

Table S1. The characteristics of 268 CT genes identified in our previous study.

ENname	CHR	Start	End	Strand	Gene	Known
ENSG0000007350	chrX	153524024	153558700	+	TKTL1	NO
ENSG00000046774	chrX	141290131	141293076	-	MAGEC2	YES
ENSG00000068985	chrX	49452053	49460596	-	PAGE1	YES
ENSG00000070886	chr1	22890057	22930087	+	EPHA8	NO
ENSG00000075886	chr2	132233666	132240507	+	TUBA3D	NO
ENSG00000080572	chrX	106449862	106487473	+	PIH1D3	NO
ENSG00000095627	chr10	115939029	115992063	+	TDRD1	YES
ENSG00000099399	chrX	30233677	30238206	+	MAGEB2	YES
ENSG00000101448	chr20	44165625	44176391	-	EPPIN	YES
ENSG00000101890	chrX	108616135	108725301	-	GUCY2F	NO
ENSG00000102387	chrX	100523241	100548059	-	TAF7L	YES
ENSG00000103546	chr16	55689516	55740104	+	SLC6A2	NO
ENSG00000104755	chr8	39601254	39695808	-	ADAM2	YES
ENSG00000104818	chr19	49535169	49536495	+	CGB2	NO
ENSG00000104941	chr19	46298968	46318577	-	RSPH6A	NO
ENSG00000106410	chr7	144094333	144107320	-	NOBOX	NO
ENSG00000109832	chr11	125773271	125793158	+	DDX25	NO
ENSG00000112038	chr6	154331631	154568001	+	OPRM1	NO
ENSG00000112238	chr6	100054606	100063454	+	PRDM13	NO
ENSG00000112273	chr6	22569678	22571892	+	HDGFL1	NO
ENSG00000114349	chr3	50229045	50233949	+	GNAT1	NO
ENSG00000114487	chr3	108677086	108836989	-	MORC1	YES
ENSG00000116726	chr1	12834984	12838049	+	PRAMEF12	NO
ENSG00000117148	chr1	18081808	18153558	+	ACTL8	YES
ENSG00000120210	chr9	5131979	5185668	-	INSL6	NO
ENSG00000120498	chrX	69748790	70128581	-	TEX11	NO
ENSG00000121446	chr1	182419256	182529734	+	RGSL1	NO
ENSG00000123569	chrX	103265719	103268259	-	H2BFWT	NO
ENSG00000123576	chrX	103494719	103499614	-	ESX1	NO
ENSG00000123584	chrX	148663309	148669116	-	MAGEA9B	YES
ENSG00000124092	chr20	56071035	56100708	-	CTCFL	YES
ENSG00000124260	chrX	151301782	151307033	-	MAGEA10	YES
ENSG00000124678	chr6	35085848	35116387	-	TCP11	NO
ENSG00000125207	chr12	130822432	130857182	+	PIWIL1	YES
ENSG00000125788	chr20	123010	126392	+	DEFB126	NO
ENSG00000126752	chrX	48114752	48126879	+	SSX1	YES
ENSG00000129221	chr17	6297013	6338519	-	AIPL1	NO
ENSG00000131050	chr20	31749574	31769218	+	BPIFA2	NO
ENSG00000131126	chr19	43905648	43922763	+	TEX101	YES
ENSG00000131738	chr17	39519746	39526052	-	KRT33B	NO
ENSG00000131914	chr1	26737269	26756213	+	LIN28A	NO
ENSG00000132446	chrX	31089360	31090170	-	FTHL17	YES
ENSG00000133980	chr14	74769772	74826711	+	VRTN	NO
ENSG00000134588	chrX	132158659	132231137	-	USP26	NO
ENSG00000134640	chr11	92702886	92718232	+	MTNR1B	NO

