Supp. Table S1. *VHL* mutations associated with congenital polycythemias. The reference *VHL* sequence used is NM_000551 (current version, NM_000551.2). yo, years old.

Inheritance & Mutation (c.DNA)		Protein Change (p.protein)	Kindred	Phenotypes	Reference
Heterozygous	Paternal: c.376G>T/ wt	Asp126Tyr	Patient 1 and 2: American siblings of Ukrainian descent	Both siblings are heterozygous: Patient 1: 16yo female with polycythemia and a history of pulmonary angioma, subcapsular renal hemangioma; after treatment of hemangiomas patient remained polycythemic. Patient 2: 10yo male with polycythemia	(Pastore et al., 2003a)
Heterozygous	c.430G->A	Gly144Arg	1 Case	Polycythemia	(Randi et al., 2005)
Compound Heterozygous	c.235C>T/ c.562C>G	Arg79Cys/ Leu188Val	Patient 1	33yo female with high erythropoeitin but is asymptomatic	(Bento et al., 2005)
Heterozygous	c.523A>G	Tyr175Cys	Patient 6; Portuguese	18yo female with polycythemia and Ataxia telangiectasia	(Bento et al., 2005)
Homozygous	Paternal: c.571C>G/ Maternal: c.571C>G	His191Asp	Patient 7; Croatian	17yo male with polycythemia	(Pastore et al., 2003b)
Compound Heterozygous with R200W	Paternal: c.388G>C/ Maternal: c.598C>T	Val130Leu & Arg200Trp	Patient 8	5yo male with polycythemia	(Pastore et al., 2003a)
	Unkown: c.562C>G Maternal: c.598C>T	Leu188Val & Arg200Trp	Patient 5; White American	13yo female with polycythemia	(Pastore et al., 2003b)
	Unknown: c.562C>G/ c.598C>T	Leu188Val & Arg200Trp	Patient 6; White American	15yo male with polycythemia	(Pastore et al., 2003b)
	Maternal: c.598C>T Paternal c.574C>T	Pro192Ser & Arg200Trp	Patient 4; White American	10yo boy with polycythemia	(Pastore et al., 2003b)

Inheritance & Mutation (c.DNA)		Protein Change (p.protein)	Kindred	Phenotypes	Reference
Homozygous R200W	Paternal: c.598C>T/ Maternal: c.598C>T	Arg200Trp	Hundreds in Chuvashia, Russia	Congenital Chuvash Polycythemia	(Ang et al., 2002), (Sergeyeva et al., 1997)
	Paternal: c.598C>T/ Maternal: c.598C>T	Arg200Trp	Patient 2 & 3 are white American siblings	38yo and 41yo males and with congenital polycythemia and thrombosis complications	(Bento et al., 2005)
	Paternal: c.598C>T/ Maternal: c.598C>T	Arg200Trp	Patient 4	17yo female with congenital polycythemia and thrombosis complications	(Bento et al., 2005)
	Paternal: c.598C>T/ Maternal: c.598C>T	Arg200Trp	Patient 6; Russian	3yo female with polycythemia	(Pastore et al., 2003a)
	Paternal: c.598C>T/ Maternal: c.598C>T	Arg200Trp	Patient 1 & 2; Danish Siblings	14yo and 12yo male siblings with polycythemia	(Pastore et al., 2003b)
	Paternal: c.598C>T/ Maternal: c.598C>T	Arg200Trp	Patient 3; White American	19yo male with polycythemia at 3 days old, thrombosis at 15yo, DVT with pulmonary embolism at 19yo	(Pastore et al., 2003b)
	Paternal: c.598C>T/ Maternal: c.598C>T	Arg200Trp	37784; Dutch	Congenital polycythemia	This report
	Paternal: c.598C>T/ Maternal: c.598C>T	Arg200Trp	Bangladesh Family	19yo male with polycythemia at 3 days old, thrombosis at 15yo, DVT with pulmonary embolism at 19yo	(Pastore et al., 2003b)

Supp. Table S2. An overview of *VHL* mutations.
Pheo: Pheochromocytoma, RCC: Renal Cell Carcinoma, HB: Hemangioblastoma, RA: Retinal Angiomas, PC: Pancreatic Cysts, ELST: Endolymphatic sac tumor, ASx: Asymptomatic, Trunc: Truncation, MS: Missense, NS: Nonsense, TS: Transition, TV: Transversion, Del: Deletion, Ins: Insertion, InF: In-frame. Column DB (database) indicates which database includes that mutation: • references the UMD Database and H references the Human Mutation Gene Database along with any article listed. Sporadic indicates Somatic and Familial indicates Germline, *unless* otherwise specified (i.e. Sporadic Germline). Two mutations exist on the same allele if mutations are separated by "and." Mutations are on two separate alleles if separated by "/.". Some mutations have incomplete information, because specific information was not provided. Exon 1 (Teal blue): nt 1 - 340; Exon 2 (purple) nt 341 - 463; Exon 3 (yellow): nt 464 – 642. Nucleotide numbering reflects cDNA numbering with +1 corresponding to the A of the ATG translation initiation codon in the reference sequence. The reference *VHL* sequence used is NM_000551 (current version, NM_000551.2).

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
1	c.	1_17del17 and 471T>A	Frameshift & Thr157Thr	Del & TV/FS	962	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			Del & TV/FS	963	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	1-?_340+?del (deletion exon 1)	?	Del/FS	330	Familial	CNS HB			Utrecht, this report	
	c.	1-?_463+?del (deletion exon 1 & 2)	?	Del/FS	215	Familial	RCC			Utrecht, this report	
	c.	1-?_642+?del (deletion exon 1, 2 & 3)	?	Del/FS	231	Familial	CNS HB, pancreatic cysts, Grawitz			Utrecht, this report	
	c.	1-?_642+?del (deletion exon 1, 2 & 3)	?	Del/FS	17991, 7250	Familial	CNS HB, pancreatic/hepatic/renal cysts, RCC			Rotterdam, this report	
	c.	1-?_642+?del (deletion exon 1, 2 & 3)	?	Del/FS	3225	Familial	CNS HB, pancreatic/renal cysts, RA			Rotterdam, this report	
	c.	1_20del21and 291_310del20	Frameshift	Large Del	941	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	3G>A	No initiation	TS	375	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
2											
3											
4											
5											
6											
7	c.	19A>G	Asn7Asp	TS/MS	1VT	Sporadic	RCC			(Ma et al., 2001)	
	c.	20A>C	Asn7Thr	TV/MS	980838	Sporadic	Hemangioblastoma			(Gijtenbeek et al., 2002)	
8	c.	24G>A	Trp8X	NS	3GT	Sporadic	RCC			(Ma et al., 2001)	
9	c.	27G>T	Asp9Asp	TV/Poly?	T48	Sporadic	RCC			(Gallou, Joly et al., 1999)	
	c.			TV/Poly?	T49	Sporadic	RCC			(Gallou, Joly et al., 1999)	
10	c.	29A>G	Glu10Gly	TS/MS	972719	Sporadic	RCC			(Schraml et al., 2002)	
	c.			TS/MS	972748	Sporadic	RCC			(Schraml et al., 2002)	
11											
12	c.	34G>A	Glu12Lys	TS/MS	972719	Sporadic	RCC			(Schraml et al., 2002)	
	c.			TS/MS	972749	Sporadic	RCC			(Schraml et al., 2002)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
13											
14	c.	42insA	Ala15Arg Stops at 26	Ins/FS	8	Sporadic	RCC			(Suzuki et al., 1997)	*
15											
16											
17											
18	c.	52G>A	Ala18Thr	TS/MS	81					(Kishida, Stackhouse et al., 1995)	*
19	c.	57C>A	Gly19Gly	TV/Poly?	972746	Sporadic	RCC			(Schraml et al., 2002)	
20											
21											
22											
23											
24											
25	c.	73C>T, homozygous	Pro25Ser	TS/MS	13FT	Sporadic	RCC			(Ma et al., 2001)	
	c.	74C>T	Pro25Leu; Polymorphism	Poly	3 Patients	Familial	2 unaffected found after screening 200 individuals; 1 affected also has P86R.			(Rothberg et al., 2001)	
	c.			Poly	3 Unaffected; Polish	Familial	Three unaffected Polish patients.			(Cybulski et al., 2002)	H
	c.			Poly	7	Familial	Cerebellar HB			(Oberstrass et al., 1996)	*
	c.			Poly	ST42	Sporadic	RCC			(Brieger et al., 1999)	*
	c.			Poly	10	Familial	MEN IIA: Bilateral, Benign, Adrenal Pheo			(van der Harst et al., 1998)	
26	c.	76G>A	Glu26Lys	TS/MS	972750	Sporadic	RCC			(Schraml et al., 2002)	
	c.	77A>G	Glu26Gly	TS/MS	972732	Sporadic	RCC			(Schraml et al., 2002)	
27	c.	81A>G	Glu27Glu	TS,/Poly?	9VT	Sporadic	RCC			(Ma et al., 2001)	
28	c.	83A>T	Asp28Val	TV/MS	972746	Sporadic	RCC			(Schraml et al., 2002)	
29											
30											
31	c.	92A>G	Glu31Gly	TS/MS	14340	Sporadic	RCC			(Schraml et al., 2002)	
32	c.										
33	c.	97T>G	Ser33Ala; CK2 phosphorylation site lost	TV/MS;	18325	Sporadic	RCC			(Barnabas et al., 2002)	
34	c.	102C>T	Gly34Gly	TS/Poly?	349	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
35	c.										
