

Supplementary Table 1: List of cellular senescence related genes

No.	Name
1	TP53
2	CDKN2A
3	CDKN1A
4	SIRT1
5	RSL1D1
6	TERT
7	RB1
8	PML
9	SIRT6
10	MAPK14
11	ATM
12	TERF2
13	BMI1
14	CDK2
15	CDKN1B
16	E2F1
17	LMNA
18	EZH2
19	CDK4
20	ID1
21	CDK6
22	MDM2
23	MAPK1
24	IL6
25	SP1
26	NUAK1
27	UBN1
28	TBX2
29	LMNB1
30	WRN
31	PTEN
32	CGAS
33	YPEL3
34	PHB1
35	H2AX
36	HMGA2
37	JUN
38	NFKB1
39	IGFBP7
40	TBX3
41	POT1
42	STAT3
43	MAPK3
44	CDKN2B
45	MYC
46	CXCL8
47	HIRA
48	RELA
49	ZNF277
50	KDM6B
51	IL1A
52	TERF1
53	CCNA2
54	H1-4
55	FOS

56	MAPK8
57	MTOR
58	IFI16
59	MAPK10
60	ZKSCAN3
61	ULK3
62	HRAS
63	MRE11
64	CAV1
65	ASF1A
66	CSNK2A1
67	ETS1
68	ACD
69	MDM4
70	ING1
71	PNPT1
72	TINF2
73	UBTD1
74	SIRT7
75	MAP3K5
76	TXN
77	RBBP4
78	UBC
79	FZR1
80	H4C16
81	TGFB1
82	RXRA
83	TWIST1
84	RBL1
85	RBL2
86	RNF114
87	IFNB1
88	MAP2K4
89	MAPK9
90	MAPKAPK5
91	FOXO1
92	HMGA1
93	EP400
94	CABIN1
95	H3-3A
96	FBXO5
97	MAP2K3
98	MAPK11
99	BRAF
100	IGF1
101	NBN
102	HSPA9
103	AKT1
104	ETS2
105	H4C1
106	MAP2K6
107	NOX4
108	KAT5
109	UBE2D1
110	CCNE2
111	HDAC1
112	NPM1
113	SELENOH

114	VENTX
115	SRF
116	LBR
117	EP300
118	PRKAA1
119	HSPA4
120	FOXO1
121	SMARCB1
122	NFE2L2
123	TP63
124	CBX4
125	E2F2
126	FOXO3
127	CBX8
128	BACH1
129	TERF2IP
130	TAGLN
131	PARP1
132	E2F3
133	CCND1
134	H1-5
135	KNDC1
136	OPA1
137	IGFBP5
138	HSF1
139	PIM1
140	MAP2K7
141	NOS3
142	PPARG
143	GLB1
144	KIR2DL4
145	PRKCD
146	CDKN2C
147	CEBPB
148	DNM1L
149	CDK1
150	SMC5
151	SMC6
152	TCF7L1
153	TFDP1
154	CCNE1
155	CDKN2D
156	KRAS
157	STAT1
158	IFNG
159	CLU
160	EGF
161	EHMT2
162	CCNA1
163	SUZ12
164	H3-4
165	RNF2
166	RING1
167	PRMT6
168	MAGEA2
169	MAGEA2B
170	RARB
171	H2AZ1

172	H2AJ
173	SERPINE1
174	CPT1C
175	TGFB1I1
176	DUSP6
177	JUNB
178	CHEK2
179	ELAVL1
180	RAD50
181	CDC27
182	ANAPC7
183	PHC2
184	ANAPC5
185	H1-1
186	ANAPC4
187	THBS1
188	ID2
189	EGFR
190	PHB2
191	CDK5
192	HNRNPA1
193	TFDP2
194	H1-3
195	YAP1
196	H1-2
197	H3C1
198	H2BC5
199	SIRT3
200	IFI27
201	BRCA1
202	CNOT6
203	HIF1A
204	PIK3CG
205	HELLS
206	BMAL1
207	E2F4
208	CCNB1
209	RPS6KA1
210	MAPKAPK3
211	MAPKAPK2
212	UBB
213	RPS27A
214	CNOT6L
215	AR
216	HLA-G
217	HSPA8
218	CDKN2AIP
219	SOD2
220	HSPD1
221	MAD2L1
222	GAPDH
223	ZSCAN4
224	RPS6KB1
225	HSPA1A
226	NOTCH1
227	LATS1
228	IGF2
229	STUB1

230	AFP
231	IL1B
232	DCLRE1B
233	FGFR1
234	TGFB2
235	MIF
236	XRCC6
237	MFN1
238	CTSD
239	SOD1
240	TNF
241	PSMC4
242	CBX2
243	PHC1
244	PHC3
245	H2AC4
246	MMP7
247	NR1H2
248	PLK1
249	FGF2
250	PIK3CA
251	ZEB1
252	PRKAA2
253	MSN
254	CPEB1
255	ANAPC1
256	RBBP7
257	ANAPC10
258	CDC16
259	CDC23
260	MOV10
261	UBA52
262	ANAPC2
263	H1-0
264	H2AC20
265	H2AZ2
266	H2BC3
267	H2BC4
268	ANAPC16
269	H2AC6
270	H2AC7
271	H2BC1
272	H2AC14
273	H2AC8
274	H2AC18
275	H2AC19
276	ABL1
277	BIRC5
278	BHLHE40
279	VTI1B
280	TKT
281	SPACDR
282	VIM
283	CHEK1
284	ARG2
285	EGR1
286	HDAC4
287	NEK6

288	KDM5B
289	UHRF1
290	FIS1
291	EEF1A1
292	SKP2
293	G6PD
294	RPS6KA3
295	MAP4K4
296	MAPK7
297	EHMT1
298	RPS6KA2
299	TNIK
300	UBE2C
301	EED
302	MINK1
303	ERF
304	UBE2E1
305	UBE2S
306	AGO1
307	ANAPC11
308	H2BC21
309	H3-3B
310	SCMH1
311	TNRC6A
312	TNRC6B
313	AGO3
314	H4C3
315	H2BC11
316	H2BC9
317	H4C11
318	AGO4
319	CBX6
320	H2BC14
321	H3C2
322	H4C2
323	H4C8
324	H4C9
325	H2BC13
326	H2BC15
327	H3C4
328	H4C12
329	H4C5
330	H3C11
331	H3C12
332	H3C14
333	H4C4
334	TNRC6C
335	ANAPC15
336	H2BC10
337	H2BC12
338	H2BC17
339	H2BC26
340	H2BC6
341	H3C10
342	H3C3
343	H3C6
344	H3C7
345	H3C8

