Table S1 Autophagy-Related Genes list

No.	Symbol
1	*AMBRA1*
2	*APOL1*
3	*ARNT*
4	*ARSA*
5	*ARSB*
6	*ATF4*
7	*ATF6*
8	*ATG10*
9	*ATG12*
10	*ATG16L1*
11	*ATG16L2*
12	*ATG2A*
13	*ATG2B*
14	*ATG3*
15	*ATG4A*
16	*ATG4B*
17	*ATG4C*
18	*ATG4D*
19	*ATG5*
20	*ATG7*
21	*ATG9A*
22	*ATG9B*
23	*ATIC*
24	*BAG1*
25	*BAG3*
26	*BAK1*
27	*BAX*
28	*BCL2*
29	*BCL2L1*
30	*BECN1*
31	*BID*
32	*BIRC5*
33	*BIRC6*
34	*BNIP1*
35	*BNIP3*
36	*BNIP3L*
37	*C12orf44*
38	*C17orf88*
39	*CALCOCO2*
40	*CAMKK2*
41	*CANX*
42	*CAPN1*
43	*CAPN10*
44	*CAPN2*
45	*CAPNS1*
46	*CASP1*
47	*CASP3*
48	*CASP4*
49	*CASP8*
50	*CCL2*
51	*CCR2*
52	*CD46*
53	*CDKN1A*
54	*CDKN1B*
55	*CDKN2A*
56	*CFLAR*
57	*CHMP2B*
58	*CHMP4B*
59	*CLN3*
60	*CTSB*
61	*CTSD*
62	*CTSL1*
63	*CX3CL1*
64	*CXCR4*
65	*DAPK1*
66	*DAPK2*
67	*DDIT3*
68	*DIRAS3*
69	*DLC1*
70	*DNAJB1*
71	*DNAJB9*
72	*DRAM1*
73	*EDEM1*
74	*EEF2*
75	*EEF2K*
76	*EGFR*
77	*EIF2AK2*
78	*EIF2AK3*
79	*EIF2S1*
80	*EIF4EBP1*
81	*EIF4G1*
82	*ERBB2*
83	*ERN1*
84	*ERO1L*
85	*FADD*
86	*FAM48A*
87	*FAS*
88	*FKBP1A*
89	*FKBP1B*
90	*FOS*
91	*FOXO1*
92	*FOXO3*
93	*GAA*
94	*GABARAP*
95	*GABARAPL1*
96	*GABARAPL2*
97	*GAPDH*
98	*GNAI3*
99	*GNB2L1*
100	*GOPC*
101	*GRID1*
102	*GRID2*
103	*HDAC1*
104	*HDAC6*
105	*HGS*
106	*HIF1A*
107	*HSP90AB1*
108	*HSPA5*
109	*HSPA8*
110	*HSPB8*
111	*IFNG*
112	*IKBKB*
113	*IKBKE*
114	*IL24*
115	*IRGM*
116	*ITGA3*
117	*ITGA6*
118	*ITGB1*
119	*ITGB4*
120	*ITPR1*
121	*KIAA0226*
122	*KIAA0652*
123	*KIAA0831*
124	*KIF5B*
125	*KLHL24*
126	*LAMP1*
127	*LAMP2*
128	*MAP1LC3A*
129	*MAP1LC3B*
130	*MAP1LC3C*
131	*MAP2K7*
132	*MAPK1*
133	*MAPK3*
134	*MAPK8*
135	*MAPK8IP1*
136	*MAPK9*
137	*MBTPS2*
138	*MLST8*
139	*MTMR14*
140	*MTOR*
141	*MYC*
142	*NAF1*
143	*NAMPT*
144	*NBR1*
145	*NCKAP1*
146	*NFE2L2*
147	*NFKB1*
148	*NKX2-3*
149	*NLRC4*
150	*NPC1*
151	*NRG1*
152	*NRG2*
153	*NRG3*
154	*P4HB*
155	*PARK2*
156	*PARP1*

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Table S1 (*continued*)