36	c.	108G>A	Glu36Glu	TS/Poly?	13FT	Sporadic	RCC			(Ma et al., 2001)	
37	c.	109G>A & 135G>A	Glu37Lys & Pro45Pro	TS/MS	U1	Sporadic	RCC			(Yang et al., 1999)	
38	c.	112T>C	Ser38Pro; CK2 phosphorylation site lost	TS/MS	CM981995		Pheo			(Li et al., 1998)	H
	c.	113C>T	Ser38Phe; CK2 phosphorylation site lost	TS/MS	2048	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
39	c.	115G>A and 291C>A	Gly39Ser & Pro97Pro	TS/MS & TV	1782	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	116G>A	Gly39Asp	TS/MS	972725	Sporadic	RCC			(Schraml et al., 2002)	
40	c.	118 ins	Frameshift	Ins/FS	46	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.	118ins and 214insGCCC	Frameshift	Ins/FS	46	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.	118C>T and 145G>T	Pro40Ser & Gly49Cys	TS/MS&TV/ MS	1716	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
41	c.	122A>T and 183C>T	Glu41Val & Pro61Pro	TV/MS&TS	973	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TV/MS&TS	974	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
42	c.	125A>T	Glu41Val	TV/MS	1013	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
43	c.	129C>T	Ser43Ser	TS/Poly?	13GT	Sporadic	RCC			(Ma et al., 2001)	
44	c.	131G>A	Gly44Asp	TS/MS	3GT	Sporadic	RCC			(Ma et al., 2001)	
45	c.	135G>A & 109G>A	Pro45Pro & Glu37Lys	TS/Poly?	U1	Sproadic	RCC			(Yang et al, 1999)	
46	c.	136G>T	Glu46X	TV/NS	V65	Familial	VHL Type 1 RA			(Dollfus et al., 2002; Olschwang et al., 1998)	*
47	c.	139_141GAA>AAG	Glu47Lys	MS	972735	Sporadic	RCC			(Ma et al., 2001)	
48	c.	142C>G	Leu48Val	TV/MS	187	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
49	c.	145G>T and 118C>T	Gly49Cys & Pro40Ser	TV/MS&TS/ MS	1716	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	146G>A	Gly49Asp	TS/MS	1ET1	Sporadic	RCC			(Ma et al., 2001)	
50	c.	148G>C homozygous	Ala50Pro	TV/MS	6VT	Sporadic	RCC			(Ma et al., 2001)	
	c.	148G>A	Ala50Thr	TS/MS	U1	Sporadic	RCC			(Yang et al, 1999)	*
	c.	149C>G and 221T>C	Ala50Gly & Val74Ala	TV/MS&TS/ MS	336	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
51	c.	151G>C and 284C>G	Glu51Gln & Pro95Arg	TV/MS&TV/ MS	1524	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TV/MS&TV/ MS	1525	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
52	c.	154G>A	Glu52Lys	TS/MS	V285	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TS/MS	CM023991	Familial	VHL: no RA			(Dollfus et al., 2002)	H
53	c.	159_168del	Met54Gly Stop at 63	Del/FS	23	Sporadic	Cerebellar HB			(Oberstrass et al., 1996)	*
	c.	158ins45	Frameshift	Ins/FS	463	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
54	c.	160_175del	Met54Arg Stop at 61	Del/FS	C18	Sporadic	RCC			(Foster et al., 1994a)	*
	c.	161insT	Met54Ile Stop at 131	Ins/FS	V69	Familial	Type 2A			(Olschwang et al., 1998)	*
	c.	162insT	Met54X	Ins/FS	1 Family; 2 affected	Familial	CNS HB			(Ong et al., 2007)	
	c.	162delG	Glu55Arg Stop at 66	Del/FS	349	Sporadic	RCC			(Gallou et al., 2001)	*
	c.	162_166delGGAGG	Met54Ile Stop at 129	Del/FS	152	Sporadic	RCC			(Shuin et al., 1994a)	*
55	c.	163_164delGA	Glu55Gly Stop at 130	Del/FS	T199	Sporadic	RCC			(Gallou et al., 1999)	*
	c.	163delG	Stop at 66	Del/FS	3682	Familial	VHL Type 1			(Zbar, Kishida et al., 1996)	
	c.	164insG	Frameshift	Ins/FS	1 Family; 10 affected	Familial	2 patients with RCC, 3 with Pheo, 7 with RA, 3 with CNS HB			(Ong et al., 2007)	
	c.	165insG	Frameshift	Ins/FS	1 Family; 1 affected	Familial	RA, CNS HB			(Ong et al., 2007)	
	c.	165insA	Ala56Gly Stop at 131	Ins/FS	146	Familial	VHL: Phenotype not described			(Crossey et al., 1994)	*
	c.	165G>A	Glu55Glu	TS	V5	Familial	VHL Type 1			(Olschwang et al., 1998)	*
56	c.	166delG	Stop at 66	Del/FS	1510	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	*
	c.	166delGC	Frameshift	Del/FS	AvB64	Somatic	RCC			Utrecht, this report	
	c.	166_178del	Ala56Gly Stop at 62	Del/FS	22	Sporadic	RCC			(Whaley et al., 1994)	*
	c.	167insA	Ala56Asp Stop at 131	Ins/FS	110	Familial	VHL Type 1			(Crossey et al., 1994)	*
57										Utrecht, this report	
58	c.	173_174 insC	Arg58Pro Stop at 131	Ins/FS	Patient 1: Korean	Familial	18yo with CNS HB			(Cho et al., 2009)	
59	c.	175delC	Pro59Arg Stop at 66	Del/FS	56	Familial	VHL Type 1			(Crossey et al., 1994)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.		Pro59Arg Stop at 66	Del/FS	1 Family; 1 affected	Familial	RA, CNS HB			(Ong et al., 2007)	
	c.	175_183del	Pro59_Pro61del	InF del	C33	Sporadic	RCC			(Foster et al., 1994a)	*
	c.	176_177delCG	Arg60Ala Stop at 130	Del/FS	361	Sporadic	RCC			(Gallou et al., 2001)	*
60	c.	179delG	Stop at 66	Del/FS	161	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			Del/FS	V9	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.	180delG	Val62Cys Stop at 66	Del/FS	3563	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			Del/FS	175	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.	180_208del	Pro61Ala Stop at 121	Del/FS	UMRC7	Sporadic	RCC			(Gnarra et al., 1994)	*
61	c.	181delC	Stop at 66	Del/FS	T197	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			Del/FS		Somatic	RCC			(Bailly et al., 1995)	*
	c.	181delCCGT	Frameshift	Del/FS		Familial	VHL: Ocular HB. The rest of the VHL pheonotype was not described.			(Webster et al., 1999)	*
	c.	182_185delCCGT	Frameshift	Del/FS	1 Family; 10 affected	Familial	2 patients with RCC, 3 with Pheo, 7 with RA, 3 with CNS HB			(Ong et al., 2007)	
	c.	183delC	Stop at 66	Del/FS	169	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.	183C>G	Pro61Pro	TV	T127	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			TV	T135	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			TV	T152	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			TV		Sporadic	RCC			(Bailly et al., 1995)	*
	c.		Polymorphism	Poly	Family 9: Brazilian	Familial				(Rocha et al., 2003)	H
	c.			Poly	Family 17: Brazilian	Familial				(Rocha et al., 2003)	H
	c.	183C>T	Pro61Pro	TS	1306	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	183insC	Truncation	Ins/FS	VHL 73	Familial	VHL: Phenotype not described			(Klein et al., 2001)	H
	c.	183ins5	Frameshift	Ins/FS	260	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	183C>T and 122A>T	Pro61Pro & Glu41Val	TS & TV/MS	973	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TS & TV/MS	974	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	183delC and 463+5T>A	Stop at 66 & Splice	Del&Splice	2109	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	183_187del5	Frameshift	Del/FS	191	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			Del/FS	683	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	183_195del	Stop at 62	Del/FS	304	Sporadic	RCC			(Gallou et al., 2001)	*
62	c.	184delG and 241C>T	Stop at 66	Del/FS	1670	Sporadic	RCC due to trichloroethylene exposure			(Brauch et al., 1999)	*
	c.	184delG	Frameshift	Del/FS	AvB47	Somatic	RCC			Utrecht, this report	
	c.	185ins5	Frameshift	Ins/FS	14	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	185delT	Val62Gly Stop at 66	Del/FS						Gallou personal comment per UMD	*
	c.		Val62Gly Stop at 66	Del/FS						Unpublished.	*
63	c.	187delC	Leu63Cys Stop at 66	Del/FS		Sporadic	RCC	β Domain		(Bailly et al., 1995)	*
	c.	188T>C	Leu63Pro	TS/MS	37	Germline	Unilateral, Benign, Adrenal Pheo. It was originally			(van der Harst et al., 1998)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
							diagnosed as a Sporadic Pheo			
	c.	189_192delGCGC	Stop at 65	Del/FS	19	Familial	VHL: Phenotype not described		(Whaley et al., 1994)	*
64	c.	191G>C	Arg64Pro	TS/MS	Family with patient numbers 31 and 34	Familial	Same family: 31: Bilateral, Benign, Adrenal Pheo 34: Bilateral, Malignant, Adrenal Pheo (Both originally diagnosed as a Sporadic Pheo)		(van der Harst et al., 1998)	*
	c.			TS/MS	Fam 1	Familial	VHL: RCC, Pheo		(Hes et al., 2007)	H
	c.	192_198del CTCGGTG	Stop at 156	Del/FS	137	Sporadic	RCC		(Shuin et al., 1994a)	*
	c.	192delC	Stop at 66	Del/FS	176	Sporadic	RCC		(Shuin et al., 1994a)	
	c.			Del/FS	18	Sporadic	RCC		(Suzuki et al., 1997)	*
65	c.	193T>C	Ser65Pro	TS/MS	331T2	Sporadic	RCC	Hif-α Binding	(Gallou et al., 2001)	*
	c.			TS/MS	1 family; 1 affected	Familial	RA, CNS HB		(Ong et al., 2007)	
	c.			TS/MS	CM023992	Familial	VHL: Phenotype not described; No RA		(Dollfus et al., 2002)	H
	c.	193T>G	Ser65Ala	TV/MS	1 Case	Familial	VHL Type 2		(Neumann et al., 2002)	
	c.	194C>A	Ser65X	TV/NS	80	Familial	VHL Type 1		(Stolle et al., 1998)	*
	c.			TV/NS	12	Familial	VHL: Phenotype not described		(Whaley et al., 1994)	
	c.			TV/NS	13	Familial	VHL: Phenotype not described		(Whaley et al., 1994)	
	c.			TV/NS	VHL 83	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.			TV/NS	192	Sporadic	RCC		(Gallou et al., 1999)	*
	c.	194C>G	Ser65Trp	TV/MS	4325	Familial	VHL Type 1		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TV/MS	25	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			TV/MS	53	Familial	VHL Type 1		(Stolle et al., 1998)	*
	c.			TS/MS	1 family; 8 affected	Familial	1 patient with RCC, 6 with RA, 5 with CNS HB		(Ong et al., 2007)	
	c.			TV/MS	Fam 3: 1 affected	Familial	VHL: RCC, CNS HB, RA, Renal and Pancreatic cysts		(Hes et al., 2007)	H
	c.			TV/MS	39	Familial	VHL: The presence of Pheo was not indicated		(Maher et al., 1996)	
	c.	194C>T	Ser65Leu	TS/MS	V209	Familial	VHL Type 1		(Olschwang et al., 1998)	*
	c.			TS/MS	52	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	Family 1: Polish; 1 affected	Familial	CNS HB		(Cybulski et al., 2002)	H
	c.			TS/MS	Family 2: Polish; 4 affected	Familial	RA, CNS HB		(Cybulski et al., 2002)	H
	c.			TS/MS	Family 3: Polish;12 affected	Familial	RCC, RA, CNS HB		(Cybulski et al., 2002)	H
	c.			TS/MS	Fam 2: 1 affected	Familial	VHL: RCC, CNS HB, Epididymal cysts, Renal and		(Hes et al., 2007)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
							Pancreatic cysts				
	c.			TS/MS	311	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TS/MS	UOK164g	Sporadic	RCC			(Gnarra et al., 1994)	
	c.		Ser65Leu	MS	F62	Familial	Cerebellar HB, RCC			(Ruiz-Llorente et al., 2004)	H