ENSG00000135248	chr7	128349115	128371797	+	FAM71F1	NO
ENSG00000137674	chr11	102447566	102496063	-	MMP20	NO
ENSG00000138684	chr4	123533783	123542224	-	IL21	NO
ENSG00000138813	chr4	100432161	100463460	+	C4orf17	NO
ENSG00000139151	chr12	18836103	18890991	-	PLCZ1	NO
ENSG00000139445	chr12	109715784	109747025	-	FOXN4	NO
ENSG00000140623	chr16	4827670	4838522	-	43355	NO
ENSG00000140798	chr16	48116884	48189929	-	ABCC12	NO
ENSG00000141096	chr16	68009566	68014732	-	DPEP3	NO
ENSG00000141255	chr17	3343313	3417146	-	SPATA22	NO
ENSG00000141316	chr17	31297394	31324895	+	SPACA3	YES
ENSG00000142025	chr19	42348806	42356401	+	DMRTC2	NO
ENSG00000142513	chr19	51293672	51298481	+	ACPT	NO
ENSG00000142698	chr1	34632484	34684732	+	C1orf94	NO
ENSG00000143006	chr1	53925072	53933161	+	DMRTB1	NO
ENSG00000143032	chr1	91177096	91182794	-	BARHL2	NO
ENSG00000143194	chr1	166958346	166991451	+	MAEL	YES
ENSG00000144015	chr2	96257766	96265526	+	TRIM43	NO
ENSG00000145309	chr4	71200683	71202833	+	CABS1	NO
ENSG00000146276	chr6	89887220	89940997	-	GABRR1	NO
ENSG00000146453	chr6	160221298	160241736	+	PNLDC1	NO
ENSG00000147183	chrX	88002226	88009786	+	CPXCR1	YES
ENSG00000147381	chrX	151080981	151093642	+	MAGEA4	YES
ENSG00000151005	chr4	164392257	164395047	-	TKTL2	NO
ENSG00000151033	chr10	30900718	30918691	-	LYZL2	NO
ENSG00000151360	chr2	3705785	3750261	+	ALLC	NO
ENSG00000151615	chr4	147560045	147563626	+	POU4F2	NO
ENSG00000151962	chr4	155702365	155749965	+	RBM46	YES
ENSG00000152086	chr2	130949318	130956034	-	TUBA3E	NO
ENSG00000152208	chr4	93225550	94695707	+	GRID2	NO
ENSG00000152463	chr10	15074226	15115851	+	OLAH	NO
ENSG00000152670	chr5	55033845	55112985	+	DDX4	NO
ENSG00000153779	chrX	89176881	89177882	+	TGIF2LX	NO
ENSG00000154143	chr11	124481386	124490252	+	PANX3	NO
ENSG00000154438	chr7	117003276	117068177	-	ASZ1	NO
ENSG00000154611	chr18	23713816	23773319	+	PSMA8	NO
ENSG00000154997	chr7	55861237	55930482	-	43357	NO
ENSG00000155495	chrX	140991680	140997174	+	MAGEC1	YES
ENSG00000155875	chr9	18927656	19033251	-	FAM154A	NO
ENSG00000156009	chrX	149009941	149014609	+	MAGEA8	YES
ENSG00000156269	chr4	80146848	80247204	-	NAA11	NO
ENSG00000157060	chr1	182869000	182922660	-	SHCBP1L	NO
ENSG00000157884	chr2	26804070	26864236	-	CIB4	NO
ENSG00000158639	chrX	55246788	55250541	+	PAGE5	YES
ENSG00000159224	chr17	47035916	47045958	-	GIP	NO
ENSG00000160505	chr19	56347944	56393220	+	NLRP4	YES
ENSG00000161040	chr7	102453308	102715286	-	FBXL13	NO
ENSG00000161609	chr19	49891475	49921251	+	CCDC155	NO

ENSG00000161652	chr19	50655805	50666452	-	IZUMO2	NO
ENSG00000162039	chr16	1883984	1934295	-	MEIOB	NO
ENSG00000162624	chr1	75594119	75627218	+	LHX8	NO
ENSG00000162753	chr1	173469603	173572233	-	SLC9C2	NO
ENSG00000162771	chr1	212797789	212800120	+	FAM71A	NO
ENSG00000163206	chr1	152850793	152857523	+	SMCP	NO
ENSG00000163263	chr1	154171848	154178809	-	C1orf189	NO
ENSG00000163424	chr3	118864997	118878889	+	C3orf30	NO
ENSG00000163440	chr4	56422692	56458379	-	PDCL2	NO
ENSG00000163530	chr3	109012635	109035364	-	DPPA2	YES
ENSG00000163793	chr2	27498289	27504367	+	DNAJC5G	NO
ENSG00000164256	chr5	23507264	23528706	+	PRDM9	NO
ENSG00000164299	chr5	79615444	79617661	+	SPZ1	NO
ENSG00000164744	chr7	48026745	48068716	-	SUN3	NO
ENSG00000164900	chr7	150845676	150871832	-	GBX1	NO
ENSG00000165131	chr7	142636440	142637955	+	C7orf34	NO
ENSG00000165496	chr14	47120222	47121028	-	RPL10L	NO
ENSG00000165583	chrX	48045656	48056199	-	SSX5	YES
ENSG00000165584	chrX	48205863	48216142	-	SSX3	YES
ENSG00000165643	chr9	138585253	138591374	-	SOHLH1	NO
ENSG00000165863	chr10	118423207	118429775	-	C10orf82	NO
ENSG00000165972	chr12	96260826	96336752	-	CCDC38	NO
ENSG00000166049	chrX	150732094	150845211	+	PASD1	YES
ENSG00000166069	chr15	38214140	38259925	+	TMCO5A	NO
ENSG00000166118	chr11	133710526	133715433	-	SPATA19	YES
ENSG00000166800	chr11	18477371	18501147	+	LDHAL6A	NO
ENSG00000166926	chr11	60102304	60164069	+	MS4A6E	NO
ENSG00000168070	chr11	64704989	64739557	-	C11orf85	NO
ENSG00000168454	chr18	9885763	9889272	+	TXNDC2	NO
ENSG00000168757	chrY	6114264	6117060	+	TSPY2	YES
ENSG00000168930	chr11	89530823	89541743	-	TRIM49	NO
ENSG00000169059	chrX	6451659	6453159	-	VCX3A	NO
ENSG00000169551	chrX	134290461	134305322	-	CXorf48	YES
ENSG00000170279	chr7	148287657	148312952	+	C7orf33	NO
ENSG00000170486	chr12	52979373	52995322	-	KRT72	NO
ENSG00000170516	chr4	46736844	46911252	-	COX7B2	NO
ENSG00000170788	chr10	82095861	82116511	-	DYDC1	NO
ENSG00000171102	chr9	136080664	136084630	-	OBP2B	NO
ENSG00000171209	chr4	71108305	71117145	+	CSN3	NO
ENSG00000171405	chrX	52841228	52847325	+	XAGE5	YES
ENSG00000171487	chr19	56511092	56573179	+	NLRP5	NO
ENSG00000171772	chr10	135367404	135382876	-	SYCE1	YES
ENSG00000171804	chr19	38375463	38397317	-	WDR87	NO
ENSG00000171956	chr15	60296421	60353929	+	FOXB1	NO
ENSG00000172967	chr22	17264302	17302589	-	XKR3	NO
ENSG00000173809	chr19	33210659	33320483	+	TDRD12	NO
ENSG00000174016	chrX	79591003	79700810	+	FAM46D	YES
ENSG00000175018	chr10	127265091	127371713	-	TEX36	NO

