

Figure S1 The analysis workflow.

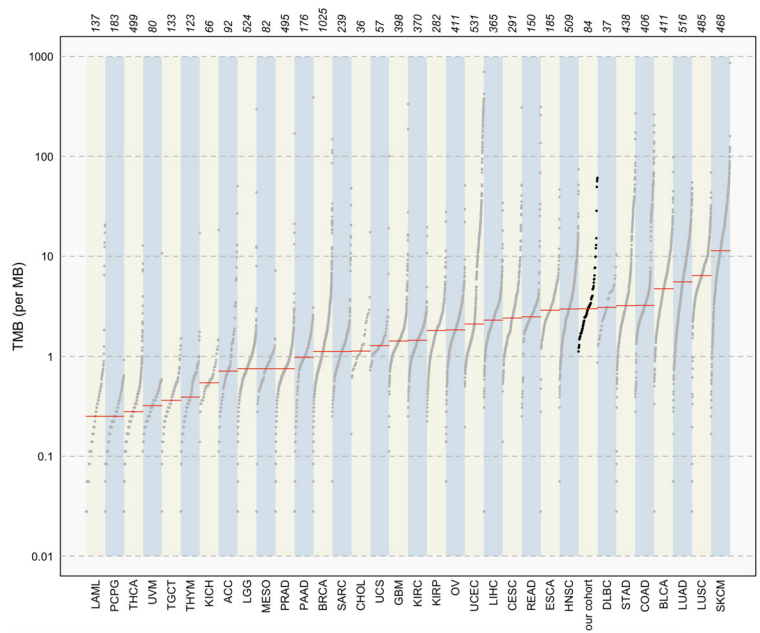


Figure S2 TMB comparison of LUAD sample in this cohort with other malignant tumor cohorts. TMB, tumor mutation burden.