	c.	194delC	Frameshift	Del/FS	1 Family; 7 affected	Familial	2 patients with RCC, 1 with Pheo, 3 with RA, 2 with CNS HB,			(Ong et al., 2007)	
	c.	195G>C	Ser65Ser	TV	669	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
66	c.	196delG	Val 66X	Del/NS	43	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.	197_220del	In-frame del	InF Large Del	V287	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.	197_213del	Asn67Pro Stop at 125	Del/FS	T15	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.	198_221del24	Frameshift	Large Del	829	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
67	c.	.201_206CTCGCG>A	.N67fs*63	Del	981992	Sporadic	RCC			(Banks et al., 2006)	
	c.	200A>G	.N67S	MS	971844	Sporadic	RCC			(Hughson et al., 2003)	
	c.	198_221del24	.N67_V74del	Del	829	Sporadic	RCC			(van Houwelingen et al., 2005)	
	c.	197_213del17	.N67fs*59	Del	T15	Sporadic	RCC			(Gnarra et al., 1994)	
68	c.	202T>A and 203C>A	Ser68Thr & Ser68X	TV/MS&TV/ NS	592	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	202T>C	Ser68Pro	TS/MS	Fam 4: 2 affected	Familial	RA Only			(Hes et al., 2007)	
	c.	203C>A	Ser68X	TV/NS	160	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.			TV/NS		Sporadic	RCC			(Gnarra et al., 1994)	*
	c.			TV/NS	27	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.			TV/NS	57	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.			TV/NS		Sporadic	RCC			(Brieger et al., 1999)	*
	c.			TV/NS	428	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TV/NS	350	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TV/NS	A44	Sporadic	RCC			(Lemm et al., 1999)	*
	c.			TV/NS	CM003058	Familial	VHL: Phenotype not described			(Mattocks et al., 2000)	H
	c.			TV/NS		Familial	VHL: Ocular HB. The rest of the VHL pheonotype was not described.			(Webster et al., 1999)	*
	c.	203C>G	Ser68Trp	TV/MS	Family with five affected members: II2, II:4, III:1, III:2, III:4	Familial	VHL Type 2: Family with variable penetrance. II:2 Pheo at 24yo Of her three children: III:1 Carrier, ASx at 35yo III:2 Pheo at 12yo III3: Not a carrier II:4 Carrier but ASx at 63yo Of her six children: III:4 Pheo at 23yo Three are not carriers and two have not been tested; none of whom have VHL manifestations.			(Martin et al., 1996)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.				Case 1	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.	203dup	Arg69Ala Stop at 131	Ins/FS						Unpublished	*
	c.	204delG and 283_297del15	Stop at 158	Del&Del	1809	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	204insC	Ser68ins Stop at 63	Ins/FS	2530					Gallou, personal commemnt per UMD.	*
69	c.	205delC	Stop at 158	Del/FS	2002	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	205C>T and 472delCT	Arg69Cys & Frameshift	TS/MS&Del/ FS	1676	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.	205delCGCG and 568delG	Frameshift & Stop at 201	Del&Del//FS	1677	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.	205_206delCG	Stop at 130	Del/FS	102	Sporadic	RCC			(Gallou et al., 1999)	*
	c.	206_208delGCG	In-Frame Deletion & substitution; SREP>SQP	InF Del	T33	Sporadic	RCC			(Gnarra et al., 1994)	*
70	c.	208G>A	Glu70Leu	TS/MS	V374	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TS/MS	Fam 5: 1 affected	Germline/ Likely de novo	Bilateral RA Only			(Hes et al., 2007)	
	c.			TS/MS	Patient 15: Korean	Germline/ Possibly de novo	52yo male with CNS HB; No family history.			(Cho et al., 2009)	
	c.	208G>T	Glu70X	TV/NS	179	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			TV/NS	VHL50: Filipino; 1 affected	Familial	VHL Type 1: CNS HB			(Glavac et al., 1996) (Zbar et al., 1996)	*
	c.			TV/NS	4479					(Chen et al., 1995)	
	c.			TV/NS	757	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	209_210delAG	Glu70Ala Stop at 130	Del/FS	375	Sporadic	RCC			(Gallou et al., 2001)	*
71	c.	211insT	Frameshift; Truncation	Ins/FS	V96	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.	213_232del	Stop at 124	Del/FS	24	Sporadic	Spinal HB			(Oberstrass et al., 1996)	*
72	c.	214insGCCC and 118ins1-nt	Ser65Trp and Frameshift	Ins/FS	46	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.	214insGCCC	Frameshift	Ins/FS	1 Family; 3 affected	Familial	1 patient with RCC, all with CNS HB, RA			(Ong et al., 2007)	
	c.	214delT	Ser72Pro Stop at 158	Del/FS	112	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.			Del/FS	1 family; 3 affected	Familial	1 patient with RCC, 2 with RA, 2 with CNS HB			(Ong et al., 2007)	
	c.	214T>C	Ser72Pro	TS/MS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.	215_259del45	Frameshift	Large Del	2043	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	215delC	Gln73Arg Stop at 158	Del/FS	Case Report of ELST.	Familial	VHL Type 1: Bilateral RA, bilateral renal cysts, RCC, CNS HB, ELST (mutation identified in the tumor tissue) The patient had 3 other family members with VHL disease.			(Kawahara et al., 1999)	*
	c.			Del/FS	Kind 98: Japanese;	Familial	VHL Type 1: CNS HB, RA			(Yoshida et al., 2000)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
					1 affected						
	c.			Del/FS	C23	Sporadic	RCC			(Foster et al., 1994a)	
	c.			Del/FS						(Neumann and Bender, 1998)	
73	c.	217C>T	Gln73X	TS/NS	2753	Familial	VHL Type 1			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/NS	38	Familial	VHL Type 1			(Maher et al., 1996).	*
	c.			TS/NS	V64	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TS/NS	20	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			TS/NS	1 family	Familial	VHl Type 1			(Ong et al., 2007)	
	c.			TS/NS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			TS/NS	1 family	Familial	VHl Type 1			(Ong et al., 2007)	
	c.			TS/NS	Patient 11; Korean	Familial	VHL Type 1: 47yo female with RCC, CNS HB			(Cho et al., 2009)	
	c.			TS/NS	3					(Manski et al., 1997)	
	c.			TS/NS	74	Familial	VHL Type 2			(Maher et al., 1996)	*
	c.	217delC	Stop at 158	Del/FS	Family 4: Polish; 1 affected	Familial	VHL: CNS HB, RA			(Cybulski et al., 2002)	H
	c.			Del/FS	2438	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	218dup	Val74Gly Stop at 131	Ins/FS	171	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.	219delG	Val74Ser Stop at 158	Del/FS	4	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.	219G>A	Gln73Gln	TS	2035	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
74	c.	220_229delGTCATCTTCT	Val74Ala Stop at 155	Del/FS	179	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.	221T>G	Val74Gly	TV/MS	VHL53: German; 4 affected	Familial	VHL Type 1: RA, CNS HB, Primitve Neuroectodermal Tumor, Renal Cysts			(Glavac et al., 1996)	*
	c.			TV/MS	VHL9: German; 3 affected	Familial	VHL Type 2B: RCC, Pheo, RA, CNS HB, Renal & Pancreatic Cysts, Cyst adenoma of epididymus			(Glavac et al., 1996)	
	c.			TV/MS	VHL 92	Familial	VHL: Phenotype not described			(Klein et al., 2001)	H
	c.	221T>C and 149C>G	Val74Ala & Ala50Gly	TS/MS&TV/MS	336	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	221T>A	Val74Asp	TV/MS	2049	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	221_223delTCA	In-Frame del	InF Del	CS	Familial	VHL: Phenotype not described			(Latif et al., 1993)	*
75	c.	223_224insT	Frameshift	Ins/FS	Patient 4; Korean	Familial	24yo female with CNS HB, RA			(Cho et al., 2009)	
	c.	224_226delTCT	In-frame del	InF del	Family 2: Japanese; 1 affected	Sporadic Germline /De novo	VHL Type 1: RCC, CNS HB, Pancreatic cysts or tumor			(Japan et al., 1995) (Kanno et al., 1996)	
	c.			InF del	Family 80: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, Pancreatic cysts or tumor			(Yoshida et al., 2000)	H
	c.			InF del	17	Familial	VHL: Phenotype not described			(Whaley et al., 1994)	*
	c.			InF del	20	Familial	VHL: Phenotype not described			(Whaley et al., 1994)	*
76	c.	226_228delTTC	In-frame del Phe76	InF del	2693	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
										al., 1996)	
	c.			InF del	2956	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			InF del	2YO	Familial	VHL Type 1			(Kishida et al., 1995) (Zbar et al., 1996)	*
	c.			InF del	20	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			InF del	27	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			InF del	75	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			InF del	48	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			InF del	144	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			InF del	V67	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			InF del	136	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			InF del	183	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			InF del	Family 2: III:4 (Mosaic Parent) IV:6 (Offspring)	Mosaic Parent & Germline Offspring	VHL Type 1 III:4 Mosaic Parent: RCC, CNS HB, Pancreatic and Renal Cysts IV:6 Germline Offspring: CNS HB, Solid kidney lesion, RA, Pancreatic Cysts			(Sgambati et al., 2000)	*
	c.			InF del	Family 5; Polish with 3 affected	Familial	VHL: CNS HB, RA			(Cybulski et al., 2002)	H
	c.			InF del	Family 6; Polish with 1 affected	Familial	VHL: CNS HB, RA			(Cybulski et al., 2002)	H
	c.			InF del	Family 7; Polish with 2 affected	Familial	VHL: CNS HB, RA			(Cybulski et al., 2002)	H
	c.			InF del	Family 1: Brazilian; 5 affected	Familial	VHL Type 1: CNS HB, RCC			(Rocha et al., 2003)	H
	c.	226_232del	Stop at 156	Del/FS	2	Sporadic	Cerebellar HB			(Oberstrass et al., 1996)	*
	c.	226T>A	Phe76Ile	TV/MS	3682	Familial	VHL Type 1			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.	227_229delTCT	In-Frame Del	InF del	48	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.			InF del	75	Familial	VHL Type 1			(Crossey et al., 1994)	
	c.			InF del	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			InF del	2034	Familial	CNS HB, RA, Grawitz tumor			Rotterdam, This report	
	c.			InF del	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			InF del	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			InF del	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			InF del	Family B: 3 members; 1 affected	Familial	VHL Type 1: Brain Stem HB, RA			(Kanno et al., 1996)	*
	c.			InF del	Fam 25: 2 affected	Familial	VHL: RCC, RA, CNS HB			(Hes et al., 2007)	H
