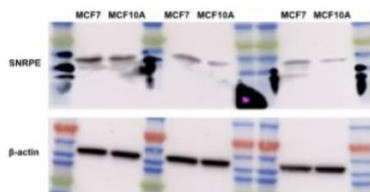


Supplementary Material

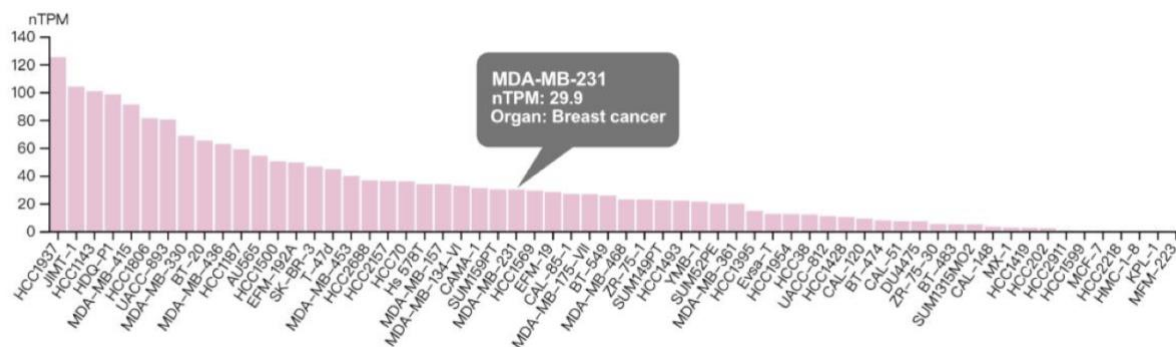
**Targeting SNRPE to induce pyroptosis enhances antitumor immunity
in breast cancer**

Supplementary Figure 1. The respective protein expression levels of SNRPE in MCF7 and MCF10 A cells; Transcript levels of GSDMD in MDA-MB-231 cells.

A



B



Supplementary Figure 2. The lists of genes used for enrichment analysis in breast cancer.

A

List 1 (cBioPortal)

Gene	Gene	Gene	Gene	Gene	Gene	Gene	Gene						
1	TMEM183A	51	ARL8A	101	TOMM5	151	CCDC167	201	PALM2AKAP2	251	PTRH2	301	RC3H2
2	COA6	52	GNPAT	102	MGST3	152	MYO9A	202	RFC2	252	TIMM9	302	SAMD8
3	RBM34	53	AKAP13	103	MORN2	153	PCNX1	203	GTF3C6	253	GNA11	303	BUD31
4	H3-3A	54	LSM 5.00	104	VPS13C	154	TBC1D2B	204	NOP16	254	MRPL1	304	SNRPA
5	CACYBP	55	MAGOHB	105	ZNF366	155	C1ORF43	205	PSMG2	255	NACA4P	305	FAM168A
6	MIX23	56	SNRPD1	106	MYOF	156	PIIH	206	RPL24	256	SF3B6	306	ATP5PF
7	TIMM17A	57	HERC2	107	TXNDC17	157	GAS5	207	METTL1	257	H2AZ1	307	PLBD2
8	GLRX2	58	HSPE1	108	GGCT	158	ZBTB40	208	TRIM56	258	TBC1D7	308	BPNT1
9	CNIH4	59	TMEM258	109	HNRNPC	159	VPS13D	209	SARNP	259	HIPK1	309	KMT2D
10	TMEM81	60	SEM1	110	SRSF3	160	CHCHD1	210	DENND4A	260	NDUFA12	310	RNPEP
11	MRPL9	61	POLR2H	111	CHTOP	161	CBX3	211	EBPL	261	RPS21	311	PKD2
12	CCT3	62	ILF2	112	GARIN2	162	ZNF672	212	CACNA2D1	262	APH1A	312	AKAP10
13	PRDX6	63	RBIS	113	ELK3	163	HNRNPA1	213	POLR2J	263	PSMA3	313	NDUFB6
14	PFDN2	64	LSM 2.00	114	PDCD5	164	ZZEF1	214	CKS2	264	S100A11	314	PDCL3
15	ACBD6	65	ATP5MJ	115	NENF	165	SNAPIN	215	SFXN4	265	MRPL18	315	SNORD116-4
16	PSMD4	66	MRPL47	116	METTL5	166	BANF1	216	ATP5F1C	266	LSM 8.00	316	PRDM2
17	PSMB4	67	UCK2	117	TFB2M	167	TNS1	217	POMP	267	NR2C2AP	317	TMCO1
18	DAP3	68	LEPROT	118	RAPGEF1	168	PARD3B	218	TBCA	268	UBQLN4	318	ATP5MC1
19	COP 1	69	RAB25	119	BLTP1	169	DYNLT1	219	SRSF7	269	MARCHF8	319	CTDSP2
20	FH	70	NDUFS2	120	NOP58	170	NDUFB11	220	DYNLL1	270	HNRNPAB	320	RGPD4
21	UFC1	71	CBX6	121	SLIRP	171	ENY2	221	SLC30A4	271	ZNF695	321	EXOSC1
22	TBCE	72	TPRKB	122	C18ORF21	172	COX7C	222	NDUFS5	272	LBHD1	322	TSACC
23	UBE2T	73	LAMTOR2	123	TOR3A	173	TRIAP1	223	ASXL2	273	MASP2	323	SECISBP2L
24	FLAD1	74	TSEN15	124	B4GALT3	174	NIT2	224	MRPS24	274	JPT1	324	DNAH14
25	HAX1	75	NAXE	125	TTBK2	175	RPP21	225	ARV1	275	BOLA2	325	NUF2
26	SNRPF	76	CHD2	126	NME1	176	WDFY3-AS2	226	SNX29	276	MRPS33	326	KIF13A
27	SCNM1	77	MRPL55	127	TARDBPP3	177	HIPK3	227	ERCC6L2	277	MSTO1	327	TIMM10
28	LYPLAL1	78	DEDD	128	GEMIN6	178	USP21	228	ZNF699	278	GCC2	328	NCOA1
29	RABIF	79	C1ORF35	129	ATP5MF	179	KIRREL1	229	RPL30	279	TRMT112	329	BOD1L1
30	KRTCAP2	80	PMF1	130	RNF187	180	TMEM14B	230	SETX	280	PFDN6	330	CSNK2B
31	CKS1B	81	UBE2Q1	131	SMIM26	181	SLC50A1	231	UBL5	281	EVI5	331	PREX2
32	SSBP1	82	NFATC2	132	UXT	182	USF1	232	NDUFAB1	282	PIKFYVE	332	NME2
33	C1ORF131	83	AHNAK	133	PSMA2	183	MYCBP2	233	NVL	283	ELOC	333	CENPW
34	SNRPG	84	SCAMP3	134	TIPRL	184	AGO4	234	LAGE3	284	NDUFB3	334	RM12
35	MRPL24	85	SNRPGP15	135	TRMT10C	185	COX7A2	235	SUMO1	285	PPP1R14B	335	YAE1
36	SF3B4	86	HDGF	136	SNRPD2	186	EIF2D	236	GPRIN3	286	PLEKHM3	336	RGP1
37	MTX1	87	SDHC	137	ARPC5	187	NEK2	237	SNRPB2	287	EMG1	337	RPP38
38	VPS72	88	NOPCHAP1	138	ZBTB38	188	MRPS21	238	RORA	288	RRP15	338	ZNF692
39	SSR2	89	GGPS1	139	UBR4	189	DUSP12	239	METTL18	289	HIVEP3	339	JAK1