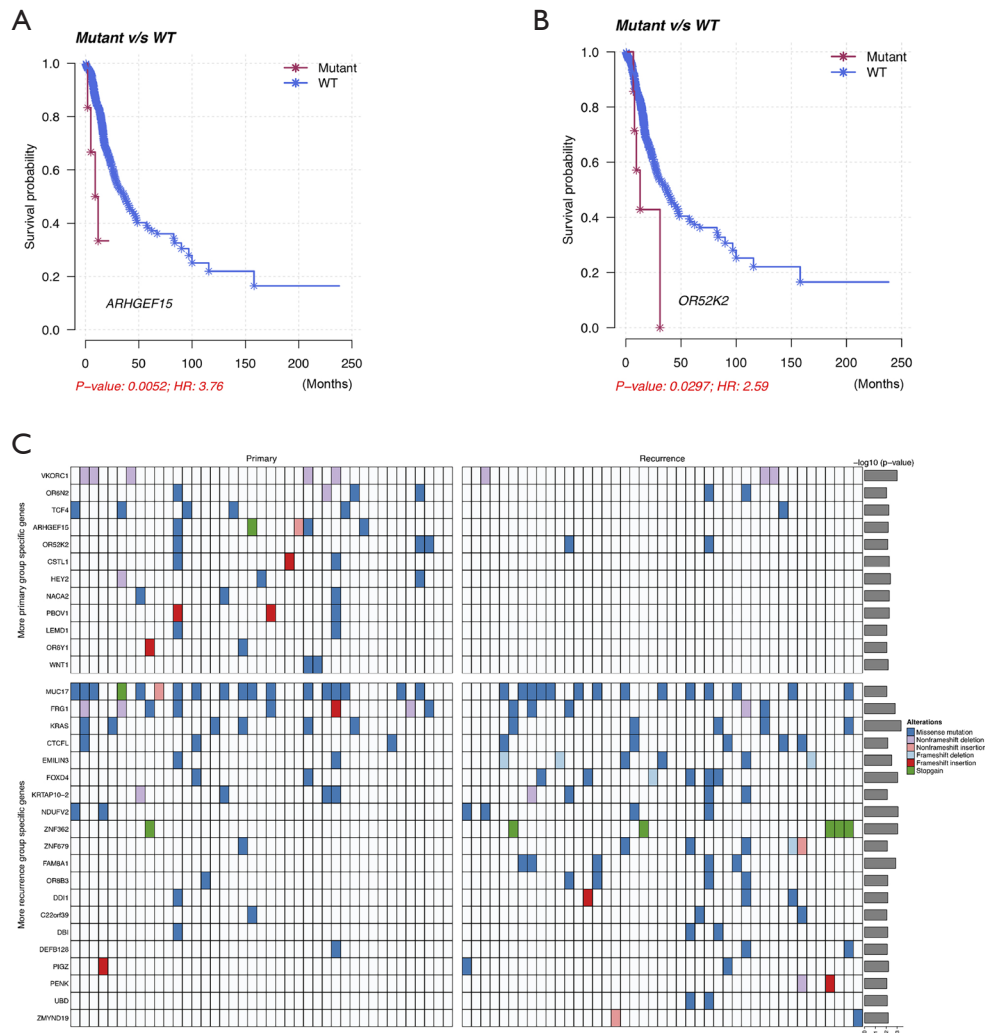


Figure S3 Survival analysis results of *ARHGEF15* and *OR52K2* gene mutation in TCGA cohort. The oncoprint of these group-specific SMGs in primary and recurrence groups. (A,B) Kaplan–Meier survival curves for RFS according to *ARHGEF15* (A) and *OR52K2* (B) mutation status in TCGA-LUAD cohort. (C) Oncoprint of these group-specific SMGs in primary and recurrence groups. The bar chart in right side represents the significance level [$-\log_{10}(P\text{ value})$] for each gene. RFS, relapse free survival; SMG, significantly mutated gene.