ENSG00000175294	chr11	65784223	65793988	-	CATSPER1	NO
ENSG00000175664	chr13	31506840	31549639	+	TEX26	NO
ENSG00000176294	chr14	20187174	20296531	+	OR4N2	NO
ENSG00000176566	chr8	88882973	88886296	-	DCAF4L2	NO
ENSG00000176635	chr22	30476163	30573064	+	HORMAD2	YES
ENSG00000176679	chrY	3447082	3448082	+	TGIF2LY	NO
ENSG00000176746	chrX	26210557	26213763	+	MAGEB6	YES
ENSG00000177138	chrX	8992273	9132680	-	FAM9B	NO
ENSG00000177414	chr1	64669310	64733051	+	UBE2U	NO
ENSG00000177627	chr12	48876286	48890295	+	C12orf54	NO
ENSG00000177689	chrX	27826107	27841131	+	MAGEB10	NO
ENSG00000177938	chr12	18891045	18892121	+	CAPZA3	NO
ENSG00000177992	chr9	90497741	90503814	+	SPATA31E1	NO
ENSG00000177994	chr2	54557171	54610879	+	C2orf73	NO
ENSG00000178125	chr8	67876334	67968839	-	PPP1R42	NO
ENSG00000178403	chr4	113434672	113437328	-	NEUROG2	NO
ENSG00000178645	chr10	50887697	50918307	+	C10orf53	NO
ENSG00000179046	chr4	189012427	189030757	-	TRIML2	NO
ENSG00000179059	chr4	188916925	188926204	+	ZFP42	NO
ENSG00000179709	chr19	56459198	56499995	+	NLRP8	NO
ENSG00000179873	chr19	56296770	56348166	-	NLRP11	NO
ENSG00000180043	chr19	55866276	55874628	-	FAM71E2	NO
ENSG00000180083	chr20	44277202	44298909	-	WFDC11	NO
ENSG00000180869	chr1	85093913	85100703	-	C1orf180	NO
ENSG00000181433	chrX	134971374	134995220	+	SAGE1	YES
ENSG00000181562	chr14	21214051	21216539	+	EDDM3A	NO
ENSG00000181781	chr19	463346	474983	-	ODF3L2	NO
ENSG00000181786	chr19	8807751	8809172	-	ACTL9	NO
ENSG00000182111	chr7	57509883	57533252	+	ZNF716	NO
ENSG00000182459	chr17	80317123	80321652	+	TEX19	NO
ENSG00000182583	chrX	7810303	7812184	+	VCX	NO
ENSG00000183324	chr15	73735499	73852355	+	C15orf60	YES
ENSG00000183434	chrX	132350697	132352376	-	TFDP3	YES
ENSG00000183559	chr10	124457225	124459338	-	C10orf120	NO
ENSG00000183629	chr15	28764757	28778160	-	GOLGA8G	NO
ENSG00000183654	chr5	16067248	16180871	-	43170	NO
ENSG00000183706	chr15	22382382	22383507	+	OR4N4	NO
ENSG00000184029	chr21	39323728	39493454	-	DSCR4	NO
ENSG00000184033	chrX	153845865	153847533	-	CTAG1B	YES
ENSG00000184478	chr11	5968570	5969591	+	OR56A3	NO
ENSG00000184507	chr15	34635516	34649938	+	NUTM1	NO
ENSG00000184571	chr22	25115001	25170687	-	PIWIL3	NO
ENSG00000184735	chrX	23018087	23020204	+	DDX53	YES
ENSG00000185177	chr7	57187321	57207571	-	ZNF479	NO
ENSG00000185247	chrX	148769894	148798926	+	MAGEA11	YES
ENSG00000185775	chr9	43624507	43630730	-	SPATA31A6	NO
ENSG00000185823	chr15	24920541	24928593	+	NPAP1	NO

