

## SUPPLEMENTARY TABLES

**Supplementary Table 1. Clinical information such as age, sex, clinic grade, pathological stage, and T stage, were obtained from the Cancer Genome Atlas (TCGA) LIHC project.**

Covariates	Type	Total	Test	Train	P-value
Age	≤65	232 (62.7%)	105 (56.76%)	127 (68.65%)	0.024
Age	>65	138 (37.3%)	80 (43.24%)	58 (31.35%)	
Gender	FEMALE	121 (32.7%)	61 (32.97%)	60 (32.43%)	1
Gender	MALE	249 (67.3%)	124 (67.03%)	125 (67.57%)	
Grade	G1	55 (14.86%)	23 (12.43%)	32 (17.3%)	0.2791
Grade	G2	177 (47.84%)	97 (52.43%)	80 (43.24%)	
Grade	G3	121 (32.7%)	57 (30.81%)	64 (34.59%)	
Grade	G4	12 (3.24%)	5 (2.7%)	7 (3.78%)	
Grade	Unknow	5 (1.35%)	3 (1.62%)	2 (1.08%)	
Stage	Stage I	171 (46.22%)	85 (45.95%)	86 (46.49%)	0.5399
Stage	Stage II	85 (22.97%)	44 (23.78%)	41 (22.16%)	
Stage	Stage III	85 (22.97%)	45 (24.32%)	40 (21.62%)	
Stage	Stage IV	5 (1.35%)	1 (0.54%)	4 (2.16%)	
Stage	Unknow	24 (6.49%)	10 (5.41%)	14 (7.57%)	
T	T1	181 (48.92%)	89 (48.11%)	92 (49.73%)	0.8288
T	T2	93 (25.14%)	48 (25.95%)	45 (24.32%)	
T	T3	80 (21.62%)	41 (22.16%)	39 (21.08%)	
T	T4	13 (3.51%)	5 (2.7%)	8 (4.32%)	
T	Unknow	3 (0.81%)	2 (1.08%)	1 (0.54%)	
M	M0	266 (71.89%)	135 (72.97%)	131 (70.81%)	0.1313
M	M1	4 (1.08%)	0 (0%)	4 (2.16%)	
M	MX	100 (27.03%)	50 (27.03%)	50 (27.03%)	
N	N0	252 (68.11%)	121 (65.41%)	131 (70.81%)	0.5738
N	N1	4 (1.08%)	2 (1.08%)	2 (1.08%)	
N	NX	113 (30.54%)	61 (32.97%)	52 (28.11%)	
N	Unknow	1 (0.27%)	1 (0.54%)	0 (0%)	

**Supplementary Table 2. A set of 79 genes related to ubiquitination (URGs) was obtained from the MSigDB database.**

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BCL10  
CDC34  
CDC73  
CTR9  
DERL1  
H2BC1  
H2BC10  
H2BC11  
H2BC12  
H2BC13  
H2BC14  
H2BC15  
H2BC17  
H2BC3  
H2BC4  
H2BC5  
H2BC6  
H2BC7  
H2BC8  
H2BC9  
HLA-A  
HLTF  
LEO1  
OTULIN  
PAF1  
PCNA  
PEX10  
PEX12  
PEX13  
PEX14  
PEX2  
PEX5  
PRKDC  
RAD18  
RNF144A  
RNF152  
RNF181  
RNF20  
RNF40  
RPS27A  
RRAGA  
RTF1  
SELENOS  
SHPRH  
TMEM129

UBA1  
UBA52  
UBA6  
UBB  
UBC  
UBE2A  
UBE2B  
UBE2C  
UBE2D1  
UBE2D2  
UBE2D3  
UBE2E1  
UBE2E3  
UBE2G1  
UBE2G2  
UBE2H  
UBE2J2  
UBE2K  
UBE2L3  
UBE2N  
UBE2Q2  
UBE2R2  
UBE2S  
UBE2T  
UBE2V2  
UBE2W  
UBE2Z  
UHL3  
USP5  
USP7  
USP9X  
VCP  
WAC  
WDR61

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