346	H4C13
347	CDC26
348	H2BC8
349	H4C14
350	H4C6
351	H2BC7
352	H3C13
353	H3C15
354	H2AB1
355	H4C15
356	COMMD3-BMI1
357	LOC102724334
358	HSPB1
359	CD36
360	AGO2
361	DUSP3
362	AURKA
363	KMT5A
364	IGF1R
365	ING2
366	CENPA
367	SRSF3
368	ERBB2
369	HDAC9
370	PRMT1
371	GADD45A
372	TNFSF13
373	IL24
374	RARA
375	WNT5A
376	ABI3BP
377	INS
378	SMARCD1
379	ZMPSTE24
380	DNMT1
381	PRKCA
382	SIRT2
383	SERPINF1
384	LGALS3
385	KL
386	AGT
387	CALR
388	DICER1
389	VTI1A
390	MTF2
391	TMPRSS11A
392	PTTG1
393	PTPRB
394	MARCHF5
395	MAPT
396	SPARC
397	PRPF19
398	IGFBP3
399	SARS1
400	NOS2
401	RAF1
402	SMAD3
403	MYBL2

404	NFIC
405	ZNF768
406	CAVIN1
407	YBX1
408	TLR2
409	CXCR2
410	RAN
411	SDC1
412	LPAR3
413	E2F7
414	XAF1
415	DPY30
416	LRRC56
417	BCL2
418	CTSB
419	SLC25A5
420	EHF
421	CYCS
422	GATA4
423	DKC1
424	TCF3
425	DAXX
426	WWTR1
427	PCNA
428	MORC3
429	ZBTB7A
430	KDR
431	ACLY
432	SATB1
433	ETV7
434	CASP3
435	NEK2
436	COPS2
437	TFAP4
438	FGFR2
439	ISG15
440	SPRY1
441	HAS2
442	HJURP
443	CIP2A
444	AURKB
445	PEBP1
446	BRF1
447	PPP2CA
448	IRF7
449	PRDX2
450	YWHAZ
451	MEF2A
452	CALCA
453	METTL3
454	IFNA1
455	KAT6A
456	BUB1
457	MORF4L1
458	GDF15
459	DYRK1A
460	ENO1
461	PPARD

462	DKK1
463	KRT10
464	FILIP1L
465	BRCA2
466	PTPN11
467	HSP90AA1
468	SOX2
469	RARS1
470	SRSF1
471	PRDX3
472	TEAD4
473	MPP1
474	ERRFI1
475	CST1
476	EEF1E1
477	APEX1
478	FXR1
479	HSPA1L
480	GNL3
481	LAMP1
482	AIM2
483	CTCFL
484	GADD45G
485	MAFK
486	MET
487	PLAT
488	USP7
489	IL10
490	FOXP3
491	ITPR2
492	TGFA
493	BAG3
494	CBX1
495	MAD2L1BP
496	TSLP
497	B2M
498	SLC30A10
499	TP73
500	SERPINB2
501	MST1R
502	WFDC1
503	KIT
504	VCP
505	HNF4A
506	GPX1
507	CUL4B
508	KDM5A
509	SND1
510	BAG5
511	AGR2
512	RRAD
513	FAHD1
514	PDIA6
515	HMOX1
516	MMP1
517	WNT7A
518	TRIB2
519	ITGB3

520	GJA1
521	PTPN6
522	VCAM1
523	KDM4A
524	ARID3A
525	SIN3B
526	SMAD4
527	MMP13
528	EEF2
529	IRF1
530	OXTR
531	TGIF1
532	TLR5
533	ADAMTS5
534	PFKFB3
535	ARRB1
536	FOXA1
537	SLC13A3
538	LMNB2
539	NUDT1
540	TIMELESS
541	DCD
542	TP53BP1
543	SMARCA4
544	MAP3K7
545	CTSZ
546	S100A13
547	TSC22D4
548	NAMPT
549	UBE3A
550	SQSTM1
551	MAP2K1
552	VASH1
553	NOX1
554	TEAD1
555	SMARCE1
556	MCAM
557	PRPF8
558	TEAD3
559	INSR
560	ALK
561	PDGFB
562	NFKBIA
563	ACTB
564	PDPK1
565	HADHB
566	MFN2
567	UQCRC2
568	FOSL1
569	ELN
570	IL13
571	KIF2C
572	SIX1
573	DNAJA1
574	HNRNPL
575	HSPB2
576	ANGPTL2
577	METTL14

578	ATR
579	CD28
580	NOS1
581	GPI
582	PRPF3
583	BAZ1A
584	LARP4
585	HBP1
586	PTGS2
587	CTNNB1
588	CAT
589	NOTCH3
590	KNG1
591	RPL5
592	AKR1B1
593	COL4A2
594	ILK
595	PAX3
596	POLB
597	SFN
598	SOX5
599	WIF1
600	HBEGF
601	DGCR8
602	CHD5
603	MUC4
604	CCNG1
605	RNF4
606	BTG3
607	CSNK2B
608	PAK2
609	ETV6
610	MIB1
611	NDUFS2
612	RUVBL1
613	FOSB
614	RPIA
615	RPL26
616	SAMHD1
617	EEF1B2
618	ING3
619	TIFA
620	BCL2L1
621	CCL2
622	MITF
623	VEGFA
624	MORF4L2
625	SIAH1
626	CASP4
627	EPHA3
628	IL7R
629	PPP1CA
630	SPHK1
631	STS
632	KPNA2
633	OGT
634	CD9
635	NCOR1