40	SRP9	90	MRPS14	140	JMJD4	190	TAGLN2	240	SLC12A6	290	ATP5PO	340	VPS39
41	MRPS17	91	NTPCR	141	THOC7	191	SYNE1	241	WDFY3	291	RAB4A	341	UMPS
42	JTB	92	LSM 3.00	142	CLCN6	192	BRIX1	242	MAST4	292	GTF2H5	342	IQSEC1
43	TMEM9	93	ENSA	143	CREBRF	193	MRPL22	243	RTRAF	293	PDSS1	343	UQCC2
44	ATP5MK	94	AIDA	144	EFCAB14	194	COX7B	244	COX6B1	294	RGPD3	344	CENPH
45	DPY30	95	TOMM6	145	BOLA1	195	LUZP1	245	BMP2K	295	SS18L2	345	PRRC2B
46	PRCC	96	SEC61G	146	MINDY2	196	TOMM20	246	RPF2	296	DUSP23	346	TGFBRAP1
47	HERC1	97	HERC3	147	RAPGEF2	197	PTTG1	247	CHD9	297	RPL35A	347	UQCRB
48	ARF1	98	MRPL51	148	MYO5A	198	STX6	248	TRIM11	298	NUCKS1	348	MRPL17
49	SNRPC	99	ERH	149	FDPS	199	PPIA	249	MGAT5	299	SLIT2	349	FICD
50	PIGC	100	ZNRF2P1	150	RPL26L1	200	TXN	250	SPTBN1	300	DDI2	350	TXNL4A

List 1 (cBioPortal)

Gene	Gene	Gene	Gene	Gene	Gene	Gene	Gene						
351	NHP2	401	PAM16	451	SH2B3	501	RUNX1T1	551	MAGI1	601	PYCR2	651	RALGAPA2
352	MIGA1	402	ABRACL	452	RABS1F	502	UBA52	552	DGUOK	602	NUDT5	652	TMEM245
353	RNASEH2A	403	PAXIP1-AS2	453	LMTK2	503	TMSB10	553	PLEKHM1	603	ATP5PD	653	RPL37
354	EFNA4	404	HECTD4	454	PSMC1	504	FBL	554	NHSL2	604	PACC1	654	ATG2B
355	NDUFA1	405	N4BP2	455	ZBTB4	505	POP7	555	NDUFA4	605	PSMA4	655	IPO9
356	RFC4	406	MRPL36	456	RPP30	506	FUT11	556	PTTG3P	606	SPATA13	656	GAPDH
357	PCDHGB7	407	TMEM147	457	CDKN3	507	CEP104	557	TADA1	607	ALG3	657	PCDHGB6
358	SPEN	408	BOLA3	458	MRPS9	508	HEBP2	558	PLPP3	608	EIF5AL1	658	PCLAF
359	PSMB1	409	CBX7	459	BMPR2	509	GTF2A2	559	LRR1	609	PRELID1	659	PRKG1
360	RNF111	410	RPL38	460	NABP2	510	SLC16A7	560	GAR1	610	SLC35E2A	660	AP1S1
361	EXOC6B	411	RPS24	461	UQCRH	511	EXOSC5	561	TIMM17B	611	NDUFB9	661	TATDN3
362	MTMR3	412	CEP85L	462	NACC2	512	PXK	562	KLF13	612	EIF6	662	HEG1
363	ATP5F1E	413	IMMP1L	463	DMXL1	513	PPTC7	563	PSMB7	613	MEMO1	663	NDUFV2
364	RPL39	414	C1ORF112	464	NDUFB1	514	RPL22L1	564	MRPS16	614	MAP3K2	664	NDUFA8
365	HNRNPU	415	FAM114A1	465	BICC1	515	NATD1	565	PIPSL	615	WDR44	665	MRPL58
366	PA2G4	416	MRPL48	466	MRPL13	516	SNORD116-20	566	PTPRG	616	CASS4	666	LIN9
367	SPHAR	417	MPC2	467	POLR1C	517	SMCR8	567	RBFOX2	617	UQCRQ	667	NDUFB4
368	ATXNIL	418	CCDC59	468	DDR2	518	APOO	568	SH3BP5L	618	KLHL11	668	WDR74
369	TCP11L2	419	ZNF106	469	SF3B5	519	PUS1	569	NOP56	619	DTL	669	MRPL15
370	TGOLN2	420	ZEB2	470	MRPL3	520	NDUFS3	570	PWAR5	620	NDUFA9	670	MSMP
371	PIN4	421	MTMR10	471	NDST2	521	MTRES1	571	MEF2A	621	LRP1	671	DNAJB14
372	PLXNC1	422	ALKBH2	472	LSM 4.00	522	GPATCH8	572	GTF2A1	622	COX6A1	672	SELENOH
373	PFDN4	423	EXOSC8	473	MTFR2	523	MIS18A	573	CCDC186	623	SEC61B	673	CARF
374	MAPKBP1	424	NXT1	474	DNAAF9	524	C1ORF74	574	CLK2	624	RPS2	674	MBD5
375	HDCC2	425	FAT4	475	ANAPC7	525	COX16	575	RAPGEF6	625	UBE2C	675	TECPR1
376	TSHZ2	426	HINT1	476	EBP	526	MAP3K3	576	PSENE1	626	EP300	676	GCNT4
377	DPP8	427	P2RX7	477	ITGB3	527	CENPL	577	LILRA1	627	COX5A	677	BAZ2A
378	CPED1	428	PPP4C	478	REST	528	HS3ST3B1	578	TEP1	628	ECE2	678	GUK1
379	CRIM1	429	UQCRBP1	479	ITGA8	529	NBEAL1	579	HSPG2	629	EBF2	679	HNRNPA2B1
380	SNRPB	430	IKZF4	480	RAD54L2	530	NME2P1	580	PARP1	630	PDPR	680	KMT2C