ENSG00000186075	chr17	38024417	38034149	+	ZBPB2	NO
ENSG00000186086	chr1	108918421	109013624	+	NBPF6	NO
ENSG00000186453	chr2	24397938	24423718	+	FAM228A	NO
ENSG00000187268	chrX	13053737	13062801	-	FAM9C	NO
ENSG00000187516	chrX	37850070	37850569	+	CXorf27	NO
ENSG00000187533	chr4	70999333	71042516	+	C4orf40	NO
ENSG00000187537	chr14	19983559	20020272	-	POTEM	NO
ENSG00000187581	chr14	93813537	93814702	+	COX8C	NO
ENSG00000187600	chr2	46656329	46711564	+	TMEM247	NO
ENSG00000187690	chrX	51149767	51151687	+	CXorf67	NO
ENSG00000187772	chr6	105404923	105531207	+	LIN28B	NO
ENSG00000187806	chr15	72690614	72700370	+	TMEM202	NO
ENSG00000189023	chrX	35816459	35821852	+	MAGEB16	NO
ENSG00000189064	chrX	49354132	49361430	+	GAGE2A	YES
ENSG00000189299	chrX	55649833	55652621	+	FOXR2	NO
ENSG00000196119	chr11	124439893	124441037	+	OR8A1	NO
ENSG00000196242	chr1	247693434	247697141	-	OR2C3	NO
ENSG00000196427	chr1	108765963	108786689	-	NBPF4	NO
ENSG00000196431	chr22	27017928	27026636	+	CRYBA4	NO
ENSG00000196844	chr11	125646008	125648714	-	PATE2	NO
ENSG00000197123	chr7	63688852	63727309	+	ZNF679	NO
ENSG00000197181	chr8	22132810	22215076	+	PIWIL2	YES
ENSG00000197416	chr8	82437216	82443613	-	FABP12	NO
ENSG00000197826	chr4	81256874	81884910	+	C4orf22	NO
ENSG00000198028	chr19	9577183	9609283	-	ZNF560	NO
ENSG00000198033	chr13	19747910	19755992	-	TUBA3C	NO
ENSG00000198054	chr21	39493545	39560110	+	DSCR8	YES
ENSG00000198062	chr22	16256441	16287937	-	POTEH	YES
ENSG00000198173	chrX	37026432	37029739	+	FAM47C	NO
ENSG00000198573	chrX	140335596	140336629	-	SPANXC	YES
ENSG00000198681	chrX	152481522	152486115	-	MAGEA1	YES
ENSG00000198704	chr6	28471073	28495992	-	GPX6	NO
ENSG00000198765	chr1	115397424	115537991	+	SYCP1	YES
ENSG00000198798	chrX	30248553	30255607	+	MAGEB3	YES
ENSG00000198883	chrX	152157368	152162671	-	PNMA5	NO
ENSG00000198889	chrX	125683369	125686834	-	DCAF12L1	NO
ENSG00000203909	chr6	74062785	74064018	-	DPPA5	NO
ENSG00000203926	chrX	140677562	140678899	+	SPANXA2	YES
ENSG00000203963	chr1	67557848	67697536	-	C1orf141	NO
ENSG00000203989	chrX	119205848	119211707	-	RHOXF2B	NO
ENSG00000204661	chr5	179068545	179072047	-	C5orf60	NO
ENSG00000204671	chr12	122656577	122658746	-	IL31	NO
ENSG00000204961	chr5	140227048	140391929	+	PCDHA9	NO
ENSG00000205108	chr9	34723052	34729464	-	FAM205A	NO
ENSG00000205111	chr2	39402787	39456729	-	CDKL4	NO
ENSG00000205212	chr17	20739760	20799453	-	CCDC144NL	NO
ENSG00000205642	chrX	8432871	8434550	+	VCX3B	NO
ENSG00000205777	chrX	49363628	49373139	+	GAGE1	YES

ENSG00000213218	chr17	61949372	61951126	-	CSH2	NO
ENSG00000213231	chr14	96152754	96158980	+	TCL1B	NO
ENSG00000214107	chrX	30261847	30270155	+	MAGEB1	YES
ENSG00000214415	chr7	80087987	80141336	-	GNAT3	NO
ENSG00000215262	chr8	36641842	36793646	+	KCNU1	NO
ENSG00000215343	chr8	11961898	11973025	+	ZNF705D	NO
ENSG00000215568	chr22	17442826	17489112	-	GAB4	NO
ENSG00000221882	chr17	3181193	3182268	-	OR3A2	NO
ENSG00000224659	chrX	49178536	49185863	+	GAGE12J	YES
ENSG00000226372	chrX	27996110	27999566	-	DCAF8L1	NO
ENSG00000226941	chrY	24454970	24564028	+	RBMY1J	NO
ENSG00000227488	chrX	49306370	49313697	+	GAGE12D	YES
ENSG00000228927	chrY	9236030	9307357	+	TSPY3	YES
ENSG00000229937	chr7	18066405	18067486	-	PRPS1L1	NO
ENSG00000231171	chr4	178649911	178911904	+	RP11-389E17.1	NO
ENSG00000232423	chr1	12998181	13117751	-	PRAMEF6	NO
ENSG00000233803	chrY	9175073	9177893	+	TSPY4	NO
ENSG00000234068	chrX	55115441	55119275	+	PAGE2	YES
ENSG00000234414	chrY	23673258	23711212	+	RBMY1A1	NO
ENSG00000236311	chr10	102849078	102890883	-	TLX1NB	NO
ENSG00000236446	chrX	120006457	120009779	-	CT47B1	YES
ENSG00000237136	chr4	146601356	146692184	+	C4orf51	NO
ENSG00000238269	chrX	55101496	55105342	+	PAGE2B	YES
ENSG00000240021	chr1	178482212	178517734	+	TEX35	NO
ENSG00000241476	chrX	52725946	52736239	-	SSX2	YES
ENSG00000243543	chr20	44162835	44168134	-	WFDC6	NO
ENSG00000250423	chrX	118212598	118284542	-	KIAA1210	NO
ENSG00000251258	chr6	112668532	112672498	+	RFPL4B	NO
ENSG00000255181	chr8	144788864	144790279	-	CCDC166	NO
ENSG00000258713	chr20	2795633	2796479	+	C20orf141	NO
ENSG00000258992	chrY	9236076	9307357	+	TSPY1	NO
ENSG00000261509	chr16	33261515	33264716	+	TP53TG3B	NO

Table S2. Information of primers for Sequenom MassARRAY iPLEX.