636	PGRMC1
637	HMMR
638	IL17F
639	KPNA3
640	KPNB1
641	NFIA
642	NFIB
643	NFIX
644	SELENBP1
645	TOM1
646	U2AF1
647	DSG1
648	KPNA1
649	PTAFR
650	LARP7
651	SMG1
652	TOPBP1
653	WWP1
654	CREG1
655	MAFG
656	PIR
657	ATF7IP
658	LSG1
659	PGAM5
660	GNG11
661	LGALS7B
662	WNT1
663	BCL6
664	CITED2
665	NEK4
666	TGFBR2
667	ABI3
668	GSK3B
669	RBX1
670	JAK1
671	CFB
672	HADHA
673	LPAR1
674	PDHB
675	SLC25A13
676	CDC73
677	LARS1
678	PPM1A
679	SLC1A5
680	C1QBP
681	EIF3A
682	FOXP2
683	POLR2A
684	TFE3
685	BLMH
686	GRK4
687	KCNH7
688	RPS15A
689	VDAC2
690	YME1L1
691	CLIC1
692	EFTUD2
693	MATR3

694	ASPSCR1
695	PSMC5
696	UBE2E3
697	DUSP16
698	EIF3E
699	EML4
700	IL17B
701	NINJ1
702	RPLP2
703	CAND1
704	EIF3L
705	RBM4
706	TIMM50
707	FBXO3
708	IL20
709	IPO7
710	HACD3
711	PSME4
712	KPNA5
713	CD24
714	ATOH8
715	DIRAS3
716	H2BC12L
717	CDKN1C
718	POU5F1
719	DNMT3A
720	BAX
721	PPARGC1A
722	ENG
723	APP
724	CDC25C
725	PLD2
726	WNT16
727	KCNK9
728	CNTN2
729	FZD5
730	KCNA2
731	DAO
732	EPHX1
733	FGF23
734	MKNK1
735	SF3B1
736	SOX9
737	BLVRA
738	AHCYL1
739	KCNJ12
740	SNAI1
741	WNT9A
742	ZMYND11
743	PHLPP2
744	CAPNS1
745	MAPK15
746	NACC1
747	NUDT5
748	SLC52A1
749	AKTIP
750	MYBBP1A
751	SUPT6H

752	NCAPH2
753	PES1
754	XAB2
755	PPP1R13B
756	SPIN1
757	ATG9B
758	CXCL14
759	SERPINB12
760	SURF2
761	ZNF778
762	ZMAT3
763	FBXO46
764	ITGB1
765	CBX7
766	FAS
767	MECP2
768	TLR4
769	ANXA5
770	AKT3
771	BCL2L12
772	ECRG4
773	HDAC2
774	PGR
775	PIN1
776	DEK
777	UCP2
778	PIK3CD
779	CREBBP
780	RHOA
781	KEAP1
782	HMGB1
783	MACROH2A1
784	TGFBR1
785	POLD1
786	RUNX2
787	IL4
788	SKP1
789	SUV39H1
790	CD44
791	ATG5
792	TIMP1
793	RASSF1
794	ESR1
795	PLA2R1
796	GGCT
797	PLAU
798	LEP
799	CXCL12
800	IVL
801	NUAK2
802	RECQL4
803	EPHB4
804	TSC2
805	BAP1
806	RARG
807	SCN9A
808	TSC1
809	ADIPOQ

810	ASIC1
811	CDC25B
812	ERCC5
813	SPOP
814	CRABP2
815	ASIC3
816	TRIM27
817	JDP2
818	CCL26
819	EID3
820	NOL12
821	SRC
822	PRKDC
823	RUNX1
824	BTG2
825	NANOG
826	CALB1
827	RPL7
828	ESR2
829	FGF1
830	SHC1
831	HGF
832	BMP4
833	PTK2
834	CXCL1
835	KLRG1
836	PRKG2
837	POU2F1
838	PEA15
839	MXD1
840	ZNF410
841	FANCD2
842	PINK1
843	MAP2
844	CBX5
845	BRD7
846	MSRA
847	NES
848	MSRB2
849	TXNIP
850	ILF3
851	ATP13A3
852	HDAC6
853	HSPA5
854	NF1
855	LOXL2
856	MCM2
857	BECN1
858	BMP6
859	EIF5A
860	SOCS1
861	XRCC5
862	ELK1
863	SIRT4
864	MCL1
865	KITLG
866	MKI67
867	BUB1B

868	EDN1
869	PPM1D
870	B3GAT1
871	CDKN3
872	RASSF5
873	DNAJA3
874	PKM
875	PRDX1
876	CCN2
877	HSPA2
878	HSPA6
879	PCGF2
880	IDH1
881	CASP8
882	CD40LG
883	HDAC3
884	TOP1
885	ATF2
886	PRDX5
887	APOD
888	SELE
889	DHX9
890	FOXO4
891	MSRB1
892	TMEM158
893	APC
894	ZEB2
895	RFC1
896	TXNRD1
897	NSUN2
898	SP100
899	USP17L2
900	GRSF1
901	ITGB4
902	GP1BA
903	CDC6
904	PECAM1
905	MVP
906	RAC1
907	IRS1
908	LIG1
909	PRMT5
910	GLO1
911	HNRNPD
912	ZFYVE9
913	RPL7A
914	STING1
915	INPP4B
916	ERGIC2
917	UBN2
918	MMP9
919	MGMT
920	CYBB
921	NR3C1
922	PLAUR
923	ATF3
924	OLR1
925	CCN1

926	ANXA2
927	CRTC1
928	DYNC1I2
929	BCCIP
930	CUL1
931	RAD9A
932	CDC42
933	CTSK
934	RAD51
935	STK11
936	TF
937	TUBB
938	BLM
939	HSP90AB1
940	RHEB
941	KAT2B
942	STAT5A
943	EIF4G1
944	TNFRSF11B
945	TNFSF10
946	CBX3
947	HMGB2
948	PABPC1
949	TNFRSF10D
950	NR2E1
951	MAP1LC3A
952	RECK
953	BGLAP
954	MEOX2
955	ZNF365
956	CCAR2
957	NGF
958	IL1RN
959	BDNF
960	GSN
961	IL2
962	SYP
963	CSF1
964	HES1
965	LIF
966	DKK3
967	LIN9
968	BMPR1A
969	MAP3K3
970	PLK2
971	NUP62
972	ZMIZ1
973	PAWR
974	PRELP
975	NSMCE2
976	MNT
977	CBS
978	DNMT3B
979	KDM1A
980	NGFR
981	ATP6V0A2
982	CKB
983	ME1