381	MECP2	431	LINC00467	481	ERN 1.00	531	ATE1	581	FARSB	631	ATP5MG	681	INO80
382	RPS7	432	RPP40	482	TNS3	532	SSH1	582	IDS	632	TECPR2	682	RGPD6
383	RUVBL1	433	TGFBR2	483	RPA3	533	MYO18A	583	EIF3M	633	PIK3CG	683	CMC1
384	STARD8	434	RBX1	484	PROB1	534	H6PD	584	ROCK2	634	APEX1	684	CPSF3
385	PEAK1	435	APTX	485	EIF5A	535	BIRC6	585	UBE2I	635	ATP5MC3	685	GMNN
386	PTMA	436	PSMG3	486	MAGOH	536	SYNE2	586	RBM8A	636	CDCA3	686	TTC13
387	MYSM1	437	NUDT1	487	UCHL5	537	HCFC2	587	CHM	637	MCTS1	687	TAF1L
388	MRPL14	438	ITSN2	488	GARRE1	538	VPS45	588	CNPY2	638	FAM120A2P	688	ZXDA
389	CCNB1	439	ANKRD44	489	PSMB3	539	POLR1H	589	BAZ2B	639	ATP23	689	PCDHGA9
390	MIDEAS	440	NDUFB5	490	NDUFB2	540	RBL2	590	ACP1	640	NCOR1	690	ZNF660
391	PYGO1	441	ARHGFE17	491	ATP5MC2	541	AMIGO1	591	SFMBT2	641	UQCR10	691	IGSF9
392	ZNF641	442	KRBA2	492	PSMB5	542	CSF1	592	VRK1	642	GBAP1	692	BCCIP
393	SUMO1P3	443	NR3C1	493	PIAS1	543	PLSCR4	593	FKBPL	643	CCNT1	693	PA2G4P4
394	ENTREP3	444	DOCK1	494	FAM104B	544	TMA7	594	FAM72A	644	LRCH1	694	ADD1
395	SNRPA1	445	HNRNPL	495	CCPG1	545	RAN	595	NIFK	645	PDE3A	695	AFF1
396	FMN1	446	SNX30	496	PPOX	546	CALM2	596	MRPL11	646	MAN2A2	696	WASF2
397	HSD17B10	447	SFT2D1	497	ZNF827	547	PYGO2	597	CDKL5	647	TRAIIP	697	USP12
398	TLN1	448	C19ORF48	498	LAMTOR5	548	FMNL3	598	NFAT5	648	ZNF32	698	RUSC1
399	RPS20	449	ANKFY1	499	TIMM8B	549	KAT2B	599	TACC1	649	PDCD2L	699	BUD23
400	MFN2	450	PIGU	500	CDK4	550	EXO1	600	ABT1	650	MFS2B	700	NACA

List 1 (cBioPortal)

Gene	Gene	Gene	Gene	Gene	Gene						
701	AKAP11	751	SNORD116-28	801	ATP10D	851	PEX11B	901	PMVK	951	MRPS26
702	TAF11	752	ZNF70	802	TLCD1	852	CLTA	902	SLC8A1	952	HAUS8
703	RPL39L	753	RPL32	803	TRPM7	853	MRPL21	903	TUBA1C	953	ANP32B
704	TAF10	754	SIK3	804	ANAPC11	854	COA8	904	EPB41L2	954	COX5B
705	MRPL32	755	RBM43	805	ROR1	855	TMEM273	905	COQ3	955	MACF1
706	RPS10	756	SLC24A5	806	SVEP1	856	CHCHD2	906	HMCE5	956	SRP19
707	NOL7	757	GIT2	807	RSC1A1	857	ADGRF5	907	MRPL27	957	NUP37
708	POLR21	758	GPATCH2L	808	TRAP1	858	SPC25	908	SOD1	958	RPS19
709	ZKSCAN8	759	GOLT1A	809	PAFAH1B1	859	SEPTIN10	909	SYNRG	959	SCN7A
710	PLA2R1	760	OPHN1	810	AP4E1	860	HMG1	910	TMEM14C	960	ITGB3BP
711	CMSS1	761	COMMD7	811	CDC123	861	PMM2	911	ZBTB20	961	ARHGFE39
712	NSL1	762	PAFAH1B3	812	CYCS	862	TXNL1	912	DOCK11	962	PRDM5
713	AKAP12	763	FEM1B	813	FYCO1	863	ADAM10	913	MALSU1	963	EPG5
714	CD93	764	TMEM127	814	OST4	864	DNAJC27	914	RIDA	964	ZNF592
715	ZNF609	765	KIF22	815	PTRHD1	865	SUV39H1	915	GBF1	965	PROX1
716	FAM72B	766	FOSL2	816	C19ORF53	866	OCIAD2	916	C12ORF73	966	TAF5L
717	AURKB	767	CHEK2	817	AHSA1	867	UNC5C	917	CDK1	967	ATP7A
718	NDUFAF2	768	MARCKSL1	818	DTYMK	868	N4BP1	918	P2RY1	968	BEND3P3
719	NEDD8	769	BTA1F1	819	PTPRM	869	RPS18	919	BTBD8	969	NDUFB10
720	DENND5B	770	POP4	820	BYSL	870	ZC3HC1	920	PLEKHA7	970	ROMO1
721	PCBD1	771	TOP1P2	821	ACER2	871	CPEB4	921	NDUFV3	971	RAI1