	c.			InF del	Fam 24: 1 affected	Sporadic Germline / Likely de novo	VHL: Pheo, RCC, CNS HB, Epididymal Cysts			(Hes et al., 2007)	H
	c.			InF del	134	Familial	VHL: Phenotype not described			(Maher et al., 1996)	*
	c.			InF del	144	Familial	VHL: Phenotype not described			(Maher et al., 1996)	*
	c.			Inf del	VHL 26	Familial	VHL: Phenotype not			(Klein et al., 2001) (Glavac	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
							described			et al., 1996)	
	c.			Inf del	VHL 63	Familial	VHL: Phenotype not described			(Klein et al., 2001) (Glavac et al., 1996)	H
	c.			Inf del	VHL 77	Familial	VHL: Phenotype not described			(Klein et al., 2001) (Glavac et al., 1996)	H
	c.	227T>C	Phe76Ser	TS/MS	132	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.	227insC	Frameshift	Ins/FS	1 Family	Familial	VHL Type 1 (1 patient with RCC)			(Ong et al., 2007)	
	c.			Ins/FS	1 Family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			Ins/FS	1 Family; 4 affected	Familial	2 patients with RCC, 2 with Pheo, 3 with RA, 1 with CNS HB			(Ong et al., 2007)	
	c.	227delT	Stop at 158	Del/FS	597	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	228C>G	Phe76Leu	TV/MS	CM982000	Familial	VHL: Phenotype not described			(Li et al., 1998)	H
	c.	228insC	Cys77Leu Stop at 131	Ins/FS	71	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.			Ins/FS	85	Familial	VHL Type 1			(Crossey et al., 1994)	*
77	c.	229_231delTGC	Cys77del	InF Del		Familial	VHL: Ocular HB, The rest of the VHL pheonotype was not described			(Webster et al., 1999)	*
	c.	230_232delGCA	In-Frame Del	InF Del	C6	Sporadic	RCC			(Foster et al., 1994a)	*
	c.	230 insTCT	Ins Ser	InF Ins	VHL 26: Croation; 2 affected	Familial	VHL Type 1: CNS HB, Renal and Pancreatic Cysts			(Glavac et al., 1996)	*
	c.	230delG	Cys77Ser Stop at 158	Del/FS	Family 16: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB			(Japan, 1995)	*
	c.	231C>A	Cys77X	TV/NS	593	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	231_232del2	Frameshift	Del/FS	1323	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
78	c.	232A>C	Asn78His	TV/MS	4389	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TV/MS	1 family; 2 affected	Familial	1 patient with RCC, 2 with RA, 2 with CNS HB			(Ong et al., 2007)	*
	c.			TV/MS	34	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.			TV/MS	Family A: 5 members with 1 affected	Familial	VHL Type 1: Multiple cerebellar and spinal HB, RA, Renal Cysts			(Kanno et al., 1996)Molecular genetic diagnosis of von Hippel-Lindau disease: analysis of five Japanese families.	*
	c.			TV/MS	Family 1: Japanese; 1 affected	Familial	VHL Type 1: RA, CNS HB			(Japan, 1995)	*
	c.	233A>[c1]C	Asn78Thr	TV/MS	3101	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.	233A>G	Asn78Ser	TS/MS	4327	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TS/MS	VHL51: German Family with 6 affected	Familial	VHL Type 1: CNS HB, Cyst adenoma of epididymus			(Glavac et al., 1996)	
	c.			TS/MS	Family 9: Japanese; 3 affected	Familial	VHL Type 1: RA, CNS HB, Pancreatic cysts or tumor			(Japan 1995)	
	c.			TS/MS	Chinese family; 47 members with 18	Familial	VHL Type 1: RCC (55.6%), CNS HB (50%), RA			(Huang, Zhang et al., 2004)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
					affected		(27.8%), Multiple Pancreaitc Cysts (38.9%)				
	c.			TS/MS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1			(Ong et al., 2007)	
	c.			TS/MS	Family 8; Polish; 1 affected	Familial	CNS, RA			(Cybulski et al., 2002)	H
	c.			TS/MS	Family 9; Polish; 2 affected	Familial	Family 9: 1 patient with RA, 1 with RCC			(Cybulski et al., 2002)	H
	c.			TS/MS	Fam 6: 1 affected	Familial	VHL: CNS HB, Renal & Pancreatic Cysts			(Hes et al., 2007)	*
	c.			TS/MS	160	Familial	VHL: The presence of Pheo was not indicated			(Maher et al., 1996)	*
	c.			TS/MS	2289	Sporadic	RCC			(Bailly et al., 1995)	*
	c.	233A>T	Asn78Ile	TV/MS	Polish Family 10: 4 affected	Familial	RCC, RA, CNS HB			(Cybulski et al., 2002)	H
	c.			TV/MS						(Neumann and Bender, 1998)	
	c.	233insTCT	Asn78dellleinsIle	InF Ins	26					(Kishida et al., 1995)	*
	c.	234_237del4	Frameshift	Del/FS	334	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
79	c.	235C>T/562C>G	Arg79Cys/ Leu188Val	TS/MS& TV/MS	Patient 1	Familial	Compound Heterozygous; 33yo female with high erythropoeitin but is asymptomatic.			(Bento et al., 2005)	
	c.	236G>C	Arg79Pro	TV/MS	150	Familial	VHL: The presence of Pheo was not indicated			(Crossey et al., 1994)	*
	c.	236_254del	Ser80Pro Stop at 152	Del/FS	39	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.	236_237del2	Frameshift	Del/FS	562	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
80	c.	238A>C	Ser80Arg	TV/MS	V259	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TV/MS	Family 2: Brazilian; 10 affected	Familial	VHL Type 1: RA, CNS HB, RCC			(Rocha et al., 2003)	H
	c.			TV/MS	CM023993	Familial	VHL: Phenotype not described			(Dollfus et al., 2002)	H
	c.	238A>G	Ser80Gly	TS/MS	Group B: Polish; 2 affected	Familial	Bilateral Pheos in mother and daughter			(Woodward et al., 1997)	*
	c.	239G>A	Ser80Asn	TS/MS	VHL 39: Slovakian; 13 affected	Familial	VHL Type 1: RCC, RA, CNS HB, Pancreatic Islet Cell Tumor, Renal & Pancreatic Cysts			(Glavac et al., 1996)	*
	c.			TS/MS	V19	Familial	VHL Type 1			(Olschwang et al., 1998)	
	c.			TS/MS	Fam 7: 1 affected	Familial	VHL: RA			(Hes et al., 2007)	H
	c.			TS/MS	VHL 82	Familial	VHL: Phenotype not described			(Klein et al., 2001)	H
	c.			TS/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	*
	c.	239G>T	Ser80Ile	TV/MS	3630	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TV/MS	VHL 104	Familial	VHL: Phenotype not described			(Klein et al., 2001)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.	239delG	Stop at 158	Del/FS	Family 22: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, RA		(Japan 1995)	*
	c.	239_241del3	In-Frame Del	InF Del	1798	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	240T>A	Ser80Arg	TV/MS	926	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			TV/MS	G72	Sporadic	RCC		(Foster et al., 1994a)	*
	c.	240T>G	Ser80Arg	TV/MS	103	Familial	VHL Type 1		(Crossey et al., 1994)	*
81	c.	241C>T	Pro81Ser	TS/MS	Japanese Family	Familial	VHL Type 1: RCC, CNS HB		(Yoshida et al., 2000)	*
	c.			TS/MS	VHL 23: German; 1 affected	Familial	VHL Type 1: RCC, CNS HB, Renal & Pancreatic Cysts; The father was an asympromatic carrier who died at 89yo disease free.		(Glavac et al., 1996)	*
	c.			TS/MS	Family 37: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB		(Japan 1995) (Kishida et al., 1995)	
	c.			TS/MS	D24: Dutch; 1 affected and 4 ASx carriers	Familial	VHL Type 1: Cerebellar HB at 44 yo; Of note, there are 4 ASx carriers (17-77yo)		(Hes et al., 2000)	
	c.			TS/MS	Fam 8: North American Origin; 1 affected; 4 ASx Carriers	Familial	VHL:CNS HB Only		(Hes et al., 2000)	H
	c.			TS/MS	North American Origin; 2 affected	Familial	VHL: Father: Pheo; Son: RA, Islet cell tumor of the pancreas		(Hes et al., 2000)	
	c.			TS/MS	VHL 38	Familial	VHL: Phenotype not described		(Glavac et al., 1996)	
	c.			TS/MS	1653	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1654 (and 260_262delTAT)	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1656	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1657 Patient also has 426delTGAC	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1659 (and 499C>T)	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1658 (and 500G>A)	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1665 (and 444 delT, 464A>G)	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1668	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1670 (and 184delG)	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1678	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1693 (and 464-1 G>C, 598 C>T)	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1694 (and 357C>G)	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1695 (and 357	Sporadic	RCC after trichloroethylene		(Brauch et al., 1999)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
					G>C, 486 C>G, 562C>G)		exposure			
	c.			TS/MS	949	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.		Pro81Ser & Leu188Val (562C>G)	MS	43	Familial	VHL Type 1		(Stolle et al., 1998)	*
	c.			MS	German family; 9 affected	Familial	VHL Type 2C		(Weirich et al., 2002)	
	c.	242delC	Pro81Arg Stop at 158	Del/FS	G47	Sporadic	RCC		(Foster et al., 1994a)	*
	c.	243-251delGCGCGTCGT	82del Arg Val Val	InF Del	1 family; 5 affected	Familial	4 patients with RA, 3 with CNS HB		(Ong et al., 2007)	
	c.			InF Del	35	Familial	VHL Type 1		(Crossey et al., 1994)	
	c.			InF Del	E	Familial	VHL: Phenotype not described		(Latif et al., 1993)	
82	c.	244C>G	Arg82Gly	TV/MS		Familial	RCC		(Rothberg et al., 2001)	H
	c.	244C>T	Arg82Cys	TS/MS	ACHN	Sporadic	RCC		(Whaley et al., 1994)	*
	c.	244_252del	Arg82_Val84del	InF Del	3177				(Chen et al., 1995)	*
	c.	244delC	Arg82Ala Stop at 158	Del/FS	161	Sporadic	RCC		(Shuin et al., 1994b)	*
	c.	245G>T	Arg82Leu	TV/MS	393	Familial	Pheo		Utrecht, this report	
	c.	245G>C	Arg82Pro	TV/MS	V12: 3 affected	Familial	VHL Type 2B		(Olschwang et al., 1998)	*
	c.			TV/MS	CM023994	Familial	VHL: Phenotype not described		(Dollfus et al., 2002)	H
	c.			TV/MS	SKRC37		RCC		(Wenzel et al., 1997)	
	c.			TV/MS	UMRC2	Sporadic	RCC		(Gnarra et al., 1994)	*
	c.			TV/MS	2456	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
83	c.	249_255del	Val84Pro Stop at 156	Del/FS	KTCL53	Sporadic	RCC		(Gnarra et al., 1994)	*
84	c.	250G>T	Val84Leu	MS/TV	Family A: Welsh; 2 affected siblings	Familial	Likely VHL Type 2C: Only Bilateral Pheo. Both patients and a non-penetrant parent were heterozygous for this missense mutation.		(Crossey, Eng et al., 1995)	*
	c.			MS/TV	VHL 110	Familial	VHL: Phenotype not described		(Klein et al., 2000)	H
85	c.	253delC	Leu85Cys Stop at 158	Del/FS	CB282	Sporadic	RCC		(Gallou et al., 2001)	*
	c.	253ins23-nt	Frameshift	Ins/FS	879	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.									