984	DLX3
985	NEDD8
986	FBXO31
987	JAK2
988	SMAD2
989	SNCA
990	IL2RA
991	NTRK1
992	CDH1
993	GLS
994	MSH2
995	MYH9
996	OGG1
997	POLG
998	CCND3
999	RPA1
1000	BAK1
1001	BTRC
1002	CANX
1003	CDC45
1004	PABPN1
1005	SIRT5
1006	NCL
1007	IL15
1008	RACK1
1009	CIB1
1010	DUSP4
1011	MDC1
1012	TP53BP2
1013	ATF6
1014	DCN
1015	CASP2
1016	CD38
1017	GRB2
1018	MDH1
1019	PFN1
1020	ERCC1
1021	UBE2D3
1022	AIMP2
1023	CDC20
1024	EWSR1
1025	SFRP1
1026	NR2C2
1027	ZNF148
1028	TEP1
1029	DUSP19
1030	RPL28
1031	CIAO2B
1032	HOPX
1033	LOX
1034	CXCR4
1035	ADA
1036	DPP4
1037	TNFRSF1A
1038	STK4
1039	NLRP3
1040	SLC4A1
1041	IL1R1

1042	CGA
1043	IL3
1044	KLF4
1045	SMURF2
1046	TIMP3
1047	DDAH2
1048	SKIL
1049	ANK2
1050	MAP1LC3B
1051	CSF3
1052	IL11
1053	LIN54
1054	ZFP36
1055	LIN52
1056	LIN37
1057	STAT6
1058	PDK3
1059	CTNNAL1
1060	ACVRL1
1061	TNFRSF10B
1062	GSR
1063	PRKD1
1064	EIF2AK3
1065	ODC1
1066	PRKN
1067	AGER
1068	ACTA2
1069	ARHGDI1A
1070	CASP9
1071	GSS
1072	IRF5
1073	MCM7
1074	SERPINH1
1075	CYB5R3
1076	HNRNPK
1077	RUVBL2
1078	CCL5
1079	IRF3
1080	MAF
1081	REV3L
1082	ENDOG
1083	KDM2B
1084	POSTN
1085	PTBP1
1086	RPL27
1087	RPS6
1088	PSMD9
1089	RUNX1T1
1090	ZBTB17
1091	CUL7
1092	HNRNPM
1093	PIEZO1
1094	TP53I3
1095	ID4
1096	MARCKS
1097	PHF12
1098	RPS18
1099	BABAM2

1100	CKAP4
1101	FBXW8
1102	SRFBP1
1103	FOXQ1
1104	PAK1
1105	PKN1
1106	MECOM
1107	ARHGAP15
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2129	ASGR1
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2131	ATP6V1H
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2135	CLDN11
2136	COL10A1
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2138	COX4I2
2139	CXCL11
2140	CYB561
2141	DLGAP1
2142	DNTT
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2145	FOXF1
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2147	GPR17
2148	GPT
2149	GTF2IRD1
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2151	HLA-E
2152	IFITM3
2153	JUND
2154	KDM2A
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2156	KLF10
2157	LAG3
2158	LDLRAP1
2159	LGALS3BP
2160	LUM
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2162	MTSS1
2163	NTM
2164	OTUB1
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2166	PDPN
2167	PIP4K2B
2168	PLCD4
2169	POGZ
2170	PPIG
2171	PRX
2172	PTGER1
2173	PTGES2
2174	PTMA
2175	RAD52
2176	RBM10
2177	REV1
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2179	SFTPC
2180	SNIP1
2181	SOX11
2182	SPINK1
2183	SRCAP
2184	STAB1
2185	TCN1
2186	TRAK1
2187	UBE2K
2188	VEGFD
2189	AKAP1
2190	ANKH
2191	ATP6V1C1
2192	ATP6V1C2
2193	ATP6V1D
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2195	BCAM
2196	BCLAF1
2197	BTG1
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2199	CDK5R2
2200	CDK5RAP2
2201	CERK

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2203	CLTB
2204	CNGA2
2205	CREM
2206	CTRL
2207	CXCL5
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2210	GAN
2211	GNRH1
2212	HIP1
2213	HLX
2214	HOXB7
2215	ICMT
2216	INCENP
2217	ITPKA
2218	KCTD17
2219	KLRB1
2220	LIMA1
2221	MAML1
2222	MAVS
2223	MED13L
2224	MICB
2225	MNX1
2226	MPG
2227	MYF5
2228	NCALD
2229	NRTN
2230	OSBP
2231	P2RY14
2232	PITRM1
2233	POLM
2234	POU4F1
2235	PTP4A3
2236	PVALB
2237	SGCB
2238	SLPI
2239	SRGN
2240	SST
2241	SYNE2
2242	SYT7
2243	TIAL1
2244	TPM4
2245	TRIM22
2246	TRIM71
2247	USP22
2248	WSB1
2249	ATF6B
2250	ATG12
2251	ATP6V0E1
2252	ATP6V1G1
2253	BIK
2254	CABLES1
2255	CALB2
2256	CAMP
2257	CBY1
2258	CCL19
2259	CD207

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2262	CLEC4A
2263	COX5B
2264	CUL9
2265	CXCL2
2266	CXCL6
2267	DIO3
2268	ECD
2269	FAIM
2270	FGF21
2271	GKN1
2272	HOXA3
2273	IL33
2274	ITLN1
2275	KLF2
2276	KRT86
2277	MICA
2278	MLLT3
2279	MSL3
2280	NAT10
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2282	NEU3
2283	NFYB
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2285	NRN1
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2291	PSD
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2293	RBPM5
2294	S100P
2295	SAA1
2296	SENP3
2297	SPARCL1
2298	SRMS
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2304	VGFB
2305	WNK2
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2307	ZC3H12A
2308	ZNF521
2309	ALKBH8
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2311	ATP6V1E2
2312	C1QTNF5
2313	CDK3
2314	DENND4A
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2317	EIF5A2