No.	Symbol
157	*PEA15*
158	*PELP1*
159	*PEX14*
160	*PEX3*
161	*PIK3C3*
162	*PIK3R4*
163	*PINK1*
164	*PPP1R15A*
165	*PRKAB1*
166	*PRKAR1A*
167	*PRKCD*
168	*PRKCQ*
169	*PTEN*
170	*PTK6*
171	*RAB11A*
172	*RAB1A*
173	*RAB24*
174	*RAB33B*
175	*RAB5A*
176	*RAB7A*
177	*RAC1*
178	*RAF1*
179	*RB1*
180	*RB1CC1*
181	*RELA*
182	*RGS19*
183	*RHEB*
184	*RPS6KB1*
185	*RPTOR*
186	*SAR1A*
187	*SERPINA1*
188	*SESN2*
189	*SH3GLB1*
190	*SIRT1*
191	*SIRT2*
192	*SPHK1*
193	*SPNS1*

Table S1 (*continued*)

Table S1 (*continued*)

No.	Symbol
194	*SQSTM1*
195	*ST13*
196	*STK11*
197	*TBK1*
198	*TM9SF1*
199	*TMEM49*
200	*TMEM74*
201	*TNFSF10*
202	*TP53*
203	*TP53INP2*
204	*TP63*
205	*TP73*
206	*TSC1*
207	*TSC2*
208	*TUSC1*
209	*ULK1*
210	*ULK2*
211	*ULK3*
212	*USP10*
213	*UVRAG*
214	*VAMP3*
215	*VAMP7*
216	*VEGFA*
217	*WDFY3*
218	*WDR45*
219	*WDR45L*
220	*WIPI1*
221	*WIPI2*
222	*ZFYVE1*

Table S2 Immune and Autophagy-Related Genes list

No.	IARGs
1	*IKBKB*
2	*RELA*
3	*TBK1*
4	*IFNG*
5	*EGFR*
6	*CXCR4*
7	*MAPK8*
8	*RAC1*
9	*MAPK3*
10	*MAPK1*
11	*EIF2AK2*
12	*NFKB1*
13	*HDAC1*
14	*TNFSF10*
15	*IKBKE*
16	*NAMPT*
17	*BID*
18	*CCL2*
19	*BECN1*
20	*VEGFA*
21	*CTSB*
22	*BIRC5*

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Table S3 GSEA enrichment analysis results of molecular subtypes of IARGs by TCGA–COADREAD dataset