	c.	253_256delTGCC	Frameshift	Del/FS	AvB02	Sporadic	RCC		Utrecht, This report	
	c.	254T>C	Leu85Pro	TS/MS	2612	Sporadic	RCC		(Bailly et al., 1995)	
	c.			TS/MS	323	Sporadic	RCC		(Gallou et al., 2001)	*
	c.			TS/MS	336	Sporadic	RCC		(Gallou et al., 2001)	*
	c.			TS/MS	VHL 66	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.	255insC	Stop at 131	Ins/FS	3312	Familial	VHL Type 1		(Chen et al., 1995) (Zbar et al., 1996)	*
	c.	255_256delGC	Pro86Arg Stop at 130	Del/FS	376	Sporadic	RCC		(Gallou et al., 2001)	*
	c.	255_258delGCCC	Pro86Tyr Stop at 157	Del/FS	22	Sporadic	RCC		(Gallou et al., 1999)	*
86	c.	256C>G	Pro86Ala	TV/MS	4416	Familial	VHL Type 1		(Chen et al., 1995) (Zbar et al., 1996)	*
	c.	256C>T	Pro86Ser	TS/MS	182	Familial	Pheo, RCC, RA		Utrecht, this report	
	c.			TS/MS	177	Familial	Multiple CNS HB		Utrecht, this report	
	c.			TS/MS	53	Sporadic	RCC		(Whaley et al., 1994)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.			TS/MS	Family 42: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, RA, Pancreatic cysts or tumors		(Japan, 1995)	*
	c.			TS/MS	Family 64: Japanese; 1 affected	Familial	VHL Type 1: CNS HB		(Yoshida et al., 2000)	H
	c.			TS/MS	1 family; 1 affected	Familial	CNS HB		(Ong et al., 2007)	
	c.			TS/MS	V11	Familial	VHL Type 2B		(Olschwang et al., 1998)	*
	c.			TS/MS	24	No information	No detailed clinical information.		(Zbar et al., 1996)	*
	c.			TS/MS	25	No information	No detailed clinical information.		(Zbar et al., 1996)	*
	c.	257C>A	Pro86His	TV/MS	61	Sporadic	RCC		(Gallou et al., 1999)	*
	c.			TV/MS	418	Sporadic	RCC		(Gallou et al., 2001)	*
	c.			TV/MS	SKRC 28	Sporadic	RCC		(Gnarra et al., 1994)	*
	c.	257C>G	Pro86Arg	TV/MS	128	Familial	VHL Type 1		(Stolle et al., 1998)	*
	c.			TV/MS	1 family; 3 affected	Familial	VHL: 2 patients with RA, 2 with RCC		(Ong et al., 2007)	
	c.	257C>T	Pro86Leu	TS/MS	2612	Familial	VHL Type 1		(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TS/MS	3568	Familial	VHL Type 1		(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TS/MS	Family 39: Japanese; 1 affected	Familial	VHL Type 1: RA		(Japan, 1995)	
	c.			TS/MS	Japanese Family; 3 affected	Familial	VHL Type 1: Patient 1: Daughter – Cerebellar HB with obstructive hydrocephalus at 8yo, recurrent HB, Pancreatic cysts, hypoacusis Patient 2: Mother -Cerebellar HB and RA at 39yo Patient 3: Daughter – 3 intracranial HB at 14yo with obstructive hydrocephalus at 19yo, Cervical Cord HB, RA, Pancreatic and Renal cysts		(Fukino et al., 2000)	*
	c.			TS/MS	1 family; 1 affected	Familial	RA, CNS HB		(Ong et al., 2007)	
	c.			TS/MS	1667 (and 340+8 C>T)	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	258_259delCG	Stop at 130	Del/FS	164	Sporadic	RCC		(Shuin et al., 1994a)	*
87	c.	260T>C	Val87Ala	TS/MS		Familial			(Gallou et al., 2004)	H
	c.	260_262delTAT and 241C>T	In-Frame Del & Pro81Ser	InF Del & TS/MS	1654	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	261dupA	Trp88FS	Ins/FS	Fam 28: 1 affected	Sporadic Germline /De novo	VHL: RCC, CNS HB, RA		(Hes et al., 2007)	H
88	c.	262T>A	Trp88Arg	TV/MS	1255	Familial	VHL Type 1		(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TV/MS	6	Familial	VHL Type 1		(Stolle et al., 1998)	
	c.			TV/MS	1 family; 1 affected	Familial	RCC, RA, CNS HB		(Ong et al., 2007)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.	262T>C	Trp88Arg	TS/MS	Family 3: Brazilian; 2 affected	Familial	VHL Type 1: RA, CNS HB			(Rocha et al., 2003)	H
	c.	263G>A	Trp88X	TS/NS	CM003059	Familial	VHL: Phenotype not described			(Mattocks et al., 2000)	H
	c.			TS/NS	142	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			TS/NS	193	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			TS/NS	258	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TS/NS	266	Sporadic	RCC			(Gallou et al., 2001)	*
	c.	263G>C	Trp88Ser	TV/MS	Family 8: Japanese; 1 affected	Familial	VHL Type 1: RCC, Pancreatic cysts or tumor			(Japan, 1995)	*
	c.			TV/MS	V266	Familial	VHL Type 1			(Olschwang et al., 1998)	
	c.			TV/MS	2	Sporadic	Cerebellar HB			(Kanno et al., 1994)	*
	c.	263G>T	Trp88Leu	TV/MS	9	Sporadic	RCC			(Whaley et al., 1994)	*
	c.	263_265delGGCinsTT	Frameshift	Del/Ins/FS	Family 11; Polish; 1 affected	Familial	VHL: RA, CNS HB			(Cybulski et al., 2002)	H
	c.	264G>A	Trp88X	TS/NS		Familial	VHL - Ocular HB, The rest of the VHL phenotype was not described			(Webster et al., 1999)	*
	c.			TS/NS	1 Family; 3 affected	Familial	2 patients with RCC, 1 with Pheo, 1 with RA, 1 with CNS HB			(Ong et al., 2007)	
	c.	264G>C	Trp88Cys	TV/MS	1499	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TV/MS		Familial	CNS HB, other phenotype unknown			(Glasker et al., 1999)	H
89	c.	266T>A	Leu89His	TV/MS	H28	Sporadic	Mesothelioma			(Sekido et al., 1994)	*
	c.			TV/MS	UMRC 3	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.			TV/MS	291	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TV/MS	308	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TV/MS	1698	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.	266T>G	Leu89Arg	TV/MS	SKRC 9M	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.	266T>C	Leu89Pro	TS/MS	21	Familial	VHL Type 1			(Kishida et al., 1995) (Zbar et al., 1996)	*
	c.			TS/MS	59	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.			TS/MS	8	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			TS/MS	23530	Familial	CNS HB, RCC, pacreatic/renal cysts			Rotterdam, this report	
	c.			TS/MS	VHL3: German; 11 affected	Familial	VHL Type 1: RCC, CNS HB, RA, Renal & Pancreatic cysts			(Glavac et al., 1996)	*
	c.			TS/MS	1 family; 1 affected	Familial	RCC, RA, CNS HB			(Ong et al., 2007)	
	c.			TS/MS	391	Sporadic	RCC			(Gallou et al., 2001)	*
90	c.	268A>T	Asn90Tyr	TV/MS	C35	Sporadic	RCC			(Foster et al., 1994a)	*
	c.	268_270del3	In-Frame Del	InF Del	1502	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	268_274del7	Frameshift	Del/FS	1651	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	269delA	Asn90Thr Stop at 158	Del/FS	292	Sporadic	RCC			(Gallou et al., 2001)	*
	c.	269A>T	Asn90Ile	TV/MS	UOK 135g	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.			TV/MS	Family 58: Japanese; 1 affected	Familial	VHL Type 1: RCC			(Japan, 1995)	H
	c.			TV/MS	Family 81:	Familial	VHL Type 1: RCC, CNS			(Japan, 1995)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
					Japanese; 1 affected		HB, Pancreatic cysts or tumor				
	c.	270_272del3	In-Frame Del	InF Del	6	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
91	c.	272T>A & 273C>A	Phe91X	TV&TV/NS	1 Family; 1 affected	Familial	RA, CNS HB			(Ong et al., 2007)	
	c.	273C>G	Phe91Leu	TV/MS	S3940	Sporadic Germline/ De novo	Cerebellar HB: Germline mutation found after screening sporadic HB			(Olschwang et al., 1998)	
92	c.	274G>T	Asp92Tyr	TV/MS	7	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	274G>A	Asp92Asn	TS/MS	23	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.	275del 18-nt	Frameshift	Del/FS	11	Familial	VHL Type 1			(Stolle, Glenn et al., 1998)	
	c.	275delA	Frameshift Stop at 158	Del/FS	T60	Sporadic	RCC			(Gallou et al., 1999)	*
93	c.	277delG	Gly93Ala Stop at 158	Del/FS	16	Familial	VHL - Specific phenotypes not described			(Whaley et al., 1994)	*
	c.				AvB44	Somatic	RCC			Utrecht, this report	
	c.	277G>A	Gly93Ser	TS/MS	4873	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			TS/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.			TS/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.			TS/MS	VHL 62: German; 2 affected	Familial	VHL Type 2C			(Glavac et al., 1996)	*
	c.			TS/MS	Fam 9: 2 affected	Familial	VHL Type 2C			(Hes et al., 2007)	H
	c.			TS/MS	1 Case	Sporadic	Pheo: Screened five Sporadic Pheos for VHL mutations			(Hofstra et al., 1996)	
	c.	277G>T	Gly93Cys	TV/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.	277G>C	Gly93Arg	TV/MS	VHL 106	Familial	VHL: Phenotype not described			(Klein et al., 2001)	H
	c.	278G>A	Gly93Asp	TS/MS	2547	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			TS/MS	Family 65: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, Pancreatic cysts or tumor			(Japan, 1995)	H
	c.			TS/MS	Family 78: Japanese; 2 affected	Familial	VHL Type 1: RCC, CNS HB, RA, Pancreatic cysts or tumor			(Japan, 1995)	H
	c.	278G>T	Gly93Val	TV/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.	278_281delGCGA	Glu94Arg Stop at 157	Del/FS	CB278					Unpublished	*
	c.	279delC (and Polymorphism 291C>G)	Stop at 158	Del/FS	Northern Italian Family	Familial	VHL Type 1: 51yo female with RCC, cerebellar HB, pancreatic cysts. The mother died of an unspecified brain tumor.			(Moore et al., 2000)	
94	c.	282ins1-nt	Frameshift	Ins/FS	424	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	280G>T	Glu94X	TV/NS	51	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.			TV/NS	Family 4: Brazilian; 3 affected	Familial	VHL Type 1: RA, CNS HB			(Rocha et al., 2003)	H
	c.			TV/NS	1 Family	Familial	Type 1 (no RCC development)			(Ong et al., 2007)	
	c.			TV/NS	1 Family	Familial	Type 1 (no RCC development)			(Ong et al., 2007)	