722	TOMM22	772	MED13L	822	DPM3	872	ZC3H7B	922	NDUFA7	972	SON
723	MRPL52	773	DYNLRB1	823	THUMPD2	873	TEX30	923	DAZAP1	973	NCOR2
724	SBF2	774	PCNA	824	ZNF791	874	TEDC2	924	PABPN1	974	GIGYF2
725	ZFYVE26	775	TRIM44	825	TUBA1B	875	TRIR	925	MRPS15	975	PDCD2
726	ATP5ME	776	ARF5	826	NOP10	876	NR1H3	926	LSM 7.00	976	SMAD9
727	EYA3	777	RNF181	827	DIP2C	877	MRPL23	927	PCSK5	977	MRGBP
728	MEX3A	778	TAOK1	828	FAM161B	878	TPM3	928	GNS	978	C1QBP
729	MLF 2.00	779	INPP4A	829	NUTF2	879	LIFR	929	ZNF483	979	DPM2
730	HRH2	780	EEF1E1	830	NOTCH2	880	SNTB2	930	HMBS	980	TMEM177
731	MEA1	781	AGO1	831	RERE	881	NECTIN3	931	MCTP1	981	IL17RA
732	NOL10	782	NPM1	832	RBMS3	882	ZNF585B	932	POLD2	982	BACE1
733	THSD7A	783	NDUFAF4	833	NAV3	883	DDX39A	933	SNRNP25	983	CRY2
734	UTRN	784	NEK9	834	SH3D19	884	OXSM	934	SUSD1	984	ABHD2
735	NCOA2	785	IL6ST	835	SKA3	885	UBE2Q2P1	935	TCF12	985	MRPS5
736	PTPRB	786	RPL37A	836	SCAPER	886	GNAL	936	TIMM50	986	GPRASP1
737	PCDHGA12	787	SYNJ1	837	TEAD1	887	ITPA	937	VPS13B	987	CCT6A
738	DST	788	ARHGAP20	838	MTOR	888	FRY	938	MRPS12	988	LATS2
739	ARHGAP31	789	LRIG2	839	XYLT1	889	PTAFR	939	RPS6KA2	989	PHLPP2
740	PRDM11	790	KLF7	840	DDX59	890	SPECC1L	940	DLC1	990	ARPC3
741	ROCK1	791	RPS15A	841	PRKAR2A	891	MANIA2	941	GAS7	991	PFN1
742	TSMF	792	PPA1	842	COX7A2L	892	RASEF	942	BIRC5	992	RO60
743	RBMX2	793	ADIPOR1	843	FBXO22-AS1	893	TJP1	943	EXOSC7	993	RPS16
744	EEF2KMT	794	CTSO	844	RPS29	894	GAB1	944	TRANK1	994	LAMA2
745	COA4	795	FRMD3	845	XCR1	895	COPS6	945	FLG	995	RFXANK
746	STMN1	796	METTL26	846	CMC2	896	POLR2G	946	DENND2C	996	RANBP1
747	TIMM8A	797	ATP5F1EP2	847	PDPK1	897	SIK2	947	CLIP1	997	NELFE
748	DAAM2	798	TTC28	848	EHD3	898	PSEN2	948	NFIC	998	ADAT1
749	SUMO2	799	ZNF154	849	COX17	899	DENND5A	949	RAE1	999	SETBP1
750	FNIP2	800	RAB11FIP5	850	ZEB1	900	PIK3C2A	950	FOXN3	1000	ITPRI

B

List 2 (GEPIA)

Gene	Gene	Gene	Gene	Gene	Gene						
1	SNRPEP2	51	STX6	101	C8orf59	151	LSM3	201	POMP	251	TMEM206
2	SNRPEP4	52	KIF14	102	GOLT1A	152	NCAPG	202	ARPC5	252	NDUFAB1
3	TMEM183A	53	SSR2	103	ZNF695	153	ZC3H11A	203	RP11-480I12.5	253	NUP37
4	TIMM17A	54	TADA1	104	NME7	154	MAGOHB	204	RFC4	254	MORN2
5	RFWD2	55	ASPM	105	PSMB4	155	CACYBPP2	205	DPY30	255	DROSHA
6	NUCKS1	56	GNPAT	106	SOX13	156	LINC00467	206	SRSF7	256	PEX11B
7	IPO9	57	TRMT10C	107	PPP1R15B	157	EEF1E1	207	MTERF3	257	EFNA4
8	TMEM81	58	FLAD1	108	CCNB1	158	TAF5L	208	TOR3A	258	DYNLT1
9	UBE2T	59	SNRPG	109	ADIPOR1	159	TOMM5	209	OR4M1	259	HNRNPU
10	RAB1F	60	CKS1B	110	POLR2H	160	SSB	210	B4GALT3	260	FAM72D
11	ACBD6	61	C1orf112	111	VRK1	161	KIF15	211	TCEB1	261	SPRTN

12	EPRS	62	SSBP1	112	GGPS1	162	RP11-242C24.3	212	PARPBP	262	NAE1
13	GLRX2	63	WDR12	113	CEBPZ	163	KIAA0020	213	SNAP47	263	KIF18A
14	CCT3	64	MRPL3	114	KRTCAP2	164	OR7D4	214	FAM189B	264	DLGAP5
15	LYPLAL1	65	NOP58	115	MGST3	165	TBC1D7	215	CPSF3	265	PALB2
16	CNIH4	66	USMG5	116	USP21	166	URB2	216	CHEK2	266	HDAC2
17	CCDC58	67	MRPL24	117	PSMD4	167	UMPS	217	PTTG1	267	RIOK2
18	RBBP5	68	ARL8A	118	TAF11	168	RAN	218	ARF1	268	CKS2
19	COA6	69	LIN9	119	RP11-651P23.4	169	ENY2	219	UBAP2L	269	SGOL2
20	DAP3	70	TMEM9	120	RP11-10N23.4	170	MCTS1	220	ADSS	270	GTF3C6
21	PRDX6	71	PIGC	121	SPC25	171	RPF30	221	PPIL1	271	HDCC2
22	DHX9	72	CENPF	122	PDSS1	172	POGK	222	GMNN	272	RP11-480H12.7
23	H3F3A	73	FLVCR1	123	RP11-345J4.5	173	MRPL51	223	RFC2	273	NOL7
24	DDX59	74	NVL	124	TRIAP1	174	RUVBL1	224	CCT8	274	CSNK2B
25	MRPL9	75	BRIX1	125	SNRPD1	175	PFDN2	225	LSM5	275	PSMA1
26	RBM34	76	TPR	126	SMYD2	176	ATIC	226	CHTOP	276	MRPL55
27	KLHL12	77	UFC1	127	MEX3A	177	CENPH	227	PMF1	277	TAF5
28	INTS7	78	TPRKB	128	TOMM20	178	GEMIN6	228	AL513523.2	278	PSMA3
29	FH	79	PARP1	129	H2AFZ	179	DDX10	229	KIF20A	279	POLE2
30	METTLL3	80	PSMA2	130	KIAA1614-AS1	180	YOD1	230	COX20	280	TCP1
31	PRCC	81	MTX1	131	RP11-452F19.3	181	PIGM	231	ZNF124	281	BPNT1
32	TBCE	82	SCAMP3	132	MTFR2	182	JMJD4	232	PPIH	282	SNRPGP10
33	CACYBP	83	RAB25	133	SDHC	183	JTB	233	RP11-295G20.2	283	HNRNPA3
34	TSEN15	84	METTLL8	134	GAR1	184	GINS1	234	SUV39H2	284	CDC45
35	TFB2M	85	NDUFAF4	135	DIEXF	185	KB-1568E2.1	235	MTBP	285	BROX
36	C1orf131	86	CENPL	136	TIMM8A	186	GTF2H5	236	LAMTOR2	286	SNRPGP2
37	EXO1	87	MRPL1	137	NUP205	187	TSACC	237	COQ3	287	NCAPH
38	MRPL13	88	DSTYK	138	LRPPRC	188	IARS2	238	SKA3	288	MSTO1
39	NEK2	89	RRP15	139	UBQLN4	189	AHCTF1	239	RM12	289	BTF3L4
40	TIPRL	90	CDC73	140	RBM8A	190	C1orf43	240	SARNP	290	LINC00824
41	DNAH14	91	SRP9	141	DUSP12	191	SUMO1	241	GPR89B	291	VPS45
42	NUP133	92	KDM5B	142	TMEM14B	192	ESRP1	242	WDHD1	292	SLC50A1
43	HAX1	93	ILF2	143	TTK	193	THOC7	243	YARS2	293	COX20P1
44	UCK2	94	SF3B4	144	SNAPIN	194	RAD54B	244	ABRACL	294	KIF11
45	RP11-101E13.5	95	NTPCR	145	RPF2	195	ARV1	245	KIN	295	DSCC1
46	UCHL5	96	METTLL5	146	FARSB	196	APOA1BP	246	CCT4	296	COX7A2
47	MRPS14	97	EIF2D	147	VPS72	197	ATP5C1	247	HDGF	297	MIS18A
48	FAM72A	98	DARS2	148	RPP40	198	H2AFV	248	TBPL1	298	RPP38
49	LSM2	99	NUF2	149	PHF14	199	GCFC2	249	CDKN3	299	ERCC6L
50	SNRPC	100	SCNM1	150	NDUFS2	200	NOL10	250	FBXO28	300	MTCH2