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2322	NDRG2
2323	NLRP5
2324	RNASEH2C
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2327	WDR33
2328	ZFX
2329	ZMYM3
2330	ZNF335
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2332	ATP6V0E2
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2334	CDH18
2335	CENPT
2336	CHTF18
2337	CMKLR2
2338	CRISP3
2339	DAZAP1
2340	DNAJC2
2341	DOHH
2342	DPT
2343	DZIP3
2344	EIF4ENIF1
2345	ENOX2
2346	GAS2
2347	GSDMD
2348	HOXB5
2349	IER3
2350	KIF16B
2351	KLF11
2352	MEX3B
2353	N4BP1
2354	NOTUM
2355	PDZD2
2356	PIWIL4
2357	POLR1E
2358	PSG1
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2360	RBM39
2361	RETREG1
2362	SLC25A17
2363	SOX8
2364	STXBP4
2365	SYNPO2
2366	THRAP3
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2369	TTF1
2370	UPK2
2371	ZNF217
2372	ZNF219
2373	ADPRH
2374	ANKRD12
2375	ATOH1

2376	ATP6V0B
2377	ATP6V1G2
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2379	CASC3
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2381	DEDD2
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2385	MAL
2386	MYDGF
2387	MZF1
2388	NUDT6
2389	RASEF
2390	RBM23
2391	RC3H1
2392	SLBP
2393	SPRR1B
2394	SSBP2
2395	TBPL1
2396	TP53INP1
2397	YTHDF2
2398	ZBTB46
2399	ZDHHC3
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2408	CDK2AP1
2409	CENPC
2410	CLASRP
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2413	FOKK1
2414	IER2
2415	INTS2
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2417	MAEL
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2422	RND1
2423	RRP15
2424	RRP8
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2426	SERINC5
2427	SNUPN
2428	XRN1
2429	BPIFB4
2430	C1QTNF9
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2435	SRRM4
2436	TSPAN32
2437	ZNF174
2438	ADM2
2439	ELL3
2440	MRFAP1L1
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2442	SPCS1
2443	SRSF12
2444	ZNF101
2445	BHLHE23
2446	BCL2L15
2447	DUSP21
2448	ELOA2
2449	KIR2DS4
2450	POTEE
2451	ZSCAN1
2452	GYPE
2453	PSG7
2454	MT-ND4L
2455	H1-7
2456	POTEJ
2457	SPATA31A3
2458	TRA
2459	TRD
2460	MCM3AP
2461	SLC25A46
2462	TRIM16
2463	MPO
2464	CSNK1D
2465	GFAP
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2468	DNAJB1
2469	NDUFS1
2470	NDUFS8
2471	KIF2A
2472	NDUFA9
2473	PRDX4
2474	TCOF1
2475	CTC1
2476	AGTR1
2477	GSTP1
2478	EIF4E
2479	IDE
2480	THRB
2481	CHRM2
2482	CP
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2484	AURKC
2485	NRP1
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2487	CTSH
2488	ERG
2489	GPX4
2490	NR3C2
2491	CTSS

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2493	GSTO1
2494	HMOX2
2495	HUWE1
2496	NDUFS7
2497	NDUFV1
2498	PPIA
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2502	TXNRD2
2503	ADNP
2504	ASXL1
2505	DNAJB2
2506	FNTA
2507	NDUFA10
2508	NDUFA6
2509	NDUFB10
2510	NDUFS4
2511	NDUFV2
2512	PON2
2513	SOD3
2514	TXN2
2515	CCS
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2518	GSTM1
2519	GSTZ1
2520	LOXL3
2521	NDUFA8
2522	NDUFB8
2523	ABCB8
2524	GSTA1
2525	GSTO2
2526	NUP93
2527	RNF8
2528	AGAP2
2529	GSTA2
2530	GSTA4
2531	GSTM4
2532	GSTM5
2533	NDUFB7
2534	NDUFC2
2535	NDUFV3
2536	ORC2
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2543	SOX1
2544	ACER2
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2546	GSTA5
2547	NDUFA3
2548	NDUFA7
2549	SELENOP

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2552	LAMTOR5
2553	NDUFB5
2554	PCGF6
2555	SAA2
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2557	H2AC1
2558	WDR75
2559	GSTT1
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2561	PRKACA
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2571	EDNRA
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2573	GYS1
2574	HDAC5
2575	IKZF1
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2577	MTAP
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2581	TUBA1A
2582	UBA1
2583	ALDH7A1
2584	DLD
2585	FST
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2589	MDH2
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2591	SDHB
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2595	USP9X
2596	YWHAG
2597	CTPS1
2598	GANAB
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2603	SLC16A1
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2605	AIMP1
2606	ALDH18A1
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2613	DLST
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2615	GLDC
2616	GYG1
2617	HCFC1
2618	HSD17B10
2619	IDO1
2620	MAT2A
2621	MAX
2622	PPP2R1B
2623	PRKAG1
2624	RANBP2
2625	RPSA
2626	SLC25A12
2627	SPTLC1
2628	SRPK1
2629	TARDBP
2630	TUBB1
2631	USP15
2632	XYL2
2633	YWHAH
2634	ACAD9
2635	ADAR
2636	AFG3L2
2637	ALDH3A2
2638	ATP5F1A
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2642	DDOST
2643	DDX6
2644	EIF2AK4
2645	GARS1
2646	GMPS
2647	GNMT
2648	HERC2
2649	HNRNPA2B1
2650	KARS1
2651	KAT6B
2652	LOXL4
2653	MARS1
2654	MTHFD1
2655	NME2
2656	NONO
2657	PLOD1
2658	PLOD2
2659	POLR3A
2660	PPP5C
2661	PRKAR2A
2662	PSMA3
2663	PSMA6
2664	PSMB1
2665	PSMB4

2666	PTGFR
2667	PYCR1
2668	PYCR2
2669	SARS2
2670	SLC25A3
2671	STIP1
2672	TET2
2673	TUBB4B
2674	VAPB
2675	WDR5
2676	WNT10A
2677	XPA
2678	YARS2
2679	YWHAQ
2680	ABCD3
2681	ALDH1B1
2682	AP1B1
2683	APOH
2684	AZGP1
2685	BCL10
2686	CD2
2687	CDC34
2688	CHD3
2689	CHD4
2690	CLPB
2691	COPB2
2692	CPOX
2693	CUL2
2694	DPM1
2695	EIF2B2
2696	EIF3F
2697	ELP1
2698	EPRS1
2699	FADS2
2700	FARSB
2701	FLII
2702	FUS
2703	GART
2704	GDI1
2705	HPN
2706	IGF2BP2
2707	IL18
2708	IREB2
2709	MAP1B
2710	MCCC2
2711	MPDZ
2712	NAE1
2713	NCOA1
2714	NUP155
2715	PBK
2716	PDIA3
2717	POLR1C
2718	POLR2B
2719	PPAT
2720	PPP1CC
2721	PPP2R2A
2722	PPP6C
2723	PSMC3