Variants	Sequence (5'-3')
rs12645087	F: ACGTTGGATGAGGCTCTGGCTTATGGTTGA R: ACGTTGGATGCTGACCTTCACGTGTTTTAC E: ccCGTGTTTTACATAATAAAAATGCC
rs145033304	F: ACGTTGGATGGCCGCTATAAACTAGAATGG R: ACGTTGGATGACACTGACTTCCACAATGGC E: CACTGTTGGTGGGAC
rs17135666	F: ACGTTGGATGATGGTCTTACTGATCAGAGG R: ACGTTGGATGATCTGCACATCACATCTCCC E: tggtCAACCCAAATTTTCCCT
rs175150	F: ACGTTGGATGCTTGGATTTTAGTTGGCAAAG R: ACGTTGGATGAGTTTATTGCGCAAGTGAGG E: ctcgTCTTCATTACAATTCATACCTAG
rs3123484	F: ACGTTGGATGAGACACAAGTAGGTAAACAG R: ACGTTGGATGTGTCTCTAGCAACAATTGTG E: AGAGCTGGGGTGGCTA
rs402969	F: ACGTTGGATGCTAGACCTAAGAAGCAAGGG R: ACGTTGGATGTGCATTGCACCGATTGGAAG E: gggatCTCCCTTGATTTCAGAATGAATG
rs60813831	F: ACGTTGGATGGGAGACCCACTAAATTGCTG R: ACGTTGGATGCCTGTCTGGACTAAATCCTG E: ctacATCCTGTTTTAGTCAGCAG
rs6941653	F: ACGTTGGATGGGAAATATGTGATCAGGAGG R: ACGTTGGATGGTTGAGCATTFTTTTGGCAGG E: TTCCAATATATTTCTTTAGAAAATGT
rs7546603	F: ACGTTGGATGCTCCCCTCTTTATACACACG R: ACGTTGGATGTGAGGTCCTGCACATACGG E: gggagACACACGTATGAAAATACATCTA
rs77027865	F: ACGTTGGATGAGAGGCAGAGGGAAGCATAG R: ACGTTGGATGGACATGGCAGTGATTTTTGAC E: atGCTGGAGAAAGGACAG
rs79461429	F: ACGTTGGATGCCTGCTTATATTTCCATTGC R: ACGTTGGATGACAAGATCGATCTGCATCTG E: ACCTGTAAAGACACACA
rs79727953	F: ACGTTGGATGAGTGATGCGCTGAGTTCTTC R: ACGTTGGATGACAAAGGTTATCCTGGGTGG E: gacgGGGTGGGCCTGACCTAATCAA
rs8139987	F: ACGTTGGATGGAGAAGTCTCTAATCTCCTC R: ACGTTGGATGACTTGATGTGAATGGATGGG E: ggCAGTTTTTTGGAAACATGC
rs9478496	F: ACGTTGGATGTGGACTTCCACTTCCAAATG

	R: ACGTTGGATGCAGTCCAAACCTTTTGCTGA E: TTTTAGCAGTTATATGATGAGAC
rs6851719	F: ACGTTGGATGGACAGTAACACAGTGGTTTC R: ACGTTGGATGGACTGCATTCATCATGTGGC E: ATTTGCTTTTAATCACTGTTC
rs75932085 (rs144031443)	F: ACGTTGGATGGGCATACAATCAGACAAGAC R: ACGTTGGATGACCAGTCATCAGGAATAAGG E: GCTGGTTTACTGGGTTA
rs4726004 (rs150492976)	F: ACGTTGGATGTTCTGGGACATGAGTGCATC R: ACGTTGGATGTGGTGACTCCTGAAACTCTG E: ATGAGTGCATCTTTGGGTA

Note: primers for rs144031443 and rs150492976 were not successfully designed due to too much “ATATAT” in the sequences. These two variants were replaced by rs75932085 ($r^2 = 0.66$) and rs4726004 ($r^2 = 1$), respectively.

Table S3. Interaction analysis between our identified SNPs (rs6941653 and rs402969) and smoking.

