Supplement 1: Gene mutation sites and affected protein changes

Mutant gene	Cases	Gene mutation point	Protein mutation point	Spacer codon
	10 20	c.824G>T	p.C275F	
	18 21	c.746G>T	p.R249M	
	10 11	c.672G>T c.480_481delGGinsTT	p.E224D p.M160_A161delinsIS	64
	10 12	c.824G>T c.455delC	p.C275F p.P152RfsX18	123
	10 18	c.824G>T c.746G>T	p.C275F p.R249M	26
	10 19	c.824G>T c.374_375delCGinsAT	p.C275F p.T125N	150
	10 28	c.672G>T c.396G>C	p.E224D p.K132N	92
	11 28	c.480_481delGGinsTT c.396G>C	p.M160_A161delinsIS p.K132N	28
	12 18	c.455delC c.746G>T	p.P152RfsX18 p.R249M	97
	12 19	c.455delC c.374_375delCGinsAT	p.P152RfsX18 p.T125N	27
	12 27	c.455delC c.428T>A	p.P152RfsX18 p.V143E	9
	12 29	c.455delC c.833C>G	p.P152RfsX18 p.P278R	126
	13 14	c.277delC c.1015G>T	p.L93Cfs*30 p.E339*	246
	13 15	c.277delC c.817C>T	p.L93Cfs*30 p.R273	180
	13 15	c.277delC c.892G>T	p.L93Cfs*30 p.E298*	205
	13 18	c.277delC c.538G>T	p.L93Cfs*30 p.E180X	87
	13 22	c.277delC c.730G>T	p.L93Cfs*30 p.G244C	151
	13 25	c.277delC c.202G>T	p.L93Cfs*30 p.E68X	25
	13 26	c.277delC c.217G>T	p.L93Cfs*30 p.V73L	20
	14 15	c.1015G>T c.817C>T	p.E339* p.R273	66
	14	c.1015G>T	p.E339*	41

	15	c.892G>T	p.E298*	41
	14 18	c.1015G>T c.538G>T	p.E339* p.E180X	159
	14 22	c.1015G>T c.730G>T	p.E339* p.G244C	95
TP53	14 25	c.1015G>T c.202G>T	p.E339* p.E68X	271
	14 26	c.1015G>T c.217G>T	p.E339* p.V73L	266
	15	c.817C>T c.892G>T	p.R273 p.E298*	25
	15 18	c.817C>T c.538G>T	p.R273 p.E180X	93
	15 18	c.892G>T c.538G>T	p.E298* p.E180X	118
	15 22	c.817C>T c.730G>T	p.R273 p.G244C	29
	15 22	c.892G>T c.730G>T	p.E298* p.G244C	54
	15 25	c.817C>T c.202G>T	p.R273 p.E68X	205
	15 25	c.892G>T c.202G>T	p.E298* p.E68X	230
	15 26	c.817C>T c.217G>T	p.R273 p.V73L	200
	15 26	c.892G>T c.217G>T	p.E298* p.V73L	225
	18 22	c.538G>T c.730G>T	p.E180X p.G244C	64
	18 25	c.538G>T c.202G>T	p.E180X p.E68X	112
	18 26	c.538G>T c.217G>T	p.E180X p.V73L	107
	18 29	c.746G>T c.833C>G	p.R249M p.P278R	29
	19 21	c.374_375delCGinsAT c.746G>T	p.T125N p.R249M	124
	19 27	c.374_375delCGinsAT c.428T>A	p.T125N p.V143E	18
	19 29	c.374_375delCGinsAT c.833C>G	p.T125N p.P278R	153
	20 29	c.824G>T c.833C>G	p.C275F p.P278R	3
	21 27	c.746G>T c.428T>A	p.R249M p.V143E	106

	22 25	c.730G>T c.202G>T	p.G244C p.E68X	176
	22 26	c.730G>T c.217G>T	p.G244C p.V73L	171
	25 26	c.202G>T c.217G>T	p.E68X p.V73L	5
	27 29	c.428T>A c.833C>G	p.V143E p.P278R	135

Mutant gene	Cases	Gene mutation point	Protein mutation point	Spacer codon
RB1	15 18	c.2134T>C c.610G>T	p.C712R p.E204X	508
	15 21	c.2134T>C c.1363C>T	p.C712R p.R455X	257
	15 22	c.2134T>C c.1981C>T	p.C712R p.R661W	51
	18 22	c.610G>T c.1981C>T	p.E204X p.R661W	457
	21 22	c.1363C>T c.1981C>T	p.R455X p.R661W	206

Mutant gene	Cases	Gene mutation point	Protein mutation point	Spacer codon
PTEN	10 19	c.601G>A c.565A>T	p.E201K p.R189X	12

Mutant gene	Cases	Gene mutation point	Protein mutation point	Spacer codon
KEAP1	10 11	c.1687C>T c.1027G>T	p.Q563* p.E343X	220
	10 20	c.1687C>T c.484T>A	p.Q563* p.Y162N	401
	10 25	c.1687C>T c.1237C>A	p.Q563* p.R413S	150
	10 31	c.1687C>T c.997G>T	p.Q563* p.G333C	230
	11 31	c.1027G>T c.997G>T	p.E343X p.G333C	10
	11 20	c.1027G>T c.484T>A	p.E343X p.Y162N	181
	11 25	c.1027G>T c.1237C>A	p.E343X p.R413S	70
	20 25	c.484T>A c.1237C>A	p.Y162N p.R413S	251
	20 25	c.484T>A c.1237C>A	p.Y162N p.R413S	251
	25 31	c.1237C>A c.997G>T	p.R413S p.G333C	80

Mutant gene	Cases	Gene mutation point	Protein mutation point	Spacer codon

ROS1	18 27	c.693G>T c.5433C>A	p.R231S p.C1811X	1580

Mutant gene	Cases	Gene mutation point	Protein mutation point	Spacer codon
PKHD1	11	c.571T>A c.8659G>T	p.C191S p.A2887S	2696
	11 14	c.571T>A c.11101G>A	p.C191S p.V3701I	3510
	11 14	c.8659G>T c.11101G>A	p.A2887S p.V3701I	814
	11 27	c.8659G>T c.10660G>A	p.A2887S p.E3554K	667
	11 27	c.8030C>A c.10142C>G	p.P2677Q p.S3381C	704
	11 27	c.571T>A c.7003A>G	p.C191S p.R2335G	2144
	11 27	c.8659G>T c.7003A>G	p.A2887S p.R2335G	552
	11 27	c.571T>A c.10660G>A	p.C191S p.E3554K	3363
	14 27	c.11101G>A c.7003A>G	p.V3701I p.R2335G	1366
	14 27	c.11101G>A c.10660G>A	p.V3701I p.E3554K	147
	27	c.7003A>G c.10660G>A	p.R2335G p.E3554K	1219

Abberation: Cases: cases of patients; Protein mutation point: the corresponding protein locations