2724	RAB5A
2725	RAD23B
2726	RFC2
2727	RPL15
2728	RPL18
2729	RPL21
2730	RPN1
2731	RPS10
2732	SEC24C
2733	SET
2734	SF3B4
2735	SLC7A5
2736	SMARCC2
2737	TDP2
2738	TECR
2739	TNKS2
2740	TRAP1
2741	UFD1
2742	ACTR2
2743	AIP
2744	ANP32A
2745	AP2B1
2746	AP2S1
2747	ATG7
2748	ATP1B3
2749	BCOR
2750	BRCC3
2751	CDC37
2752	CTBP2
2753	DARS1
2754	DBT
2755	DDX1
2756	DRG1
2757	DTNA
2758	EIF2B1
2759	EIF4A3
2760	EXOSC3
2761	EXOSC9
2762	GATAD2B
2763	GTF2E2
2764	HAX1
2765	HNRNPDL
2766	HNRNPU
2767	IQGAP1
2768	MOGS
2769	MTA1
2770	MTMR3
2771	NDUFA4
2772	NUDC
2773	OPLAH
2774	ORC4
2775	PASK
2776	PDHA2
2777	PIP5K1A
2778	PMPCA
2779	PMPCB
2780	POLR2E
2781	POLRMT

2782	PRIM1
2783	PSMB7
2784	PSMD2
2785	PTRH2
2786	RANBP1
2787	RBMX
2788	RFC4
2789	RNMT
2790	RPL10
2791	RPL13
2792	RPL35A
2793	RPS20
2794	RPS26
2795	SEC23A
2796	SEC23B
2797	SFPQ
2798	SH3GL1
2799	SLC25A11
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2801	SNRPB
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2803	TARS1
2804	TARS2
2805	TBC1D4
2806	TUBB6
2807	UNC13B
2808	USP4
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2812	ASCC1
2813	DARS2
2814	ERO1A
2815	FARSA
2816	GAS1
2817	LRPPRC
2818	MRPS16
2819	PIGT
2820	POLR2C
2821	PPIE
2822	PRPF4
2823	PSMA1
2824	PSMA2
2825	PSMA5
2826	PSMC1
2827	PSMD12
2828	PSMD3
2829	PSMD7
2830	PUF60
2831	RCOR1
2832	RPL3
2833	RPN2
2834	RPS12
2835	RPS14
2836	RPS29
2837	SEC13
2838	SMARCD2
2839	SSR4

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2841	VAPA
2842	VPS11
2843	WDR26
2844	ABCA2
2845	AP2A1
2846	APBA2
2847	ASH2L
2848	CAPZA1
2849	CCNT1
2850	CDSN
2851	COMMD1
2852	COPS5
2853	DDX39B
2854	DEPTOR
2855	DHX30
2856	DNAJB6
2857	EEF1D
2858	ELOC
2859	ELP3
2860	ERP44
2861	EXOSC2
2862	EXOSC5
2863	EXOSC8
2864	FAF1
2865	FBN2
2866	FLAD1
2867	FLOT2
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2871	HNRNPR
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2873	IFT88
2874	IGF2BP3
2875	IPO8
2876	IQCB1
2877	IRS4
2878	ISYNA1
2879	KCTD1
2880	MAGED1
2881	MBD3
2882	MCAT
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2885	MRPS22
2886	MTA2
2887	MTHFD1L
2888	NAGK
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2891	NUP153
2892	NUP85
2893	NXN
2894	OLA1
2895	PABPC4
2896	PARS2
2897	PCBP1

2898	PCBP2
2899	PLS1
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2901	PPM1G
2902	PRIM2
2903	PSMB2
2904	PSMB6
2905	RAB10
2906	RAB1A
2907	RAB3A
2908	RAD18
2909	RANBP9
2910	RBM8A
2911	RIOK2
2912	RNGTT
2913	RPL19
2914	RPL4
2915	RPS23
2916	RPS7
2917	RPS9
2918	RTEL1
2919	SERPINA4
2920	SF3B2
2921	SIX6
2922	SLC25A22
2923	SMARCA5
2924	SNRPE
2925	SRP72
2926	SRSF9
2927	SSB
2928	SSBP1
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2932	TNPO3
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2935	TXNDC5
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2937	UBE3C
2938	VPS33A
2939	YBX3
2940	ABCF1
2941	ACTL6A
2942	AHSA1
2943	AP3S1
2944	ARPC4
2945	ATAD3A
2946	ATP5F1D
2947	CCT6B
2948	CDC5L
2949	COLGALT1
2950	CPVL
2951	CSE1L
2952	CST6
2953	CTNBL1
2954	CTPS2
2955	CXCR6

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2963	EIF2S2
2964	EIF3I
2965	EIF4E2
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2969	HNRNPF
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2971	HSPA14
2972	IL19
2973	IMMT
2974	IPO5
2975	LSM4
2976	MAGED2
2977	MAT2B
2978	MED17
2979	MLF1
2980	MYL6
2981	NDUFS5
2982	NPLOC4
2983	NUP160
2984	NUP88
2985	NXF1
2986	PDLIM5
2987	PHF6
2988	POP1
2989	PPIH
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2991	PRC1
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2993	PSMC2
2994	PSMD11
2995	PSMD13
2996	PSMD8
2997	PSME3
2998	PTCD3
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3003	RIOK1
3004	RNF220
3005	RPL13A
3006	RPL23
3007	RPL23A
3008	RPL34
3009	RPS11
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3012	SNRNP70
3013	SNX9