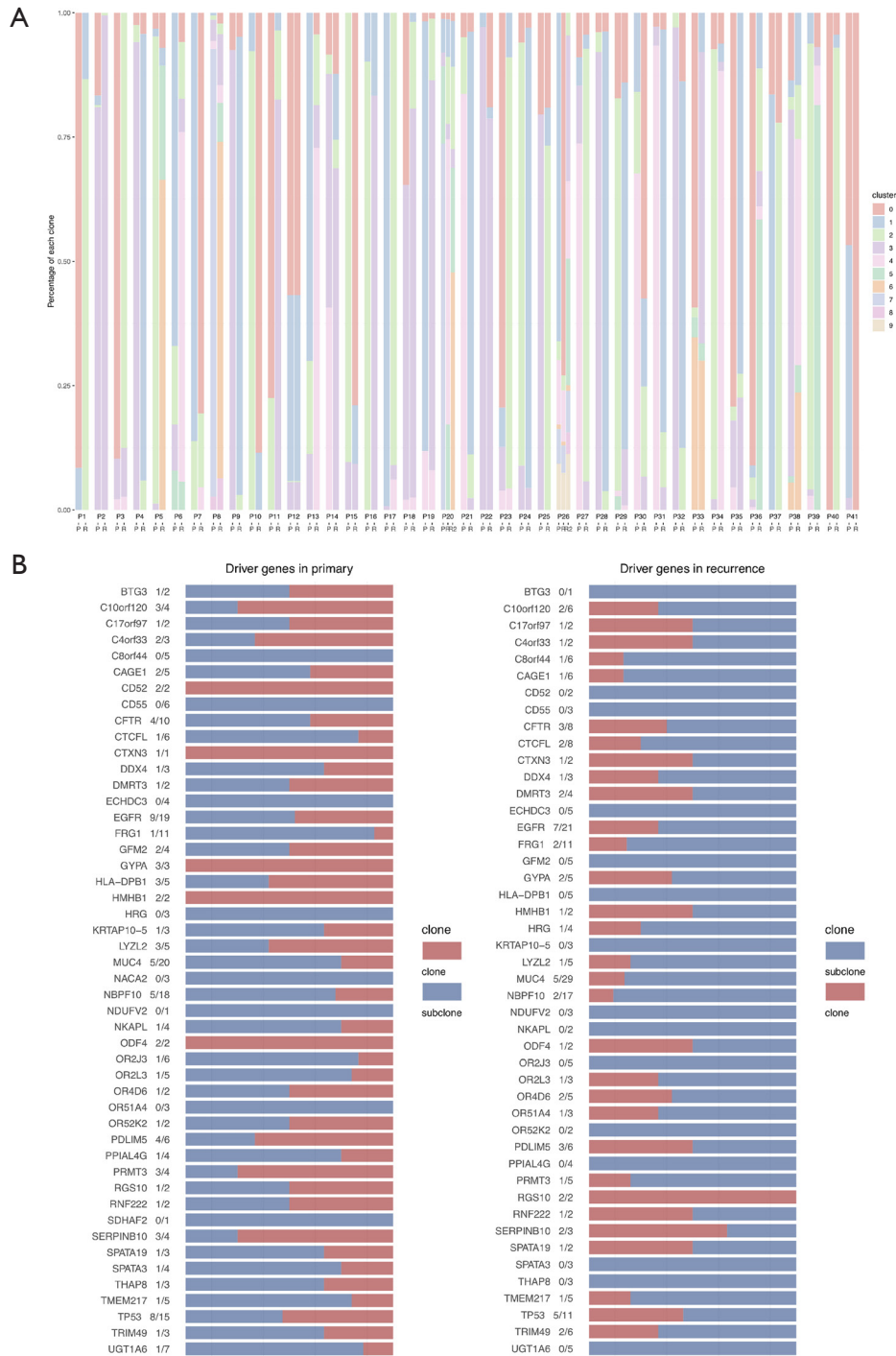


Figure S4 Clonality analysis results. (A) Clonality analysis for primary (left) and recurrent tumors (right) of each patient (P1–P41) using pyclone-vi. Patient 20 (P20) and patient 26 (P26) have two recurrent tumors. (B) Clonality analysis of SMGs identifying clonal and subclonal mutations. The number of clone mutations and all mutations for each gene were shown. SMG, significantly mutated gene.