	c.			TV/NS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.			TV/NS	VHL 85	Familial	VHL: Phenotype not described			(Klein et al., 2001)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.	281_291del	Glu94Val Stop at 127	Del/FS	235	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			Del/FS	T225	Sporadic	RCC			(Gallou et al., 1999)	*
95	c.	283_297del15 and 204del1	Frameshift	Del/FS	1809	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	284C>G and 151G>C	Pro95Arg & Glu51Gln	TV/MS&TV/MS	1524	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TV/MS&TV/MS	1525	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	285_287delGCA	In-Frame del	InF Del	Family 90: Japanese; 2 affected	Familial	VHL Type 1: RCC, CNS HB, Pancreatic cysts or tumor			(Japan, 1995)	H
	c.			InF Del	T209	Sporadic	RCC			(Gallou et al., 1999)	*
96	c.	286C>T	Gln96X	TS/NS	48	Familial	VHL Type 1			(Stolle et al., 1998)	
	c.			TS/NS	V77	Familial	VHL Type 1			(Olschwang et al., 1998)	
	c.			TS/NS	357	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TS/NS	379	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TS/NS	433	Sporadic	RCC			(Gallou et al., 2001)	*
	c.		Gln96X	TS/NS	F66	Familial	12yo with Multiple RA (Family history of Pancreatic cysts)			(Ruiz-Llorente et al., 2004)	H
	c.	286insT	Gln96Ser Stop at 131	Ins/FS		Sporadic	RCC			(Bailly et al., 1995)	*
	c.	287A>C	Gln96Pro	TV/MS	98	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.			TV/MS	Family 28: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB and Pancreatic cysts or tumor			(Japan 1995)	
	c.	287_289delAGC	Gln96_Gln96del	InF Del						(Kishida et al., 1995)	*
	c.	288_290delGCC	Gln96_Pro97delinsHis	InF Del	Family 25: Japanese; 1 affected	Familial	VHL Type 1: RCC, RA and Pancreatic cysts or tumor			(Japan, 1995)	*
	c.			InF Del	Family 48: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, RA and Pancreatic cysts or tumor			(Japan, 1995)	H
	c.	288_291del4	Frameshift	Del	229	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	288G>T	Gln96His	TV/MS	2088	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
97	c.	290C>T	Pro97Leu	TS/MS		Familial				(Gallou et al., 2004)	H
	c.	290_291delCC	Stop at 130	Del	293	Sporadic	RCC			(Gallou et al., 2001)	*
	c.	290_299del	Pro97Arg Stop at 214	Del	203	Sporadic	RCC			(Gallou et al., 1999)	*
	c.	291C>G	Pro97Pro; Possible Polymorphism	Poly	Northern Italian	Familial	1 unaffected patient identified after screening 55 individuals.			(Moore et al., 2000)	
	c.	291C>T	Pro97Pro	TS	1339	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	291_310del20 and 1-1_20del 21	Frameshift	Large Del	941	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	291C>A and 115G>A	Pro97Pro & Gly39Ser	TV & TS/MS	1782	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
98	c.	292T>A	Tyr98Asn	TV/MS	UOK 150	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.	292T>C	Tyr98His	TS/MS	VHL47: German; 3 affected	Familial	VHL Type 1: RCC, RA, Renal Cysts			(Glavac et al., 1996)	*
	c.			TS/MS	Family 3127: German; 47 affected	Familial	VHL Type 2A: Pheo, RA, CNS HB			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TS/MS	Family 3476:	Familial	VHL Type 2A: Pheo, RA,			(Chen et al., 1995)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
					American; 8 affected		CNS HB				
	c.			TS/MS	VHL 1;Black Forest	Familial	VHL Type 2A Kindred: ( ) indicates the number affected in each family. VHL1 (2), VHL2 (3), VHL4 (3), VHL5 (3), VHL8 (9), VHL11 (5), VHL18 (3), VHL28 (4): Pheo, RA VHL12 (13), VHL16 (4), VHL17 (3): Pheo, RA, CNS HB VHL Type 2B: VHL22 (6): Pheo, RCC, RA, CNS HB VHL Type not Assigned: VHL27 (1) and VHL34 (2): RCC, CNS HB			(Brauch, Kishida et al., 1995)	*
	c.				VHL 2;Black Forest						
	c.				VHL 4;Black Forest						
	c.				VHL 5;Black Forest						
	c.				VHL 8;Black Forest						
	c.				VHL 11;Black Forest						
	c.				VHL 18;Black Forest						
	c.				VHL 28;Black Forest						
	c.				VHL 12;Black Forest						
	c.				VHL 16;Black Forest						
	c.				VHL 17;Black Forest						
	c.				VHL 22;Black Forest						
	c.				VHL 27;Black Forest						
	c.				VHL 34;Black Forest						
	c.			TS/MS	VHL54: German; 1 affected	Familial	VHL Type 2A: Pheo, RA			(Glavac et al., 1996)	*
	c.			TS/MS	VHL*: German; 52 affected	Familial	VHL Type 2A: Pheo, RA, CNS HB			(Glavac et al., 1996)	*
	c.			TS/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.			TS/MS	14	Familial	VHL: Phenotypes not described			(Whaley et al., 1994)	*
	c.			TS/MS	15	Familial	VHL: Phenotypes not described			(Whaley et al., 1994)	*
	c.			TS/MS	22	Familial	VHL: Pheo phenotype not described			(Crossey et al., 1994)	
	c.	293A>G	Tyr98Cys	TS/MS	Family 106: Japanese; 1 affected	Familial	VHL Type 2B: RCC, Pheo			(Yoshida et al., 2000)	H
	c.	294delC	Frameshift Stop at 217	Del/FS	149	Sporadic	RCC			(Gallou et al., 1999)	*
99	c.	296insCAAA	Stop at 132	Ins/FS	135	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.	297delA	Stop at 158	Del/FS						Unpublished	*
100	c.	298A>G	Thr100Ala	TS/MS		Sporadic	RCC			(Bailly et al., 1995)	*
	c.	299delC	Thr100Ser Stop at 158	Del/FS	50	Sporadic	RCC			(Gallou et al., 1999)	*
	c.	300-301delGCinsA	Thr100fs	Del/FS	AvB03	Somatic	RCC			Utrecht, this report	
	c.	299_316del	Thr100_Gly106delins Ser	InF Del	1677	Sporadic	RCC after trichloroethene exposure			(Brüning et al., 1997)	*
	c.			InF Del	1689	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
101	c.	301C>T	Leu101Leu	TS/MS	755	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	301C>G and 302T>G	Leu101Gly	TV/MS&TV/MS	103	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.	302T>G	Leu101Arg	TV/MS	23	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			TV/MS	Family 5: Brazilian; 2 affected	Familial	VHL Type 1: CNS HB			(Rocha et al., 2003)	H
	c.	302_304del3	In-Frame Del	InF Del	1342	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
102	c.	304C>G and 444delT	Pro102Ala & Stop at 158	TV/MS&Del	176	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	304ins56-nt	Frameshift	Ins/FS	1661	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.	305delC	Frameshift Stop at 142	Del/FS	Family 6: Brazilian; 1 affected	Familial	VHL Type 1: CNS HB, RCC, Pancreatic cystadenoma			(Rocha et al., 2003)	H
	c.	305_312del	Pro102His Stop at 127	Del/FS	155	Sporadic	RCC			(Gallou et al., 1999)	*
	c.	306_308del3	In-Frame Del	InF Del	695	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
103	c.	307_311delCCTGG	Pro103His Stop at 129	Del/FS	G7	Sporadic	RCC			(Foster et al., 1994a)	*
	c.	309delT	Gly104Ala Stop at 158	Del/FS	UOK115	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.			Del/FS		Sporadic	RCC			(Bailly et al., 1995)	*
	c.	309_310delTG	Gly104His Stop at 130	Del/FS	1 family; 16 affected	Familial	2 patients with RCC, 6 with RA, 10 with CNS HB			(Ong et al., 2007)	
	c.			Del/FS	53	Familial	VHL Type 1			(Crossey et al., 1994)	*
104	c.	310delG	Stop at 158	Del/FS	786-0	Sporadic	RCC			(Whaley et al., 1994) (Gnarra et al., 1994)	*
	c.	311G>C	Gly104Ala	TV/MS	S6150	Sporadic Germline/ De novo	Sporadic Cerebellar HB diagnosed at 56yo (No other family history)			(Olschwang et al., 1998)	*
	c.			TV/MS	CM023995	Familial	VHL: Phenotype not described			(Dollfus et al., 2002)	H
	c.	311delC	Stop at 158	Del/FS	UOK141	Sporadic	RCC			(Gnarra et al., 1994)	
	c.	312C>G	Gly104Gly	TV/MS	V95	Germline	RA; Originally diagnosed as sporadic			(Olschwang et al., 1998)	*
105	c.	313A>C	Thr105Pro	TV/MS	T55	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			TV/MS	V8: 14 affected	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TV/MS	208	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.	314C>T	Thr105Met	TS/MS	343	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
106	c.	315insAC	Frameshift Truncation	Ins/FS	V89	Familial	VHL Type 2B			(Olschwang et al., 1998)	*
	c.	317G>A	Gly106Asp	TS/MS	H1672	Sporadic	Small Cell Lung Cancer			(Sekido et al., 1994)	*
107	c.	319C>G	Arg107Gly	TV/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.	320delG	Stop at 158	Del/FS	58	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.	320G>C	Arg107Pro	TV/MS	33	Sporadic	RCC			(Suzuki et al., 1997)	
	c.			TV/MS	76	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			TV/MS	Family 7: Brazilian; 5 affected	Familial	VHL Type 1: RA, CNS HB, RCC, a nonfunctional paraganglioma			(Rocha et al., 2003)	H
	c.	320G>A	Arg107His	TS/MS	CM023996	Familial	VHL: Phenotype not described			(Dollfus et al., 2002)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.	321_323del3 and 426T>G	InF Del & Stop at 158	InF Del&TV	954	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
108	c.	322delC	Arg108Ala Stop at 158	Del/FS	1674	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	324C>A	Arg108Arg	TV	161	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	324delC	Stop at 158	Del/FS	1350	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	324InsCGC	Arg108InsArg	InF Ins	VHL 86	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