		rs6941653 Genotype									<i>P</i> _interaction
Stage	Smoke	TT			TC			CC			
		Cases/Controls	OR (95%CI)	<i>P</i>	Cases/Controls	OR (95%CI)	<i>P</i>	Cases/Controls	OR (95%CI)	<i>P</i>	
NJMU GWAS	NO	497/1111	1.00	Reference	286/588	1.10(0.92-1.31)	0.292	42/69	1.34(0.90-2.00)	0.155	0.287
	Yes	863/835	3.17(2.67-3.77)	6.58E-39	566/420	4.13(3.41-5.01)	1.51E-47	77/54	4.27(2.93-6.22)	3.81E-14	
Validation	NO	353/364	1.00	Reference	186/166	1.15(0.89-1.49)	0.272	26/22	1.22(0.68-2.20)	0.501	0.644
	Yes	262/275	1.07(0.83-1.38)	0.597	160/124	1.45(1.07-1.97)	0.016	20/18	1.25(0.64-2.43)	0.513	
Combined	NO	850/1475	1.00	Reference	472/754	1.09(0.95-1.26)	0.227	68/91	1.29(0.93-1.79)	0.129	0.172
	Yes	1125/1110	2.20(1.91-2.53)	3.41E-28	726/544	2.89(2.47-3.39)	1.80E-39	97/72	2.88(2.08-3.98)	1.69E-10	
		rs402969 Genotype									<i>P</i> _interaction
Stage	Smoke	CC			CT			TT			
		Cases/Controls	OR (95%CI)	<i>P</i>	Cases/Controls	OR (95%CI)	<i>P</i>	Cases/Controls	OR (95%CI)	<i>P</i>	
NJMU GWAS	NO	539/1188	1.00	Reference	249/521	1.07(0.89-1.28)	0.498	37/59	1.33(0.87-2.04)	0.189	0.341
	Yes	983/913	3.25(2.75-3.85)	3.89E-43	457/356	3.85(3.16-4.69)	6.61E-41	66/40	5.00(3.29-7.59)	4.47E-14	
Validation	NO	348/358	1.00	Reference	191/184	1.06(0.83-1.37)	0.628	26/20	1.33(0.73-2.43)	0.355	0.365
	Yes	281/290	1.07(0.83-1.38)	0.614	143/118	1.33(1.00-1.82)	0.049	14/11	1.39(0.62-3.14)	0.423	
Combined	NO	887/1546	1.00	Reference	440/705	1.09(0.95-1.27)	0.226	63/79	1.36(0.97-1.92)	0.077	0.222
	Yes	1264/1203	2.28(1.99-2.61)	3.54E-32	600/474	2.73(2.32-3.22)	2.07E-33	80/51	3.39(2.35-4.91)	7.94E-11	

Table S4. Interaction analysis between risk variant rs6941653 and SNP rs402969.

Stage	rs6941653 Genotype	rs402969 Genotype									<i>P</i> _{interaction}
		CC			CT			TT			
		Cases/Controls	OR (95%CI)	<i>P</i>	Cases/Controls	OR (95%CI)	<i>P</i>	Cases/Controls	OR (95%CI)	<i>P</i>	
NJMU GWAS	TT	894/1357	1.00	Reference	413/532	1.18(1.01-1.38)	0.039	53/57	1.37(0.93-2.04)	0.116	0.787
	TC	548/661	1.25(1.08-1.44)	0.003	262/307	1.32(1.09-1.59)	0.005	42/40	1.64(1.04-2.58)	0.033	
	CC	80/83	1.37(0.98-1.90)	0.062	31/38	1.31(0.80-2.16)	0.283	8/2	5.77(1.19-27.94)	0.029	
Validation	TT	365/424	1.00	Reference	210/191	1.28(1.02-1.63)	0.036	26/18	1.66(0.89-3.08)	0.108	0.094
	TC	233/178	1.52(1.19-1.93)	6.79E-04	98/93	1.24(0.90-1.70)	0.185	9/11	0.96(0.39-2.34)	0.923	
	CC	24/24	1.17(0.65-2.09)	0.904	16/14	1.32(0.63-2.74)	0.461	5/2	2.92(0.56-15.14)	0.203	
Combined	TT	1259/1781	1.00	Reference	623/723	1.23(1.07-1.40)	0.002	79/75	1.48(1.07-2.06)	0.019	0.276
	TC	781/839	1.30(1.15-1.47)	3.28E-05	360/400	1.30(1.10-1.53)	0.002	51/51	1.45(0.97-2.17)	0.068	
	CC	104/107	1.32(1.00-1.76)	0.054	47/52	1.31(0.87-1.97)	0.195	13/4	4.62(1.49-14.38)	0.008	

Age, gender, smoking and principal components were adjusted when appropriate.

Table S5. Pathway enrichment and GO analysis.