Table S1 The percentage of point mutation type in each sample

Patient_ID	C>A	C>G	C>T	T>C	T>A	T>G	Group
P1	9.554140127	7.006369427	29.93630573	39.8089172	5.414012739	8.280254777	Primary
P2	10.48218029	7.966457023	38.78406709	28.30188679	8.805031447	5.660377358	Primary
P3	8.146067416	6.179775281	41.29213483	32.30337079	6.179775281	5.898876404	Primary
P4	11.79941003	7.079646018	35.69321534	32.15339233	7.374631268	5.899705015	Primary
P5	22.92887029	8.368200837	30.20920502	26.0251046	7.531380753	4.937238494	Primary
P6	12.44725738	5.696202532	46.83544304	21.94092827	7.805907173	5.274261603	Primary
P7	9.971509972	6.267806268	35.32763533	33.04843305	8.831908832	6.552706553	Primary
P8	8.337758895	10.35581519	43.97238449	27.13754647	3.929899097	6.266595858	Primary
P9	14.28571429	5.019305019	46.71814672	20.46332046	6.177606178	7.335907336	Primary
P10	12.5	8.012820513	39.1025641	29.16666667	5.769230769	5.448717949	Primary
P11	10.24734982	7.77385159	35.68904594	30.03533569	8.833922261	7.4204947	Primary
P12	7.877226873	9.823281105	43.48572655	28.53258925	4.299921299	5.981254919	Primary
P13	10.26392962	6.451612903	36.95014663	32.25806452	7.331378299	6.744868035	Primary
P14	10.45081967	7.991803279	37.90983607	31.35245902	5.532786885	6.762295082	Primary
P15	11.07784431	6.886227545	44.31137725	24.8502994	6.586826347	6.28742515	Primary
P16	15.01014199	10.34482759	39.14807302	21.70385396	7.707910751	6.085192698	Primary
P17	7.490572506	10.28453891	45.81762084	26.72266027	3.668152211	6.016455262	Primary
P18	11.82432432	10.47297297	39.86486486	25.67567568	6.418918919	5.743243243	Primary
P19	29.6625222	9.058614565	28.41918295	17.40674956	10.8348135	4.618117229	Primary
P20	7.297830375	8.08678501	48.12623274	26.23274162	5.325443787	4.930966469	Primary
P21	8.888888889	8.611111111	44.72222222	26.94444444	4.722222222	6.111111111	Primary
P22	8.650875386	6.179196704	44.79917611	30.07209063	3.501544799	6.797116375	Primary
P23	11.27596439	5.637982196	44.80712166	25.22255193	7.715133531	5.341246291	Primary
P24	11.06719368	10.86956522	44.2687747	25.49407115	4.347826087	3.95256917	Primary
P25	14.00651466	5.537459283	42.01954397	24.10423453	8.794788274	5.537459283	Primary
P26	31.8975553	8.963911525	26.6589057	18.16065192	9.429569267	4.889406286	Primary
P27	6.306306306	7.807807808	36.93693694	36.33633634	7.207207207	5.405405405	Primary
P28	11.94379391	8.430913349	36.76814988	29.03981265	7.025761124	6.791569087	Primary
P29	7.561518043	9.720926896	44.00602626	28.23731975	4.196857737	6.277351316	Primary
P30	14.84375	5.729166667	42.1875	26.82291667	4.947916667	5.46875	Primary
P31	33.50604491	7.944732297	25.90673575	21.24352332	6.390328152	5.008635579	Primary
P32	8.219178082	10.1978691	41.01978691	29.22374429	4.946727549	6.392694064	Primary
P33	23.89558233	9.236947791	28.71485944	23.89558233	8.43373494	5.823293173	Primary
P34	18.75	6.845238095	28.57142857	25.89285714	12.20238095	7.738095238	Primary
P35	13.28413284	12.17712177	33.57933579	25.46125461	5.719557196	9.778597786	Primary
P36	40.82792208	8.441558442	21.83441558	13.7987013	10.63311688	4.464285714	Primary
P37	9.157509158	6.227106227	39.19413919	29.67032967	7.326007326	8.424908425	Primary
P38	41.08527132	9.612403101	24.03100775	12.01550388	10.7751938	2.480620155	Primary
P39	17.27078891	8.742004264	37.52665245	23.24093817	7.249466951	5.970149254	Primary
P40	9.006928406	6.466512702	52.65588915	19.86143187	5.773672055	6.23556582	Primary
P41	11.40350877	6.578947368	37.71929825	30.26315789	7.01754386	7.01754386	Primary
P1	5.687203791	9.478672986	40.75829384	27.01421801	9.952606635	7.109004739	Recurrence