109	c.	327delC	Ile109fs stop at 159	Del/FS	T92	Sporadic	RCC		(Gallou et al., 1999)	*
	c.	326delT	Ile109fs stop at 158	Del/fs	VHL-12	Familial	VHL Type 1: RA, CNS HBs, RCC,		(Ciotti et al., 2009)	
110	c.	328insT	His110Phe Stop at 159	Ins/FS					(Kishida et al., 1995)	*
	c.	328_333del6	In-Frame Del	InF Del	965	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	329ins6	111_His110dup	InF Ins	1671	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	329ins2-nt	Frameshift	Ins/FS	Family 38: Japanese; 1 affected	Familial	VHL Type 1: RCC		(Japan, 1995)	
	c.	330CA>TT	Ser111Cys	MS	174	Familial	VHL Type 2		(Stolle, Glenn et al., 1998)	
	c.	330delC and 38delG	Stop at 158	Del&Del/FS	49	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
111	c.	331A>G	Ser111Gly	TS/MS	19	Sporadic	RCC		(Whaley et al., 1994)	*
	c.	331A>T	Ser111Cys	TV/MS	Patient 2	Familial	Unilateral Pheo		(Bauters et al., 2003)	H
	c.			TV/MS	Patient 3	Familial	Unilateral Pheo		(Bauters et al., 2003)	H
	c.			TV/MS	CM023997	Familial	VHL: Phenotype not described		(Dollfus et al., 2002)	H
	c.	331delA	Stop at 158	Del/FS	3669	Familial	VHL Type 1		(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			Del/FS	307	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	331_340del	Ser111Val Stop at 155	Del/FS	1697	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	331insC	S111fs	Ins/FS	AvB35	Somatic	RCC		Utrecht, this report	
	c.	332G>A	Ser111Asn	TS/MS	3315	Familial	VHL Type 1		(Chen et al., 1995) (Zbar et al., 1996)	
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	*
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	127	Familial	VHL Type 1		(Maher et al., 1996)	
	c.			TS/MS	Patient B	Sporadic	RCC: No trichloroethylene exposure, but does have exposure to cutting oils in screw cutting industry		(Charbotel et al., 2007)	*
	c.		Ser111Asn	MS	F7	Familial	RA, Spinal and Cerebellar HB, Renal cysts (Family history of RCC)		(Ruiz-Llorente et al., 2004)	H
	c.	332G>T	Ser111Ile	TV/MS	HM971583		Pancreatic Cancer		(Bradley et al., 2000)	H
	c.	333C>A	Ser111Arg	TV/MS		Familial	VHL: Ocular HB, The rest of the VHL phenotype was not discussed		(Webster et al., 1999)	*
	c.			TV/MS	Family 61:	Familial	VHL Type 1: RCC, CNS		(Yoshida et al., 2000)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
					Japanese; 4 affected		HB, RA, Pancreatic cysts or tumor				
	c.	333C>G	Ser111Arg	TV/MS	4401	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TV/MS	Family 12; Polish; 1 affected	Familial	VHL: RA, CNS HB			(Cybulski et al., 2002)	H
	c.	333insA	S111fs	Ins/FS	AvB84	Somatic	RCC			Utrecht, this report	
	c.	333delC	Stop at 158	Del/FS	48	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	333C>T	Ser111Ser	TS	347	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
112	c.	334T>A	Tyr112Asn	TV/MS	Family with over 100 at-risk and 13 affected individuals IV:2,3,4 V:1,2,3,4,5,6 VI:1,2,3 VII:1,2,3,4	Familial	VHL Type 1 IV:2, V:3, V:4: RCC IV:3, V:5, VI:1, VI:3: RCC, HB CNS IV:4, V:1, V:2: HB CNS, Renal cysts V:6 HB CNS VI:2 RA, Renal cysts VHL Type 2A VII:1 Pheo ASx Carrier VII:2 ASx carrier, 12yo VII:3 ASx carrier, 19yo VII:4 ASx carrier, 20yo			(Bradley et al., 1999)	*
	c.			TV/MS	Family 74: Japanese; 2 affected	Familial	VHL Type 1: CNS HB, RA, Pancreatic cysts or tumor			(Yoshida et al., 2000)	H
	c.	334T>C	Tyr112His	TS/MS	1190: Pennsylvania, USA; 19 of 22 affected (Pt# 4612,4613)	Familial	VHL Type 2A: 19 Affected with 19 Pheos, 4 Retinal Angiomas, and 1 HB CNS			(Chen et al., 1996) (Tisherman et al 1962 and 1993)	*
	c.			TS/MS	3738: 3 affected	Familial	VHL Type 2A: All three with Pheos			(Chen et al., 1996) (Tisherman et al 1962 and 1993)	*
	c.			TS/MS	4874	Familial	VHL Type 2			(Zbar et al., 1996)	*
	c.	334T>G	Tyr112Asp	TV/MS	189	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	336C>A	Tyr112X	TV/NS	3759	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TV/NS	3760	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
113	c.	337C>T	Arg113X	TS/NS	136	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.			TS/NS	81	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			TS/NS	VHL 55: German; 2 affected	Familial	VHL Type 1: CNS HB, RA			(Glavac et al., 1996)	*
	c.			TS/NS	136	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			TS/NS	V59	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TS/NS	30	Familial	VHL: Pheo phenotype not described			(Crossey et al., 1994)	*
	c.			TS/NS	Family 47: Japanese; 1 affected	Familial	VHL Type 2B: RCC, Pheo, CNS HB, Pancreatic cysts or tumor			(Yoshida et al., 2000)	H
	c.	337delC	Frameshift	Del/FS	1 family; 1 affected	Familial	RA			(Ong et al., 2007)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.	339_340delAG	Gly114Ser Stop at 130	Del/FS	354	Sporadic	RCC			(Gallou et al., 2001)	*
	c.	339A>T	Arg113Arg	TV	1912	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
114	c.	340G>C	Gly114Arg	TV/MS	59	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			TV/MS	4409	Familial	VHL Type 2			(Zbar et al., 1996)	
	c.	340G>A	Gly114Ser	TS/MS	AG	Sporadic Germline / likely de novo	Bilateral Pheo			(Eng, 1995)	*
	c.			TS/MS	Case Report	Familial	5yo with bilateral pheo			(Blanco et al., 2004)	
	c.			TS/MS	Case Report's Father	Familial	Bilateral pheos			(Blanco et al., 2004)	
	c.			TS/MS	UOK110g	Sporadic	RCC			(Gnarra et al., 1994)	
	c.	340G>T	Gly114Cys	TV/MS	1 family; 1 affected	Familial	CNS HB			(Ong et al., 2007)	
	c.			TV/MS	40	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.			TV/MS	133	Familial	VHL: Pheo phenotype not described			(Crossey et al., 1994)	*
	c.			TV/MS	301	Sporadic	RCC			(Gallou et al., 2001)	*
	c.			TV/MS	904	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TV/MS	C48	Sporadic	RCC			(Foster et al., 1994a)	*
	c.	340+1delG		Splice	1688	Sporadic	RCC after trichloroethylene exposure			(Brauch, Weirich et al., 1999)	
	c.	340+1G>A		Splice	Fam 31: 1 affected	Familial	VHL: RCC			(Hes et al., 2007)	H
	c.	340G>A and 340+2T>G	Gly185Ser & Splice	TV/MS&Splice	38	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	340+5G>C		Splice	139	Familial	VHL Type 1			(Maher et al., 1996)	
	c.	340+8C>T and 257C>T	Splice & Pro86Leu	Splice&TS/MS	1667	Sporadic	RCC after trichloroethylene exposure			(Brauch, Weirich et al., 1999)	
	c.	340+9C>T		Splice	2458	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	341-2del1	Frameshift	Splice	262	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	341-2A>C		Splice	Fam 32: 1 affected	Familial	VHL: RCC, CNS HB, RA, Renal & Pancreatic cysts			(Hes et al., 2007)	H
	c.			Splice	1 family; 1 affected	Familial	RCC, Pheo, CNS HB, RA			(Ong et al., 2007)	
	c.	341-delCGTTTCCAACAATTTCtCGGTGT		Splice	1 family; 3 affected	Familial	1 patient with RCC, 3 with RA			(Ong et al., 2007)	
	c.	341-1_367del28	Frameshift	Splice	690	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	341-?_463+?del (deletion exon 2)	?	Del	193	Familial	VHL			Utrecht, this report	
	c.		?	Del	379	Familial	Multiple pancreatic and kidney cysts, solid renal tumor, CNS HB			Utrecht, this report	
	c.	341-4028_463+1011del5162	?	Del	20710	De novo germline	CNS HB, RA, renal cysts			Rotterdam, this report	
	c.	342del10-nt	Frameshift	Del/FS	G34	Sporadic	RCC			(Foster et al., 1994a)	*
	c.	342insGGT	114insGly	InF Ins	1 family; 2 patients	Familial	2 patients with RA, 2 with CNS HB			(Ong et al., 2007)	
115	c.	343C>G	His115Asp	TV/MS						(Olschwang et al., 1998)	H
	c.	343C>A	His115Asn	TV/MS	1299	Sporadic	RCC			(van Houwelingen, van	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
										Dijk et al., 2005)	
	c.	343C>T	His115Tyr	TS/MS	KTCL 140	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.			TS/MS	AvB25	Sporadic	RCC			Utrecht, this report	
	c.			TS/MS	C27	Sporadic	RCC			(Foster et al., 1994a)	*
	c.			TS/MS	A113	Sporadic	RCC			(Lemm et al., 1999)	*
	c.			TS/MS	VHL 59: German Family with 1 affected	Familial	VHL Type 1: RA			(Glavac et al., 1996)	*
	c.	344A>G	His115Arg	TS/MS	VHL 60: German; 2 affected	Familial	VHL Type 1: RCC, RA, CNS HB, Renal & Pancreatic Cysts, Cyst adenoma of the epididymus			(Glavac et al., 1996)	*
	c.	344A>C	His115Pro	TV/MS	1 family; 1 affected	Familial	RA, CNS HB			(Ong et al., 2007)	
	c.	344delA	His115Pro Stop at 158	Del/FS	167	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.			Del/FS	Family 9: Brazilian; 3 affected	Familial	VHL Type 1: RCC, RA, CNS HB			(Rocha et al., 2003)	H
	c.	345C>A	His115Gln	TV/MS	4486	Familial	VHL Type 2			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.	345C>G	His115Gln	TV/MS	V48	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TV/MS	33912: Portugese	Familial	VHL (specifics unknown)			Rotterdam, this report	
	c.			TV/MS	CM023998	Familial	VHL: Phenotype not described			(Dollfus et al., 2002)	H
	c.	345delC	Stop at 158	Del/FS	ST168	Sporadic	RCC			(Brieger et al., 1999)	*
116	c.	346C>G	Leu116Val	TV/MS	68	Sporadic	RCC			(Gallou et al., 1999)	*
	c.			TV/MS	1 family; 3 affected	Familial	RA			(Ong et al., 2007)	