List 2 (GEPIA)

Gene	Gene	Gene	Gene	Gene	Gene						
301	SFT2D1	351	CDCA3	401	TEX30	451	RP11-435O5.2	501	CMC1	551	ADCK3
302	CWC27	352	DTL	402	MAD2L1	452	BPHL	502	HOXC13	552	LINC00493

303	GMPS	353	LMNB1	403	RPS27	453	PCNA	503	PXN-AS1	553	PSMB5
304	TTC13	354	KNTC1	404	SMG7	454	CENPE	504	AURKB	554	CCNB2
305	C12orf45	355	DCUN1D5	405	CBX3	455	EIF3E	505	SFXN4	555	USF1
306	CTD-2124B8.2	356	MRPL15	406	KIF4A	456	HNRNPL	506	RP4-616B8.5	556	CHD1L
307	PCAT6	357	NDUFB3	407	MRPS9	457	HSPE1	507	BLZF1	557	RPL39L
308	PRUNE	358	NDUFA12	408	CCNA2	458	PNPT1	508	OIP5	558	NUTF2
309	CHEK1	359	SNRPF	409	PDCD2L	459	TBCA	509	TRIT1	559	NONO
310	ITGB3BP	360	HELLS	410	ZNF672	460	TXN	510	TBP	560	C20orf24
311	INTS8	361	RNF187	411	LRR1	461	RP11-386G11.10	511	KIF2C	561	PSME4
312	TIMM23	362	MRPS33	412	DEDD	462	TRAP1	512	TPM3	562	AC006547.8
313	EIF2S2	363	MRPL42	413	SS18L2	463	FBXO5	513	LYSMD1	563	MCM6
314	RP11-298D21.1	364	SGOL1	414	LTV1	464	PRIM2	514	EBNA1BP2	564	LYRM4
315	RNPEP	365	RIOK1	415	RANBP1	465	NIT2	515	REPS1	565	CDK8
316	DNAJC2	366	TORIAIP2	416	BOLA3	466	SPC24	516	TMEM261	566	GGCT
317	USP39	367	DCTPP1	417	ACTL6A	467	TIMM9	517	FAM72B	567	NCBP2
318	PSMB1	368	RPS6KC1	418	PTGES3	468	MELK	518	EBPL	568	GEMIN2
319	PDCL3	369	DCAF6	419	C12orf73	469	PSMG2	519	NUDCD1	569	HMMR
320	WDR75	370	C1orf35	420	PSMD1	470	DSN1	520	RRM1	570	E2F5
321	CCSAP	371	IGHV2OR16-5	421	TATDN3	471	DEPDC1B	521	RNASEH2A	571	SENP3
322	NSL1	372	RP11-343C2.12	422	MEMO1	472	ALKBH2	522	ZNF670	572	CHML
323	NDUF55	373	EHMT2	423	ECT2	473	ZC3H8	523	LINC01136	573	RPL30
324	SF3B6	374	C1orf27	424	PRRC2C	474	SAYS1	524	PDCD2	574	NEIL3
325	IGSF9	375	STMN1	425	FKBPL	475	PTRHD1	525	HSPA4	575	SPDL1
326	GPATCH4	376	NDC80	426	NOL11	476	ACPI	526	C18orf21	576	DRG1
327	FAM104B	377	BUB1B	427	ACOT13	477	RPP21	527	HIST1H3PS1	577	ALG6
328	DYNLL1	378	ISG20L2	428	PWP1	478	DNA2	528	CEP55	578	CDC123
329	RAB4A	379	KIAA0101	429	HYLS1	479	TOMM40L	529	TAF1A	579	SUCO
330	NUP155	380	UAP1	430	MRPS21	480	CDC20	530	GLRX5	580	CIQBP
331	ORC3	381	RPA3	431	EIF5B	481	ZNF669	531	MCM3	581	KB-1208A12.3
332	CMSS1	382	C4orf27	432	FAM20B	482	C2orf76	532	APH1A	582	RP3-337H4.9
333	KIFAP3	383	HEATR1	433	CDK1	483	C14orf2	533	NUP85	583	TUBB
334	DESI2	384	RBM45	434	CCDC138	484	FANCD2	534	SKA1	584	DNAJB11
335	ASUN	385	GLMP	435	PLK4	485	DONSON	535	CAMSAP2	585	TXNL1
336	CCDC167	386	RP13-753N3.3	436	MRPL18	486	SPAG5	536	RAD54L	586	TARBP1
337	TMCO1	387	TRAIIP	437	C8orf76	487	CTD-2369P2.12	537	NCSTN	587	WDYHV1
338	EMG1	388	HCG25	438	HPRT1	488	UTP6	538	HMG3	588	SLC25A44
339	BTF3L4P2	389	ERH	439	USP2-AS1	489	RP11-132A1.4	539	EIF2B3	589	CHAC2
340	PDCD5	390	HNRNPAB	440	MCUR1	490	SAAL1	540	CALM2	590	UQCRH
341	ANAPC7	391	SH3BP5L	441	TROAP	491	CDC25A	541	ELAVL1	591	RFESD
342	PAICS	392	CNOT10	442	ANP32E	492	MPHOSPH10	542	RP11-344N17.8	592	SNX27
343	NOP56	393	MLF1	443	PAK1IP1	493	PPIA	543	PIK3R4	593	KATNA1
344	MRPL47	394	EZH2	444	CCZ1	494	NENF	544	MDM4	594	KIF23
345	DCAF13	395	RPL26L1	445	RPL22L1	495	NIFK	545	IQGAP3	595	TAGLN2
346	UBE2C	396	AIDA	446	TXNDC17	496	CDC25C	546	UHRF1	596	BUB1