	C1.C2	C1.C3	C1.C4	C2.C3	C2.C4	C3.C4	AveExpr	F	P.Value	adj.P.Val
HALLMARK_INFLAMMATORY_RESPONSE	0.067893	−0.0931	−0.01126	−0.16099	−0.07915	0.081842	0.121554	275.3141	#######	#######
HALLMARK_COMPLEMENT	0.047445	−0.05277	−0.005	−0.10021	−0.05245	0.047768	0.223596	229.9653	3.97E−91	9.94E−90
HALLMARK_IL2_STAT5_SIGNALING	0.030687	−0.04423	−0.00693	−0.07491	−0.03762	0.037299	0.220936	209.7957	9.81E−86	1.63E−84
HALLMARK_KRAS_SIGNALING_UP	0.052639	−0.05645	−0.0028	−0.10909	−0.05544	0.053653	0.159154	208.7928	1.85E−85	2.31E−84
HALLMARK_ALLOGRAFT_REJECTION	0.066664	−0.0844	−0.00814	−0.15106	−0.07481	0.076257	0.15665	206.8847	6.23E−85	6.23E−84
HALLMARK_IL6_JAK_STAT3_SIGNALING	0.063562	−0.07707	−0.00757	−0.14063	−0.07113	0.069498	0.227409	196.3139	5.82E−82	4.85E−81
HALLMARK_APOPTOSIS	0.023943	−0.03687	−0.01156	−0.06081	−0.0355	0.025305	0.396908	154.0392	4.11E−69	2.94E−68
HALLMARK_INTERFERON_GAMMA_RESPONSE	0.053819	−0.08666	−0.02646	−0.14047	−0.08028	0.060196	0.274985	140.9131	9.21E−65	5.75E−64
HALLMARK_TNFA_SIGNALING_VIA_NFKB	0.04635	−0.07514	−0.01137	−0.12149	−0.05772	0.063774	0.34312	135.3355	7.43E−63	4.13E−62
HALLMARK_COAGULATION	0.068387	−0.03175	0.014526	−0.10013	−0.05386	0.046272	0.246672	134.0512	2.07E−62	1.03E−61
HALLMARK_EPITHELIAL_MESENCHYMAL_TRANSITION	0.098517	−0.08982	−0.00364	−0.18834	−0.10216	0.086184	0.30933	124.7637	3.88E−59	1.76E−58
HALLMARK_ANGIOGENESIS	0.066249	−0.06637	−0.00781	−0.13262	−0.07406	0.058561	0.281266	115.0666	1.33E−55	5.55E−55
HALLMARK_HYPOXIA	0.030298	−0.03141	−0.00264	−0.06171	−0.03293	0.028773	0.30316	100.9877	3.10E−50	1.19E−49
HALLMARK_UV_RESPONSE_DN	0.013838	−0.05084	−0.02816	−0.06467	−0.04199	0.022679	0.198857	75.84384	7.10E−40	2.54E−39
HALLMARK_APICAL_JUNCTION	0.026124	−0.03005	−0.00755	−0.05618	−0.03368	0.022502	0.229044	69.12404	6.46E−37	2.15E−36
HALLMARK_INTERFERON_ALPHA_RESPONSE	0.035219	−0.06828	−0.03503	−0.1035	−0.07025	0.033256	0.379008	64.99714	4.70E−35	1.47E−34
HALLMARK_MITOTIC_SPINDLE	−0.02878	−0.03134	−0.04518	−0.00256	−0.01639	−0.01383	0.28913	56.62017	3.62E−31	1.07E−30
HALLMARK_TGF_BETA_SIGNALING	0.014802	−0.04135	−0.01883	−0.05615	−0.03364	0.022515	0.391089	54.0535	6.03E−30	1.68E−29
HALLMARK_APICAL_SURFACE	0.011121	−0.03469	−0.01146	−0.04581	−0.02258	0.023221	0.099478	46.06604	4.77E−26	1.25E−25
HALLMARK_ANDROGEN_RESPONSE	0.001789	−0.03123	−0.02648	−0.03302	−0.02827	0.004751	0.358888	42.74285	2.21E−24	5.53E−24
HALLMARK_MYOGENESIS	0.035521	−0.01852	0.01325	−0.05404	−0.02227	0.031767	0.12369	36.50986	3.51E−21	8.35E−21
HALLMARK_PROTEIN_SECRETION	−0.01425	−0.0372	−0.03642	−0.02295	−0.02218	0.000776	0.425161	30.32501	6.63E−18	1.51E−17
HALLMARK_PEROXISOME	−0.00387	0.021126	0.009605	0.024992	0.013471	−0.01152	0.332185	28.57714	5.83E−17	1.27E−16
HALLMARK_BILE_ACID_METABOLISM	0.005549	0.025946	0.0171	0.020397	0.011552	−0.00885	0.1109	26.88391	4.89E−16	1.02E−15
HALLMARK_MYC_TARGETS_V2	−0.01819	0.031291	0.00279	0.049483	0.020983	−0.0285	0.487624	26.12165	1.28E−15	2.56E−15