P2	7.891332471	10.21992238	43.27296248	27.49029754	5.10996119	6.015523933	Recurrence
P3	6.953642384	6.291390728	39.07284768	32.45033113	6.622516556	8.609271523	Recurrence
P4	15.42553191	7.978723404	42.55319149	27.12765957	3.723404255	3.191489362	Recurrence
P5	30.62098501	14.7751606	26.98072805	13.49036403	9.207708779	4.925053533	Recurrence
P6	13.8121547	7.182320442	40.69981584	27.44014733	6.261510129	4.604051565	Recurrence
P7	14.17004049	8.502024291	39.27125506	21.45748988	9.71659919	6.882591093	Recurrence
P8	10.63829787	13.4751773	44.44444444	19.14893617	6.855791962	5.437352246	Recurrence
P9	13.91585761	9.708737864	39.80582524	23.62459547	5.177993528	7.766990291	Recurrence
P10	9.855072464	8.695652174	43.47826087	25.2173913	5.797101449	6.956521739	Recurrence
P11	10.60240964	19.75903614	47.46987952	13.25301205	5.060240964	3.855421687	Recurrence
P12	24.08719346	10.19073569	34.8773842	20.76294278	5.340599455	4.741144414	Recurrence
P13	11.21718377	9.546539379	34.12887828	31.26491647	6.443914081	7.398568019	Recurrence
P14	10.34482759	10.72796935	47.70114943	20.49808429	6.130268199	4.597701149	Recurrence
P15	6.688963211	9.364548495	44.14715719	26.42140468	5.016722408	8.361204013	Recurrence
P16	16.83501684	5.387205387	38.72053872	24.24242424	8.417508418	6.397306397	Recurrence
P17	12.82894737	7.565789474	48.02631579	19.07894737	6.578947368	5.921052632	Recurrence
P18	18.75	11.77325581	36.62790698	22.81976744	6.25	3.779069767	Recurrence
P19	35.97785978	8.487084871	22.50922509	18.4501845	10.70110701	3.874538745	Recurrence
P20	9.307875895	13.60381862	43.43675418	21.95704057	6.443914081	5.250596659	Recurrence
P20	9.302325581	14.47028424	49.6124031	18.60465116	5.167958656	2.842377261	Recurrence2
P21	9.956709957	12.12121212	43.50649351	21.42857143	7.575757576	5.411255411	Recurrence
P22	16.10942249	9.422492401	34.65045593	29.78723404	5.167173252	4.863221884	Recurrence
P23	8.88030888	8.108108108	52.12355212	15.05791506	9.266409266	6.563706564	Recurrence
P24	8.592644979	9.900990099	44.83734088	27.26308345	3.889674682	5.516265912	Recurrence
P25	14.59854015	4.01459854	34.30656934	33.94160584	8.759124088	4.379562044	Recurrence
P26	10.32786885	9.81557377	42.75614754	26.81352459	4.641393443	5.645491803	Recurrence
P26	25.52816901	7.570422535	29.04929577	24.82394366	8.626760563	4.401408451	Recurrence2
P27	8.547008547	8.205128205	30.08547009	37.60683761	8.717948718	6.837606838	Recurrence
P28	8.185053381	7.473309609	39.14590747	33.4519573	7.117437722	4.62633452	Recurrence
P29	7.917538094	9.40394383	43.75560203	28.64505527	4.294890947	5.982969824	Recurrence
P30	19.00311526	10.28037383	38.94080997	20.56074766	7.788161994	3.426791277	Recurrence
P31	17.94871795	9.743589744	28.20512821	32.30769231	7.179487179	4.615384615	Recurrence
P32	10.75697211	14.74103586	39.44223108	21.9123506	5.976095618	7.171314741	Recurrence
P33	24.23664122	8.58778626	30.91603053	23.47328244	6.870229008	5.916030534	Recurrence
P34	6.366047745	9.549071618	35.27851459	35.27851459	5.835543767	7.692307692	Recurrence
P35	10.10362694	11.39896373	32.64248705	32.64248705	7.25388601	5.958549223	Recurrence
P36	18.18181818	6.951871658	29.41176471	32.62032086	6.951871658	5.882352941	Recurrence
P37	9.440559441	5.944055944	46.85314685	27.27272727	5.594405594	4.895104895	Recurrence
P38	11.92982456	10.87719298	35.78947368	28.07017544	8.421052632	4.912280702	Recurrence
P39	11.83206107	7.633587786	40.07633588	24.42748092	9.923664122	6.106870229	Recurrence
P40	26.79355783	12.29868228	34.26061493	13.61639824	8.052708638	4.978038067	Recurrence
P41	14.67391304	5.97826087	41.84782609	27.7173913	4.891304348	4.891304348	Recurrence