347	TPX2	397	PSMG1	447	LYAR	497	WDR70	547	POLRIC	597	MND1
348	CCDC59	398	MAGOH	448	CPSF6	498	NUP35	548	ABT1	598	GAS5
349	SETDB1	399	ZSCAN16	449	PSMD14	499	TROVE2	549	MORC2	599	CMC2
350	ELK4	400	FAM83D	450	PRMT5	500	POLR3F	550	OXSM	600	ABCB10

List 2 (GEPIA)

Gene	Gene	Gene	Gene	Gene	Gene
601	CENPN	651	SLC41A1	701	THUMPD2
602	CENPQ	652	PLK1	702	SMC4
603	TTC27	653	ATP5J	703	GNL2
604	DGUOK	654	NKRF	704	C7orf73
605	POC1A	655	GTPBP4	705	MDH1
606	FANCG	656	RAD51AP1	706	ZBTB41
607	GTF2H4	657	NUP88	707	CHCHD4
608	UBE2V2	658	KPNA2	708	TARS
609	TMEM258	659	RP11-332M2.1	709	FIGNL1
610	GLRX3	660	C11orf74	710	AC009005.2
611	EPCAM	661	RP11-78A19.3	711	COG2
612	AIMP2	662	SNRPB2	712	PVT1
613	MARCI	663	MARCKSL1	713	TCAIM
614	BLM	664	SOX4	714	RPUSD3
615	ATP5O	665	MDN1	715	UQCRB
616	RP11-1100L3.7	666	SRPK1	716	LAD1
617	NUDT5	667	CENPI	717	TXNL4A
618	DUSP23	668	PTMA	718	CDCA7
619	EXOSC9	669	SCML2	719	VDAC1
620	POLR2K	670	RAB3GAP2	720	ZNF670
621	KIFC1	671	AP000251.3	721	ALDH9A1
622	CDCA8	672	HJURP	722	H3F3AP4
623	DBF4	673	ORC5	723	IPO4
624	BOLA1	674	FDPS	724	C17orf53
625	CTB-193M12.5	675	KLHDC9	725	GPR89A
626	CENPK	676	MRS2	726	ASF1A
627	MCM10	677	RP11-343H5.6	727	MASTL
628	UBE2Q1	678	ZNF317	728	VASH2
629	PVRL4	679	CECR5	729	DNTTIP2
630	HNRNPC	680	SRSF1	730	VARS
631	BZW2	681	RP11-395L14.17	731	RP11-97O12.5
632	RP11-402J6.3	682	SEH1L	732	NDUFAF5
633	ARMC10	683	PNO1	733	COA5
634	POLR3C	684	HNRNPA2B1	734	SKP2
635	MRPS35	685	MRPL22	735	DEGS1
636	FANCB	686	C11orf73	736	DNMT3B
637	DENR	687	ARHGEF39	737	GTF2IRD1
751	YY1AP1	801	DNAJC9	851	C5orf34
752	ATAD5	802	UCHL3	852	RP3-337H4.8
753	RP11-135L13.4	803	TOMM70A	853	NUP93
754	STAMBIP	804	THOC1	854	TLCD1
755	PKMYT1	805	RP11-122A21.2	855	PFDN6
756	RPIA	806	CWC15	856	CLTA
757	CDK2AP1	807	HRSP12	857	ANP32B
758	TRIP13	808	ZNF706	858	POLR3G
759	PPP1R14B	809	PARP2	859	E2F1
760	CCDC77	810	POLQ	860	FAM111B
761	IMMP1L	811	S100A11	861	SNRPEP6
762	ACTR6	812	CTPS1	862	CRIP1
763	GTF3C2	813	PRIM1	863	HMGNI
764	WRNIP1	814	NDUFB6	864	ZNRD1
765	YWHAQ	815	ZC3HC1	865	WDR53
766	TRIM11	816	MRPL39	866	HSPA14
767	NDUFAF2	817	SASS6	867	COX5A
768	ZNF93	818	FAM49B	868	UBL5
769	MTHFD1	819	MRPS22	869	RP11-480I12.9
770	PBK	820	MLK4	870	TMEM177
771	RP3-461F17.3	821	MSH2	871	TCERG1
772	PDCD11	822	E2F3	872	RP11-23E19.2
773	RP11-10G12.1	823	MRPL30	873	EXOSC8
774	TMEM186	824	ERI3	874	EXOSC1
775	ATP5J2	825	FEN1	875	RPL39
776	ANKRD32	826	CCNE2	876	HMGB2
777	RSL1D1	827	NUSAP1	877	NDUFB11
778	ZUFSP	828	RANP1	878	PIGU
779	CENPA	829	TOP2A	879	RP11-244M2.1
780	COMMD3	830	ZNF32	880	NDC1
781	CHCHD1	831	C11orf98	881	AUNIP
782	CTB-43P18.1	832	VANGL2	882	RP11-770J1.5
783	CKAP2L	833	LRRC40	883	PMS1
784	BUD31	834	LINC00665	884	COX7A2L
785	RFC3	835	TUBAP2	885	ZC3H15
786	TMSB15A	836	SMN1	886	PSMA5
787	MRPS5	837	RACGAP1	887	RGS5

