3

Supplementary table 2. Gsea report or low-risk group

NAME	GS follow link to MSigDB	SIZE	FDR q-val
KEGG_LINOLEIC_ACID_METABOLISM	KEGG_LINOLEIC_ACID_METABOLISM	29	0.047 132
KEGG_ALPHA_LINOLENIC_ACID_METABOLISM	KEGG_ALPHA_LINOLENIC_ACID_METABOLISM	19	0.461 807
KEGG_DRUG_METABOLISM_CYTOCHROME_P450	KEGG_DRUG_METABOLISM_CYTOCHROME_P450	71	0.442 483
KEGG_OXIDATIVE_PHOSPHORYLATION	KEGG_OXIDATIVE_PHOSPHORYLATION	115	0.427 106
KEGG_ARACHIDONIC_ACID_METABOLISM	KEGG_ARACHIDONIC_ACID_METABOLISM	58	0.435 747
KEGG_METABOLISM_OF_XENOBIOTICS_BY_CYTOCHROME_P450	KEGG_METABOLISM_OF_XENOBIOTICS_BY_CYTOCHROME_P450	69	0.371 857
KEGG_PARKINSONS_DISEASE	KEGG_PARKINSONS_DISEASE	113	0.335 96
KEGG_STEROID_HORMONE_BIOSYNTHESIS	KEGG_STEROID_HORMONE_BIOSYNTHESIS	55	0.352 223
KEGG_RETINOL_METABOLISM	KEGG_RETINOL_METABOLISM	64	0.321 965
KEGG_OLFACTORY_TRANSDUCTION	KEGG_OLFACTORY_TRANSDUCTION	383	0.351 719
KEGG_ASCORBATE_AND_ALDARATE_METABOLISM	KEGG_ASCORBATE_AND_ALDARATE_METABOLISM	25	0.497 586
KEGG_DRUG_METABOLISM_OTHER_ENZYMES	KEGG_DRUG_METABOLISM_OTHER_ENZYMES	51	0.560 558
KEGG_PENTOSE_AND_GLUCURONATE_INTERCONVERSIONS	KEGG_PENTOSE_AND_GLUCURONATE_INTERCONVERSIONS	28	0.543 647