HALLMARK_HEME_METABOLISM	0.005661	−0.01304	−0.0069	−0.0187	−0.01256	0.006141	0.234819	25.90039	1.69E−15	3.26E−15
HALLMARK_UV_RESPONSE_UP	0.012348	−0.00288	0.007237	−0.01522	−0.00511	0.010113	0.368478	24.68829	7.91E−15	1.46E−14
HALLMARK_OXIDATIVE_PHOSPHORYLATION	1.50E−05	0.021032	0.018287	0.021017	0.018272	−0.00275	0.556262	20.2179	2.52E−12	4.51E−12
HALLMARK_DNA_REPAIR	−0.00278	0.016602	0.010837	0.019384	0.013619	−0.00577	0.400173	19.82452	4.22E−12	7.27E−12
HALLMARK_NOTCH_SIGNALING	0.019241	−0.00698	−0.00236	−0.02622	−0.02161	0.004614	0.313913	19.67614	5.12E−12	8.53E−12
HALLMARK_SPERMATOGENESIS	−0.01854	0.004662	−0.01276	0.023205	0.005785	−0.01742	−0.02302	19.40193	7.33E−12	1.18E−11
HALLMARK_ADIPOGENESIS	0.013034	0.000319	0.007842	−0.01272	−0.00519	0.007523	0.400316	19.0428	1.17E−11	1.83E−11
HALLMARK_XENOBIOTIC_METABOLISM	0.01769	0.0157	0.018855	−0.00199	0.001166	0.003156	0.270819	18.23836	3.38E−11	5.12E−11
HALLMARK_REACTIVE_OXYGEN_SPECIES_PATHWAY	0.01237	−0.00235	0.00819	−0.01472	−0.00418	0.010543	0.441643	16.39396	3.88E−10	5.70E−10
HALLMARK_G2M_CHECKPOINT	−0.02885	−0.0179	−0.03931	0.010949	−0.01046	−0.02141	0.394438	16.16468	5.26E−10	7.51E−10
HALLMARK_HEDGEHOG_SIGNALING	0.012037	−0.02524	−0.01234	−0.03727	−0.02438	0.012895	0.072065	14.753	3.46E−09	4.81E−09
HALLMARK_PI3K_AKT_MTOR_SIGNALING	−0.00697	−0.00662	−0.01158	0.000346	−0.00462	−0.00496	0.350547	14.36238	5.84E−09	7.89E−09
HALLMARK_WNT_BETA_CATENIN_SIGNALING	−0.00752	0.024594	0.01325	0.03211	0.020766	−0.01134	0.214792	11.87067	1.68E−07	2.21E−07
HALLMARK_UNFOLDED_PROTEIN_RESPONSE	−0.00682	−0.01282	−0.01219	−0.006	−0.00537	0.00063	0.482112	10.8986	6.29E−07	8.07E−07
HALLMARK_GLYCOLYSIS	0.00891	−0.00287	−0.00127	−0.01178	−0.01018	0.001596	0.370417	10.76718	7.52E−07	9.40E−07
HALLMARK_PANCREAS_BETA_CELLS	0.016276	−0.01256	−0.00466	−0.02884	−0.02094	0.007903	−0.02965	10.00077	2.14E−06	2.61E−06
HALLMARK_E2F_TARGETS	−0.02778	−0.00661	−0.02988	0.021166	−0.0021	−0.02327	0.421357	9.472073	4.40E−06	5.24E−06
HALLMARK_MTORC1_SIGNALING	−0.00128	−0.01349	−0.01367	−0.01222	−0.01239	−0.00018	0.48289	9.445983	4.56E−06	5.30E−06
HALLMARK_FATTY_ACID_METABOLISM	0.00909	0.018462	0.011379	0.009372	0.002289	−0.00708	0.390257	8.68921	1.28E−05	1.46E−05
HALLMARK_P53_PATHWAY	0.010545	−0.00097	0.006774	−0.01151	−0.00377	0.007741	0.351722	8.02784	3.18E−05	3.53E−05
HALLMARK_MYC_TARGETS_V1	−0.01249	−0.00098	−0.00945	0.011508	0.003041	−0.00847	0.638468	6.754242	0.000182	0.000198
HALLMARK_KRAS_SIGNALING_DN	0.003818	0.01162	0.010602	0.007802	0.006784	−0.00102	−0.23347	6.080509	0.000459	0.000489
HALLMARK_ESTROGEN_RESPONSE_EARLY	0.005819	0.001106	−0.00417	−0.00471	−0.00999	−0.00528	0.267412	5.505376	0.00101	0.001053
HALLMARK_ESTROGEN_RESPONSE_LATE	0.008693	0.00677	0.00425	−0.00192	−0.00444	−0.00252	0.310791	4.804189	0.002637	0.002691

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