638	SLC25A3	688	SMARCA4	738	POLE	788	UQCC2	838	EIF2B1	888	COPS5
639	TBC1D31	689	HN1	739	SRP19	789	NASP	839	GEN1	889	AHSA1
640	PAICSP4	690	TSEN2	740	RHEB	790	TAF1D	840	XRCC4	890	FUS
641	UNG	691	SHFM1	741	MCM2	791	PUS7	841	APOO	891	CBWD2
642	MRPL19	692	TMEM97	742	LINC00998	792	PRPF3	842	VTA1	892	SNX14
643	RTKN2	693	TRIM27	743	RAB29	793	UTP11L	843	PUS1	893	TFDP2
644	HMGB1	694	NPM3	744	IAH1	794	MRPL17	844	CDK5RAP1	894	SYNJ2BP-COX16
645	TIMMDC1	695	NGDN	745	LAGE3	795	CREB3L4	845	RBM8B	895	PAIP1
646	COX16	696	EIF2A	746	U2SURP	796	RP11-667K14.4	846	XRCC6BP1	896	MTIF2
647	FBL	697	MRPS15	747	GLO1	797	SPATA5L1	847	SBK1	897	FOXP4-AS1
648	CDC7	698	RFC5	748	SERTAD4	798	ORC6	848	HSBP1	898	POLA2
649	SRSF2	699	SLBP	749	PYGO2	799	TATDN1	849	SYNCRIP	899	HCG17
650	MRPL14	700	RAD1	750	DHX57	800	HSP90AA1	850	CCZ1B	900	APEX1

List 2 (GEPIA)

Gene	Gene		
901	TXLNG	951	MCM7
902	UXT	952	C1orf106
903	TMEM70	953	GLMN
904	TXNDC9	954	PPP1CC
905	RP1-228H13.5	955	RPAP3
906	MGME1	956	MMACHC
907	APTX	957	MTA3
908	ZNF883	958	HAUS8
909	MRPL35	959	DNMT1
910	TRA2B	960	MRPL33
911	DHFRP1	961	ARMC1
912	SNHG1	962	FOXMI
913	CUL3	963	TMPO
914	GTPBP10	964	COMMD7
915	RBMX	965	HMCEs
916	RHNO1	966	ACBD3
917	PPA2	967	PPP2R5A
918	FBXO45	968	EFTUD2
919	SNRPD2	969	ARPC1A
920	ZYG11A	970	PSMB2
921	CEP78	971	MRPS18C
922	RAD51	972	PIP5K1A
923	DHTKD1	973	FXN
924	C16orf59	974	ZNF638
925	GTF3A	975	GATAD2B
926	RP11-126K1.2	976	HSPD1
927	RP5-967N21.11	977	THOC3
928	BIRC5	978	DDX56

929	MTX2	979	SAP30
930	STRAP	980	H3F3AP6
931	CDCA5	981	SLC19A1
932	UBE3D	982	RP11-429G19.3
933	SLIRP	983	MAD2L1BP
934	PMVK	984	SF3B5
935	CSE1L	985	HSPH1
936	HOXC10	986	NDUFA9
937	POLR1B	987	CRLS1
938	GORAB	988	MRPS16
939	KIF20B	989	KIAA1524
940	OPN3	990	SUPT16H
941	HMGAI	991	DUT
942	XPO1	992	DNAJA1
943	TSNAX	993	METAP2
944	COCH	994	DTYMK
945	PCGF6	995	C14orf166
946	RRNAD1	996	HNRNPA3P5
947	ZNF281	997	TIAL1
948	LCLAT1	998	RP11-968A15.2
949	NRD1	999	PPOX
950	TUBA1B	1000	UBE2K

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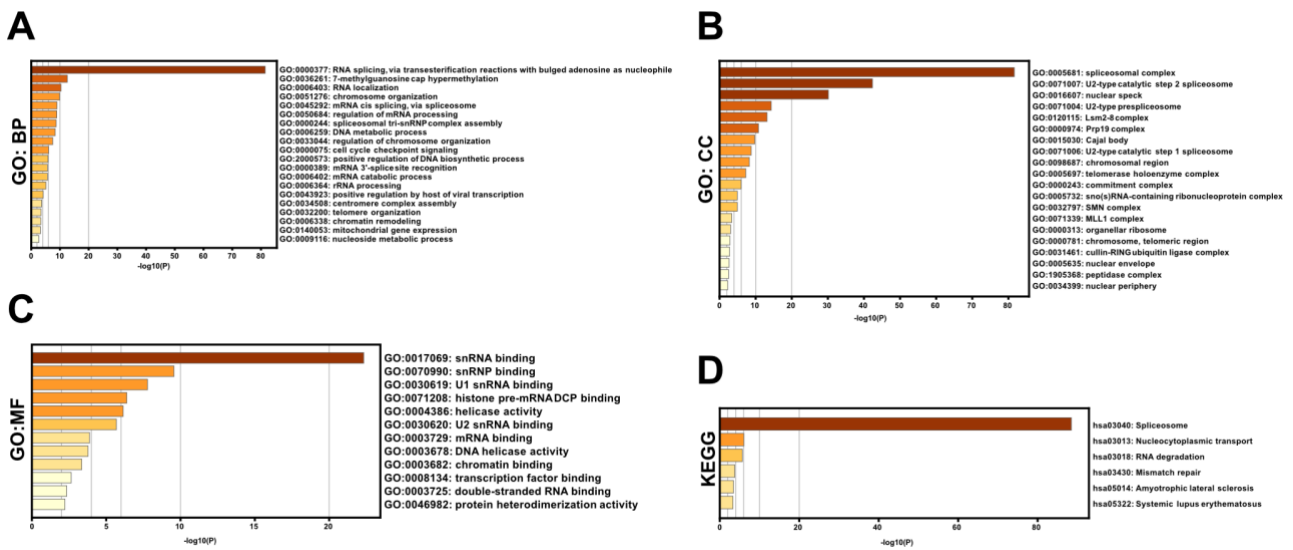
345 genes intersected by list1 and list2