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3015	SPG11
3016	SSR1
3017	TARBP2
3018	TBL2
3019	TFCP2
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3021	TSR1
3022	UBR5
3023	UCHL5
3024	UGGT1
3025	UPF1
3026	VPS29
3027	WDR11
3028	ZFYVE16
3029	ACBD3
3030	ADRM1
3031	ARIH1
3032	ARIH2
3033	ASCC3
3034	ATP5F1C
3035	ATXN2L
3036	BAG4
3037	BYSL
3038	CAPZA2
3039	CHAF1B
3040	CNN2
3041	COPS3
3042	CXCL16
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3044	ECSIT
3045	EIF3D
3046	EIF3G
3047	EIF3H
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3050	EXOSC7
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3053	GDI2
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3057	GTPBP1
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3059	HNRNPH2
3060	HNRNPH3
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3065	LARP1
3066	LIN7A
3067	LSM2
3068	LSM3
3069	MCM10
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3071	MRPL15

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3073	MRPS25
3074	MRPS28
3075	MRPS7
3076	MRS2
3077	MYL12A
3078	MYL6B
3079	NCBP1
3080	NDUFB4
3081	NECAP1
3082	NUP205
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3084	POLR3D
3085	PPP6R2
3086	PSMC6
3087	RBBP5
3088	RCC2
3089	RCL1
3090	RFC5
3091	RNPS1
3092	RPL14
3093	RPL24
3094	RPL27A
3095	RPL29
3096	RPL6
3097	RPL9
3098	RPRD1B
3099	RPS15
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3102	SAP18
3103	SCFD1
3104	SEC61B
3105	SF3A3
3106	SF3B3
3107	SMNDC1
3108	SMU1
3109	SNRPD2
3110	SNTB2
3111	SRP19
3112	SRP68
3113	SYNCRIP
3114	TMOD1
3115	TRAPPC3
3116	TSNAX
3117	ULBP2
3118	URI1
3119	USP32
3120	USP34
3121	YEATS4
3122	AASDHPPT
3123	ACTR1A
3124	ACTR3B
3125	ANKRD28
3126	COPS8
3127	CPNE3
3128	CSTF3
3129	DDX24

3130	DDX3Y
3131	DIMT1
3132	DNAJC10
3133	EIF3B
3134	EIF3C
3135	EIF3K
3136	EIF3M
3137	ELOB
3138	EXOC3
3139	FAM120A
3140	GTF3C4
3141	HECTD1
3142	HIGD1A
3143	HNRNPA3
3144	IFT27
3145	IFT57
3146	IFT74
3147	INA
3148	KPNA6
3149	LYAR
3150	MAP1A
3151	MRPL11
3152	MRPL4
3153	MYO1D
3154	NAP1L1
3155	NAP1L4
3156	NRDC
3157	NUF2
3158	NUP50
3159	ORC3
3160	PALS1
3161	PEG3
3162	PLRG1
3163	PNO1
3164	POLDIP3
3165	PYCR3
3166	RANBP10
3167	RPL17
3168	RPL18A
3169	RSL24D1
3170	SNRPD1
3171	SRPRB
3172	SRSF4
3173	STOML2
3174	STRAP
3175	TAF9B
3176	TFB2M
3177	TRMT10C
3178	U2AF2
3179	ULBP1
3180	ZNF331
3181	AAMP
3182	AAR2
3183	AP2A2
3184	API5
3185	AVEN
3186	CACYBP
3187	CAPRIN1

3188	CCDC8
3189	CEP78
3190	CHCHD3
3191	CHST9
3192	CLNS1A
3193	CMTM8
3194	COPS7B
3195	CPSF2
3196	DCAF1
3197	DCAF7
3198	DHX32
3199	DRAP1
3200	EBNA1BP2
3201	EFHD2
3202	EXOSC4
3203	FAF2
3204	FUBP3
3205	G3BP2
3206	GPS1
3207	GTF3C1
3208	GTF3C5
3209	HNRNPAB
3210	HSPA4L
3211	IFT80
3212	INTS9
3213	IPO4
3214	KIFBP
3215	LACTB
3216	LRRC1
3217	LSM6
3218	LSM7
3219	MAEA
3220	MPHOSPH6
3221	MPLKIP
3222	MRPL1
3223	MRPL22
3224	MRPL23
3225	MRPL24
3226	MRPL37
3227	MRPL39
3228	MRPS10
3229	MRPS2
3230	MRPS24
3231	MRPS30
3232	MRPS35
3233	MRPS9
3234	MTREX
3235	NCBP2
3236	NMD3
3237	NOB1
3238	NOM1
3239	NOSIP
3240	NPM3
3241	NSMCE3
3242	NUP188
3243	NUP37
3244	PAF1
3245	PCGF5

3246	PELO
3247	PJA2
3248	POLR2G
3249	POLR2H
3250	PPP6R3
3251	PSMA8
3252	RALY
3253	RBM22
3254	RBM38
3255	RNH1
3256	RPL32
3257	RPL37A
3258	RPL38
3259	RPP30
3260	RPS21
3261	RPS25
3262	RRP1
3263	RRP12
3264	SENP7
3265	SNRPB2
3266	SNRPF
3267	STAU1
3268	SUGT1
3269	TCF25
3270	TIPIN
3271	TOMM34
3272	TRIM26
3273	TRIM41
3274	TRMT11
3275	TSHZ3
3276	VPS18
3277	YPEL5
3278	ZC3HAV1
3279	ZFR
3280	ZNF207
3281	ZNF638
3282	ZNHIT6
3283	AMER1
3284	ANKHD1
3285	ARFIP1
3286	ASCC2
3287	AUP1
3288	BRIX1
3289	CNN3
3290	CNRIP1
3291	COPS6
3292	COPS7A
3293	DBR1
3294	DDX28
3295	DHX40
3296	DHX57
3297	DNAJC9
3298	GATAD2A
3299	GPRASP2
3300	GRPEL2
3301	GRWD1
3302	GSE1
3303	GTF3C2