Table S2 TMB level of each tumor sample

Tumor_Sample_Barcode	total_perMB	total_perMB_log	Group
P1	1.68	0.22530928	Primary
P2	3.86	0.5865873	Primary
P3	2.42	0.38381537	Primary
P4	2.56	0.40823997	Primary
P5	6.24	0.79518459	Primary
P6	3.78	0.5774918	Primary
P7	2.48	0.39445168	Primary
P8	9.82	0.99211149	Primary
P9	2.62	0.41830129	Primary
P10	2.46	0.39093511	Primary
P11	1.74	0.24054925	Primary
P12	60.7	1.78318869	Primary
P13	1.62	0.20951501	Primary
P14	3.84	0.58433122	Primary
P15	2	0.30103	Primary
P16	5.28	0.72263392	Primary
P17	28.34	1.45239985	Primary
P18	1.8	0.25527251	Primary
P19	4.52	0.65513843	Primary
P20	2.8	0.44715803	Primary
P21	2.76	0.44090908	Primary
P22	5.88	0.76937733	Primary
P23	2.18	0.33845649	Primary
P24	3	0.47712125	Primary
P25	2.4	0.38021124	Primary
P26	7.52	0.87621784	Primary
P27	1.9	0.2787536	Primary
P28	2.68	0.42813479	Primary
P29	59.08	1.77144049	Primary
P30	2.4	0.38021124	Primary
P31	4.56	0.65896484	Primary
P32	7.52	0.87621784	Primary
P33	3.14	0.49692965	Primary
P34	2.14	0.33041377	Primary
P35	3.08	0.48855072	Primary
P36	9.56	0.98045789	Primary
P37	1.7	0.23044892	Primary
P38	11.74	1.0696681	Primary
P39	3.26	0.5132176	Primary
P40	4.84	0.68484536	Primary
P41	1.86	0.26951294	Primary
P1	1.24	0.09342169	Recurrence
P2	7.64	0.88309336	Recurrence
P3	1.54	0.18752072	Recurrence
P4	1.06	0.02530587	Recurrence
P5	3.94	0.59549622	Recurrence
P6	3.32	0.52113808	Recurrence
P7	1.46	0.16435286	Recurrence
P8	3.12	0.49415459	Recurrence
P9	1.7	0.23044892	Recurrence
P10	3.18	0.50242712	Recurrence
P11	3.18	0.50242712	Recurrence
P12	12.82	1.10788803	Recurrence
P13	2.46	0.39093511	Recurrence
P14	3.9	0.59106461	Recurrence
P15	2.04	0.30963017	Recurrence
P16	3.02	0.48000694	Recurrence
P17	2.42	0.38381537	Recurrence
P18	4.8	0.68124124	Recurrence
P19	4.56	0.65896484	Recurrence
P20	2.94	0.46834733	Recurrence
P20	2.84	0.45331834	Recurrence2
P21	3.14	0.49692965	Recurrence
P22	2.98	0.47421626	Recurrence
P23	1.66	0.22010809	Recurrence
P24	15.02	1.17666993	Recurrence
P25	1.52	0.18184359	Recurrence
P26	48.78	1.6882418	Recurrence
P26	3.68	0.56584782	Recurrence2
P27	3.58	0.55388303	Recurrence
P28	1.52	0.18184359	Recurrence
P29	55.92	1.74756716	Recurrence
P30	2.4	0.38021124	Recurrence
P31	2.48	0.39445168	Recurrence
P32	1.52	0.18184359	Recurrence
P33	2.98	0.47421626	Recurrence
P34	1.82	0.26007139	Recurrence
P35	2.02	0.30535137	Recurrence
P36	1.26	0.10037055	Recurrence
P37	2.12	0.32633586	Recurrence
P38	1.96	0.29225607	Recurrence
P39	3.22	0.50785587	Recurrence
P40	5.8	0.76342799	Recurrence
P41	1.22	0.08635983	Recurrence