Gene	Gene	Gene	Gene	Gene	Gene	Gene							
1	HMCES	51	MRPL47	101	MEMO1	151	MSTO1	201	MRPL3	251	PSMD4	301	GTF3C6
2	KRTCAP2	52	DYNLT1	102	SLC50A1	152	S100A11	202	POMP	252	JMJD4	302	TLCD1
3	DPY30	53	FAM72B	103	PPOX	153	SRP9	203	CDCA3	253	FLAD1	303	SF3B4
4	GOLT1A	54	EFNA4	104	CMC1	154	PTTG1	204	AHSA1	254	POLR2H	304	TPRKB
5	COX7A2L	55	COA6	105	ARHGGEF39	155	RPP30	205	TFB2M	255	LIN9	305	NUDT5
6	PDCL3	56	NUP37	106	METTL5	156	PEX11B	206	TIMM9	256	USF1	306	MORN2
7	ARV1	57	CENPH	107	GTF2H5	157	SNAPIN	207	TBCE	257	RPA3	307	SNRPB2
8	COX5A	58	SF3B6	108	LRR1	158	STMN1	208	NOP56	258	TMEM14B	308	HDFG
9	TAF5L	59	IMMP1L	109	RUVBL1	159	RAN	209	HNRNPA2B1	259	ADIPOR1	309	PIGU
10	BRIX1	60	TSEN15	110	THOC7	160	UBE2T	210	PPP1R14B	260	THUMPD2	310	PSMB1
11	GAS5	61	COMMD7	111	RANBP1	161	UFC1	211	OXSM	261	DDX59	311	TXN
12	CCDC59	62	MTX1	112	CSNK2B	162	PDCD2	212	ZC3HC1	262	TIPRL	312	BOLA1
13	SUMO1	63	EBPL	113	NSL1	163	GAR1	213	NDUFAF2	263	SDHC	313	SFT2D1
14	TOMM20	64	LAGE3	114	CHCHD1	164	RPF2	214	UQCC2	264	RNASEH2A	314	TRMT10C
15	DNAH14	65	COX7A2	115	RNF187	165	CKS2	215	TBCA	265	NDUFB11	315	SFXN4
16	POLRIC	66	ARF1	116	SLIRP	166	HNRNPC	216	UBE2C	266	B4GALT3	316	TEX30
17	CCNB1	67	SNRPF	117	TRAIIP	167	MRPL22	217	MEX3A	267	TBC1D7	317	RRP15
18	PTRHD1	68	EMG1	118	TXNL1	168	ITGB3BP	218	MRPL13	268	NOL7	318	STX6

19	NDUFA4	69	MRPL15	119	MRPS9	169	TIMM8A	219	CMC2	269	NVL	319	PIGC
20	NDUFAB1	70	PSMG2	120	PDCD2L	170	NDUFB3	220	USP21	270	DTL	320	SSBP1
21	IPO9	71	PUS1	121	RPL39	171	PARP1	221	MRPL55	271	TOMM5	321	TXNDC17
22	MRPL1	72	NOP58	122	APTX	172	CHTOP	222	ENY2	272	CBX3	322	ANP32B
23	HMG1	73	RPL22L1	123	SNRPG	173	DUSP23	223	MRPS5	273	CDC123	323	HNRNPL
24	MRPS14	74	TUBA1B	124	COQ3	174	CCDC167	224	APH1A	274	ACP1	324	HNRNPU
25	PRDX6	75	ZNF672	125	TMEM183A	175	PSMA2	225	MRPL14	275	TATDN3	325	CDKN3
26	ILF2	76	MAGOHB	126	PYGO2	176	FH	226	DTYMK	276	MARCKSL1	326	UBE2Q1
27	AIDA	77	AURKB	127	PPIA	177	ZNF695	227	PFDN6	277	TSACC	327	PRCC
28	PSMA3	78	CKS1B	128	GEMIN6	178	SKA3	228	TRIM11	278	ZNF32	328	RPL26L1
29	FARSB	79	ARPC5	129	NTPCR	179	MCTS1	229	EEF1E1	279	NIT2	329	FDPS
30	CLTA	80	ANAPC7	130	NDUFB6	180	HDHC2	230	DYNLL1	280	MRPS15	330	RMI2
31	PDCD5	81	NDUFS2	131	TXNL4A	181	DUSP12	231	UBL5	281	CACYBP	331	NOL10
32	DGUOK	82	NENF	132	ERH	182	PTMA	232	HNRNPAB	282	MRPS21	332	SCNM1
33	RPP40	83	SCAMP3	133	RAB25	183	NUTF2	233	RAB4A	283	LINC00467	333	VRK1
34	BIRC5	84	TTC13	134	MRPL17	184	COX16	234	APOO	284	RBM8A	334	NEK2
35	TAGLN2	85	SS18L2	135	ABRACL	185	MRPL18	235	PSMB4	285	MAGOH	335	TRAP1
36	DAP3	86	UMPS	136	TRIAP1	186	METTL18	236	TAF11	286	EXO1	336	VPS45
37	MIS18A	87	C1QBP	137	UXT	187	RABIF	237	CCT3	287	TMEM258	337	UQCRH
38	ALKBH2	88	TIMM17A	138	APEX1	188	NUCKS1	238	HSPE1	288	NDUFA12	338	LYPLAL1
39	LAMTOR2	89	IGSF9	139	SF3B5	189	RBM34	239	TMEM177	289	NDUFS5	339	RPP38
40	BUD31	90	MRPS33	140	RFC4	190	DEDD	240	PSMB5	290	RPP21	340	TMEM81
41	UBQLN4	91	PDSS1	141	RPL30	191	TMEM9	241	SSR2	291	VPS72	341	PFDN2
42	GLRX2	92	CPSF3	142	HAUS8	192	MTFR2	242	SPC25	292	GNPAT	342	UCK2
43	MRPL24	93	FKBPL	143	SRP19	193	PPIH	243	CHEK2	293	GMNN	343	EIF2D
44	TPM3	94	CENPL	144	TADA1	194	RFC2	244	RNPEP	294	NDUFA9	344	RPL39L
45	MGST3	95	GGPS1	145	MRPL9	195	BPNT1	245	TMCO1	295	SARNP	345	SNRPD2
46	CDK1	96	PMVK	146	ABT1	196	NIFK	246	MRPS16	296	FAM104B		
47	ACBD6	97	SNRPC	147	NUF2	197	CMSS1	247	FAM72A	297	UCHL5		
48	JTB	98	SNRPD1	148	CALM2	198	EXOSC1	248	FBL	298	BOLA3		
49	TOR3A	99	UQCRB	149	EXOSC8	199	SRSF7	249	CNIH4	299	MRPL51		
50	PMF1	100	PCNA	150	ARL8A	200	SH3BP5L	250	GGCT	300	HAX1		

Supplementary Figure 2. The lists of genes used for pan-cancer enrichment analysis. (A) list1: The 1000 SNRPE correlated genes obtained through the cBioPortal tool. **(B) list2:** The top 1000 SNRPE correlated genes obtained through the GEPIA tool. **(C)** The 345 genes intersected by list1 and list2.

Supplementary Figure 3. Functional enrichment analysis of SNRPE in breast cancer.



Supplementary Figure 3. Functional enrichment analysis of SNRPE in breast cancer. (A-C) GO enrichment analysis of the 345 SNRPE correlated genes in breast cancer. **(D)** KEGG enrichment analysis of the 345 SNRPE correlated genes in breast cancer.