3304	GTF3C3
3305	HCFC2
3306	HIVEP3
3307	HMG20A
3308	HNRNPA0
3309	HNRNPLL
3310	HNRNPUL1
3311	IFT52
3312	IFT56
3313	LANCL1
3314	LARP4B
3315	LUC7L2
3316	MAGOHB
3317	MARCKSL1
3318	MCTS1
3319	MRM3
3320	MRPL10
3321	MRPL13
3322	MRPL16
3323	MRPL17
3324	MRPL19
3325	MRPL2
3326	MRPL28
3327	MRPL43
3328	MRPL46
3329	MRPL49
3330	MRPS14
3331	MRPS17
3332	MRPS18B
3333	MRPS27
3334	MRPS34
3335	MRPS6
3336	NDUFAF5
3337	NSMCE1
3338	NT5DC2
3339	NUDT21
3340	NUP42
3341	PCNX1
3342	PDCD2
3343	PFDN2
3344	PHAX
3345	PNMA2
3346	PPIL4
3347	PPP6R1
3348	RANBP6
3349	RIOX2
3350	RPAP1
3351	RPAP2
3352	RPL36A
3353	RPRD1A
3354	RPS27L
3355	SAMD4B
3356	SART3
3357	SEC16A
3358	SKIC8
3359	SNRPA1
3360	SNRPD3
3361	SRP14

3362	SRSF10
3363	THUMPD3
3364	TMED2
3365	TRMT112
3366	TTC4
3367	TUBAL3
3368	TUT1
3369	TXNRD3
3370	WDR6
3371	WDR82
3372	ZFP91
3373	ZNF3
3374	ZNF326
3375	ANGEL1
3376	ANGEL2
3377	ARHGAP20
3378	ARMC8
3379	ASCL2
3380	ATP5MK
3381	CHTOP
3382	COPS4
3383	CPEB3
3384	CSNK1A1L
3385	DDX52
3386	DEPDC1
3387	DHRS7B
3388	DUS3L
3389	EIF1B
3390	EXOSC6
3391	FAM91A1
3392	GIN54
3393	GPN3
3394	H2AC11
3395	INSM2
3396	IPO9
3397	ISOC2
3398	KCTD5
3399	LANCL2
3400	LMOD2
3401	MAP6
3402	MCMBP
3403	MRPL21
3404	MRPS11
3405	MRPS15
3406	MRPS26
3407	MRPS31
3408	MRPS33
3409	MRPS5
3410	NELFB
3411	NIFK
3412	NTPCR
3413	PARP16
3414	PIH1D1
3415	PPP2R2D
3416	PRRC2A
3417	PTCD1
3418	QPCTL
3419	RPAP3

3420	RPL10L
3421	RPP38
3422	RTRAF
3423	SARNP
3424	SDAD1
3425	SEC22B
3426	SHCBP1
3427	SLIRP
3428	TEFM
3429	TMED5
3430	TMED9
3431	TRAPPC5
3432	UBXN1
3433	UTP14A
3434	WASHC4
3435	ZBTB10
3436	ZC3H8
3437	ZNF333
3438	ZNF346
3439	AKAP8L
3440	ASB4
3441	BTBD7
3442	CCDC86
3443	FAM98B
3444	GID8
3445	H2AC25
3446	HSDL2
3447	LRRRC41
3448	MALSU1
3449	METTL17
3450	MRPL14
3451	MRPL18
3452	MRPL30
3453	MRPL55
3454	NOA1
3455	NUP43
3456	NUSAP1
3457	PRPSAP2
3458	PRRC2C
3459	RPUSD3
3460	SEH1L
3461	STON2
3462	TIPRL
3463	TMEM33
3464	ALKBH5
3465	ANKMY2
3466	CCDC137
3467	CKMT1A
3468	CWC15
3469	DNAJC16
3470	EXD2
3471	GATD3
3472	H2AC13
3473	HDHD5
3474	HEATR3
3475	LSM12
3476	LSM14B
3477	LSM8

3478	LTV1
3479	MAP7D1
3480	MRPL41
3481	MRPS21
3482	MTERF3
3483	RBM34
3484	RPL26L1
3485	RSAD1
3486	SBSN
3487	SIMC1
3488	SPRR2A
3489	TLL11
3490	UBXN7
3491	ZC3H15
3492	ZSWIM8
3493	ARMCX3
3494	C7orf50
3495	COPRS
3496	DENND6A
3497	ENTR1
3498	FABP12
3499	H2AC12
3500	H2AC16
3501	ICE2
3502	IFT46
3503	IFT70A
3504	ISOC1
3505	KBTD6
3506	MAIP1
3507	MRPL27
3508	MRPL45
3509	MRPL9
3510	RBFA
3511	RPS19BP1
3512	STEEP1
3513	TBPL2
3514	TRMT1L
3515	TUSC2
3516	C1orf174
3517	DNAAF10
3518	H2AC15
3519	H2AC17
3520	H2AC21
3521	HMCN2
3522	IFT22
3523	ISY1
3524	RESF1
3525	SAAL1
3526	SLC25A48
3527	TMEM80
3528	WDR5B
3529	ARK2N
3530	BTBD6
3531	HNRNPA1L2
3532	PANX3
3533	PBDC1
3534	TMA16
3535	C5orf22

3536	KIAA1143
3537	SLX9
3538	C1orf68
3539	FAM199X
3540	ODF3L2
3541	QARS1
3542	WASHC1
3543	ANKRD30B
3544	C1orf167
3545	RCC1L
3546	TTC6
3547	WDR87
3548	UQCC5
3549	TIMM23B
3550	EIF2S3B
3551	SETSIP
3552	HNRNPCL3
3553	TRBV11-2
3554	AAK1
3555	ADCK5
3556	ASPH
3557	CDK18
3558	CYR61
3559	FASTK
3560	GRK6
3561	HIVEP1
3562	HK3
3563	ITPK1
3564	ITPKB
3565	ITSN2
3566	KIAA1524
3567	KSR2
3568	LIMK1
3569	MAGOH
3570	MAP3K6
3571	MAP4K1
3572	44625
3573	MAST1
3574	MATK
3575	MORF4
3576	MVK
3577	NADK
3578	NEK1
3579	P3H1
3580	PDIK1L
3581	PEX19
3582	PIAS4
3583	PIK3R5
3584	PMVK
3585	RBP2
3586	RNASEL
3587	SENP1
3588	SENP2
3589	SIK1
3590	STAT5B
3591	STK32C
3592	STK40
3593	TERC

3594	TMSB4X
3595	TYK2
3596	USP1
3597	WNT2