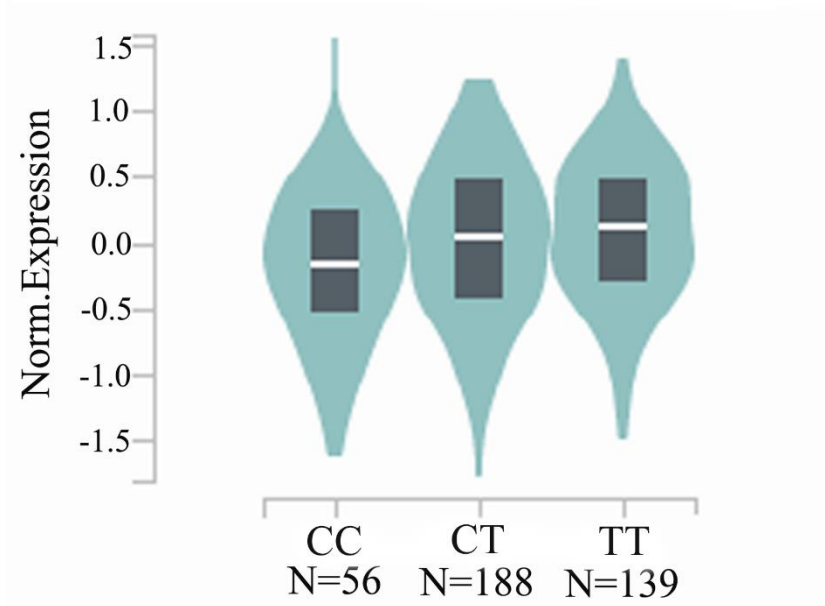
Gene	Category	Term	Count	%	P	Fold ^a	Bonferroni ^b
<i>OPRM1</i>	KEGG_PATHWAY	Olfactory transduction	194	46.6	2.10E-214	14.0	2.00E-212
	GO_MF	olfactory receptor activity	196	47.1	8.00E-243	23.9	1.50E-240
	GO_MF	G-protein coupled receptor activity	210	50.5	1.00E-215	15.6	2.00E-213
	GO_MF	odorant binding	47	11.3	4.10E-55	26.9	7.90E-53
	GO_MF	transmembrane signaling receptor activity	48	11.5	1.20E-36	11.8	2.40E-34
	GO_MF	type I interferon receptor binding	8	1.9	1.40E-08	24.7	2.60E-06
	GO_MF	trace-amine receptor activity	4	1.0	1.30E-04	35.1	2.50E-02
	GO_MF	adrenergic receptor activity	4	1.0	2.20E-04	30.1	4.20E-02
	GO_CC	plasma membrane	227	54.6	4.90E-68	2.9	5.50E-66
	GO_CC	integral component of membrane	240	57.7	5.80E-59	2.5	6.50E-57
	GO_CC	keratin filament	12	2.9	2.60E-06	6.4	2.90E-04
	GO_BP	detection of chemical stimulus involved in sensory perception of smell	196	47.1	5.70E-246	24.5	2.80E-243
	GO_BP	G-protein coupled receptor signaling pathway	204	49.0	2.10E-183	12.1	1.00E-180
	GO_BP	sensory perception of smell	57	13.7	1.00E-56	19.0	4.90E-54
	GO_BP	detection of chemical stimulus involved in sensory perception	48	11.5	2.90E-56	26.8	1.50E-53
	GO_BP	natural killer cell activation involved in immune response	8	1.9	3.20E-08	22.4	1.60E-05
	GO_BP	positive regulation of peptidyl-serine phosphorylation of STAT protein	8	1.9	3.20E-08	22.4	1.60E-05
	GO_BP	T cell activation involved in immune response	8	1.9	1.00E-07	19.3	5.00E-05
	GO_BP	regulation of type I interferon-mediated signaling pathway	8	1.9	3.70E-07	16.4	1.80E-04
GO_BP	B cell proliferation	8	1.9	1.70E-06	13.3	8.50E-04	
GO_BP	response to exogenous dsRNA	8	1.9	2.70E-06	12.5	1.30E-03	
GO_BP	B cell differentiation	9	2.2	3.10E-05	7.2	1.50E-02	
GO_BP	adenylate cyclase-activating serotonin receptor signaling pathway	5	1.2	7.60E-05	20.4	3.70E-02	
GO_BP	humoral immune response	8	1.9	9.00E-05	7.5	4.40E-02	
<i>NLRP8</i>	KEGG_PATHWAY	Olfactory transduction	176	16.1	3.10E-110	6.7	7.60E-108

GO_MF	olfactory receptor activity	177	16.2	1.00E-111	7.7	9.10E-109
GO_MF	G-protein coupled receptor activity	193	17.7	3.30E-85	5.1	2.90E-82
GO_MF	odorant binding	45	4.1	1.40E-31	9.1	1.20E-28
GO_MF	transmembrane signaling receptor activity	50	4.6	1.80E-18	4.4	1.50E-15
GO_MF	type I interferon receptor binding	8	0.7	1.50E-05	8.8	1.30E-02
GO_MF	structural molecule activity	31	2.8	2.50E-05	2.3	2.10E-02
GO_CC	plasma membrane	379	34.7	1.30E-33	1.7	5.80E-31
GO_CC	integral component of membrane	404	37.0	3.50E-21	1.5	1.60E-18
GO_CC	extracellular region	127	11.6	3.30E-06	1.5	1.50E-03
GO_BP	detection of chemical stimulus involved in sensory perception of smell	177	16.2	1.50E-113	7.8	4.70E-110
GO_BP	G-protein coupled receptor signaling pathway	200	18.3	1.80E-72	4.2	5.70E-69
GO_BP	sensory perception of smell	57	5.2	1.80E-31	6.7	5.70E-28
GO_BP	detection of chemical stimulus involved in sensory perception	45	4.1	5.70E-31	8.9	1.80E-27
GO_BP	keratinocyte differentiation	17	1.6	1.90E-06	4.2	6.10E-03

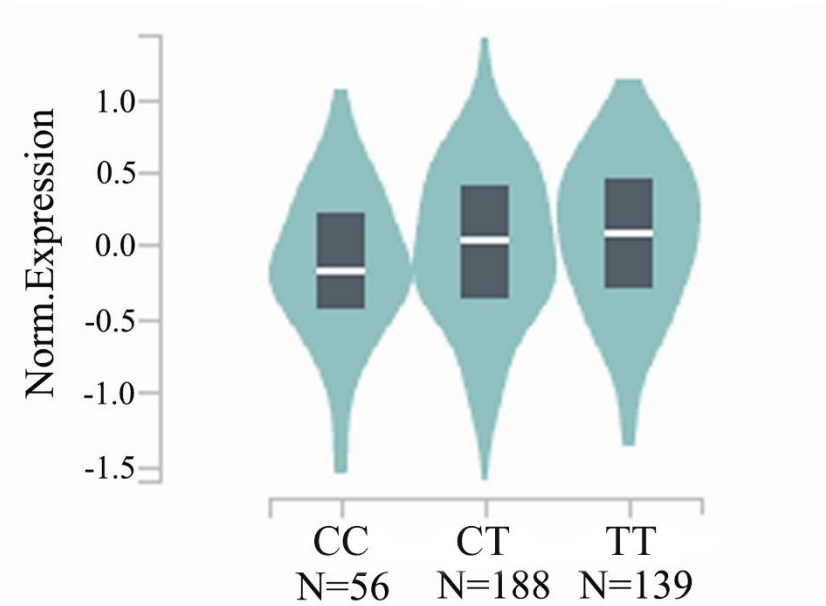
^a Fold enrichment in each pathway or GO process.

^b *P* values after taking Bonferroni correction.

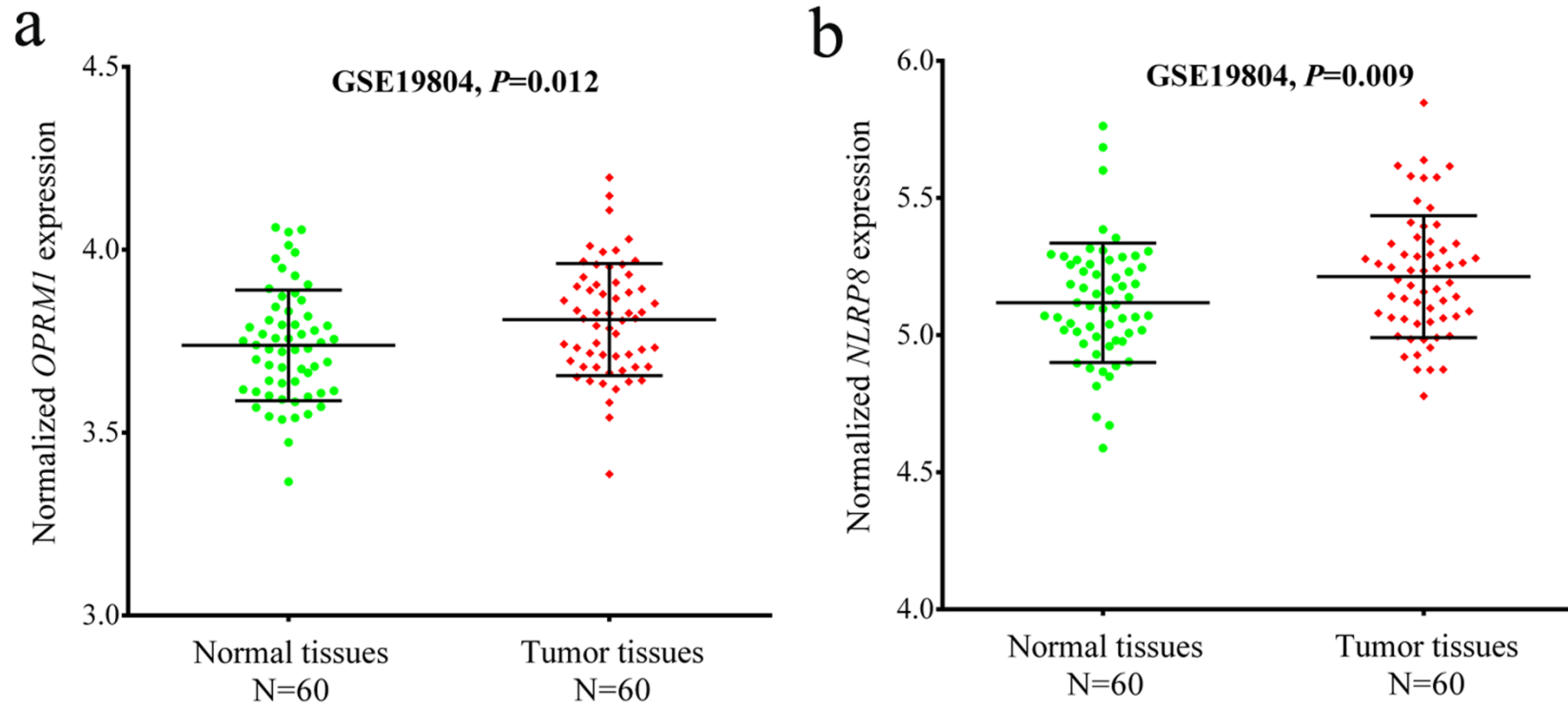
rs805165, AC010525.7 ($\beta=0.13$, $P=0.017$)



rs805165, AC024580.1 ($\beta=0.11$, $P=0.034$)



Supplementary Figure 1. Rs805165 was significantly associated with the expression of AC010525.7 and AC024580.1 in lung tissues based on GTEx v7 database.



Supplementary Figure 2. Expression of *OPRM1* and *NLRP8* in 60 paired lung tumor tissues and adjacent normal tissues based on GSE19804.