	c.			TV/MS	131	Familial	VHL: Pheo phenotype not described			(Maher et al., 1996)	*
	c.	347delT	Stop at 158	Del/FS	259	Sporadic	RCC			(Gallou et al., 2001)	*
	c.	348_354del7	Frameshift	Del/FS	596	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
117	c.	349T>A	Trp117Arg	TV/MS	UOK 111g	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.	349T>C	Trp117Arg	TS/MS	25823	Germline, Inconclusive whether de novo	VHL (specifics unknown)			Rotterdam, this report	
	c.	350delG	Trp117Cys Stop at 158	Del/FS	ST72	Sporadic	RCC			(Brieger et al., 1999)	*
	c.			Del/FS	198	Sporadic Germline	CNS HB			Utrecht, this report	
	c.	349-350insG	Leu118Ala Stop at 131	Ins/FS	355	Sporadic	RCC			(Gallou et al., 2001)	*
	c.	350G>A	Trp117X	TS/NS		Sporadic	RCC			(Bailly et al., 1995)	*
	c.	351G>A	Trp117 X	TS/NS	UOK 163g	Sporadic	RCC			(Gnarra et al., 1994)	*
	c.			TS/NS	97	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.	351G>T	Trp117Cys	TV/MS	1239	Familial	VHL Type 1			(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TV/MS	564	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			TV/MS	13F	Familial	VHL Type 1			(Zbar et al., 1996)	*
	c.			TV/MS	V13: 4 affected and 4 carriers	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TV/MS	Family 83	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			TV/MS	Family 146	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			TV/MS	Family 83:	Familial	VHL Type 1: CNS HB,			(Yoshida et al., 2000)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
					Japanese; 1 affected		Pancreatic cysts or tumor			
118	c.	352insA	Leu118Thr Stop at 131	Ins/FS	13	Familial	VHL Type 1		(Stolle et al., 1998)	*
	c.	353T>C	Leu118Pro	TS/MS	19	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			TS/MS	V27: 3 affected and 10 ASx carriers	Familial	VHL Type 1		(Olschwang et al., 1998)	*
	c.			TS/MS	127F	Familial	VHL Type 1		(Zbar et al., 1996)	*
	c.			TS/MS	Family 46: Japanese; 2 affected	Familial	VHL Type 1: RCC, Pancreatic cysts or tumor		(Japan, 1995)	
	c.			TS/MS	1 family	Familial	VHL Type 2:Pheo, RCC, RA, CNS HB		(Ong et al., 2007)	
	c.			TS/MS	VHL 94	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.			TS/MS	36	Sporadic	RCC		(Gnarra et al., 1994)	*
	c.			TS/MS	16	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	353T>G	Leu118Arg	TV/MS	18	Familial	VHL Type 2		(Maher et al., 1996)	*
	c.	353T>A	Leu118His	TV	338	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	*
119	c.	356T>C	Phe119Ser	TS/MS	333	Sporadic Germline/ De novo	Bilateral Pheo		(Eng, 1995)	*
	c.	357C>G	Phe119Leu	TV/MS		Familial	VHL Type 2		(Kang et al., 2005)	H
	c.			TV/MS	4414	Familial	VHL Type 2		(Chen et al., 1995) (Zbar et al., 1996)	*
	c.			TV/MS	4577	Familial	VHL Type 2		(Zbar et al., 1996)	*
	c.			TV/MS	1 Case	Familial	VHL Type 2		(Neumann et al., 2002)	
	c.			TV/MS	VHL 99	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.			TV/MS	1685 Patient also has 598C>T	Sporadic	RCC		(Brauch et al., 1999)	*
	c.			TV/MS	1694 Patient also has 241C>T	Sporadic	RCC		(Brauch et al., 1999)	*
	c.			TV/MS	1695 Patient also has 241 C>T, 486C>T, and 562C>G	Sporadic	RCC		(Brauch et al., 1999)	*
120	c.	358A>G	Arg120Gly	TS/MS					(Magnani et al, 2001)	H
	c.			TS/MS	290, 22153	Famlilial	CNS HB, Pheo		Utrecht & Rotterdam, this report	
	c.	358insAC	Arg120Thr Stop at 159	Ins/FS	Family 14: Japanese; 2 affected	Familial	VHL Type 1: RCC		(Japan, 1995)	*
	c.	358_361delAGAG	Arg120Met Stop at 157	Del/FS	Case 122	Sporadic	RCC		(Shuin et al., 1994a)	*
	c.	359delG	Arg120Lys Stop at 158	Del/FS	SKRC8	Sporadic	RCC		(Gnarra et al., 1994)	*
121	c.	361G>A	Asp121Asn	TS/MS					(Kang et al, 2005)	H
	c.	361delG	Asp121Met Stop at 158	Del/FS	1147	Familial	VHL Type 1		(Maher et al., 1996)	*
	c.	361_366del	Asp121_Ala122del	In F Del	UOK142g	Sporadic	RCC		(Gnarra et al., 1994)	*
	c.	362A>G	Asp121Gly	TS/MS	21	Familial	VHL: Phenotype not described		(Whaley et al., 1994)	*
	c.			TS/MS	VHL 105	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.		Asp121Gly	MS	F26	Familial	Retinal HB, Renal cysts		(Ruiz-Llorente et al., 2004)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
							(Family history of pheochromocytomas and CNS HB)			
	c.	363delT	Asp121Glu Stop at 158	Del/FS	CB136	Sporadic	RCC		(Gallou et al., 1999)	*
	c.	363T>C	Asp121Asp	TS/MS	Case 5	Sporadic	Pancreatic microcyst adenomas		(Vortmeyer, 1997)	*
	c.	363T>G	Asp121Glu	TV/MS	C7	Sporadic	RCC		(Foster et al., 1994a)	*
122	c.									
123	c.	367delG	Stop at 158	Del/FS		Familial	VHL: Ocular HB, The rest of the VHL phenotype was not described		(Webster, Maher et al., 1999)	*
	c.			Del/FS	1 family; 1 affected	Familial	RA		(Ong et al., 2007)	
	c.	369delGACACAC	Frameshift	Del/FS	1 family; 1 affected	Familial	No phenotype described.		(Ong et al., 2007)	
	c.				B1	Familial	VHL: Cerebellar HB, Pancreatic Cysts		(Hes et al 2000)	
124	c.	370-371 insTGCAGGA	Thr124Met Stop at 133	Ins/FS	346	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.	371C>T	Thr124Ile	TS/MS	Family 10: Brazilian; 1 affected	Familial	VHL Type 2: Pheo, RA		(Rocha et al., 2003)	H
125	c.	373_378del6	In-Frame Del	InF Del	9	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	374insA	Frameshift	Ins/FS	1 family; 3 affected	Familial	1 patient with RCC, 1 with RA, 1 with CNS HB		(Ong et al., 2007)	
	c.	375insC	Asp126Arg Stop at 131	Ins/FS	102	Familial	VHL Type 1		(Crossey et al., 1994)	*
126	c.	376G>T	Asp126Tyr	TV/MS	Patient 1 and 2: American siblings of Ukrainian descent	Familial (inherited from their unaffected father)	Both siblings were heterozygous and had inherited the mutation from their unaffected father. (#1) Sister: 16yo female with a heterozygous mutation with polycythemia and history of pulmonary angioma, subcapsular renal hemangioma; after treatment of hemangiomas patient remained polycythemic (#2) Brother: 10yo male with polycythemia		(Pastore et al., 2003a)	H
	c.	377A>G	Asp126Gly	TS/MS	UOK140	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.			TS/MS		Sporadic	RCC		(Zhuang et al., 1996)	*
	c.	378delT	Asp126Glu Stop at 158	Del/FS	ST114	Sporadic	RCC		(Brieger et al., 1999)	*
127	c.	381delG and 330delC	Leu128Phe Stop at 158	Del/FS	49	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	381del	Leu128Phe Stop at 158	Del/FS	T13	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.				AvB40	Somatic	RCC		Utrecht, this report	
127-128	c.	381-382GC>TT	Leu128Phe	MS	29	Familial	VHL Type 2		(Stolle, Glenn et al., 1998) Previously reported by (Chen et al., 1995) or (Zbar et al., 1996)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.			MS	4783	Familial	VHL Type 2		(Zbar, Kishida et al., 1996)	*
128	c.	382C>T	Leu128Phe	TS/MS					(Neumann et al., 2001)	H
	c.	382delC	Leu128Phe Stop at 158	Del/FS	1683	Sporadic	RCC after trichloroethylene exposure		(Brauch, Weirich et al., 1999)	*
	c.		Leu128Arg	MS	F41	Germline	Retinal HB, Cerebellar HB, RCC, Renal & Pancreatic Cysts		(Ruiz-Llorente et al., 2004)	H
	c.	383T>A	Leu128His	TV/MS		Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	383T>C	Leu128Pro	TS/MS	Patient 5; Korean	Germline/ Possible de novo	27yo female with RCC, CNS HB; No family history of VHL		(Cho et al., 2009)	
	c.	383T>G	Leu128Arg	TV/MS	1 family; 3 affected	Familial	1 patient with RA, 1 with CNS HB		(Ong et al., 2007)	
	c.	384delT	Leu129Trp Stop at 158	Del/FS	VHL 44: German; 2 affected	Familial	VHL Type 1: RCC, CNS HB, Renal & Pancreatic Cysts		(Glavac et al., 1996)	*
129	c.	386insAGA	Leu129delinsGln X	InF Ins/NS	4410	Familial	VHL Type 1		(Chen, Kishida et al., 1995) (Zbar, Kishida et al., 1996)	*
130	c.	388G>C	Val130Leu	TV/MS	SKRC61	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.			TV/MS	173	Sporadic	RCC		(Shuin et al., 1994b)	*
	c.			TV/MS	180	Sporadic	RCC		(Shuin et al., 1994b)	*
	c.			TV/MS	2003F	Familial	VHL Type 1		(Shuin et al., 1994b) (Zbar, Kishida et al., 1996)	*
	c.			TV/MS	V91	Familial	VHL Type 1		(Olschwang, Richard et al., 1998)	*
	c.			TV/MS		Sporadic Germline/ De novo			(Cebrian et al., 1999)	
	c.		Val130Leu/598C>T (Arg200Trp)	TS/MS	Patient 8	Familial	5yo male with polycythemia who inherited 598C>T from his mother and the 388G>C from his father.		(Pastore et al., 2003a)	H
	c.		Val130Leu	MS	F2	Germline	Multiple Cerebellar HB and Pancreatic cysts		(Ruiz-Llorente et al., 2004)	H
	c.	388G>T	Val130Phe	TV/MS	Family 11: Brazilian; 14 affected	Familial	VHL Type 1: RCC, Pancreatic Cystadenoma, RA, CNS HB		(Rocha et al., 2003)	H
	c.			TV/MS	Fam 10: 5 patients	Familial	VHL Type 1: RCC, CNS HB, RA, Renal & Pancreatic cysts		(Hes et al., 2007)	H
	c.	389delT	Asn131Thr Stop at 158	Del/FS	333	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.	390_391delTA	Asn131Pro Stop at 133	Del/FS	64	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			Del/FS	1 family; 1 affected	Familial	CNS HB		(Ong et al., 2007)	
	c.	390delT	Stop at 158	Del/FS	2057	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
131	c.	391_398del	Asn131 Stop at 131	Del/FS	14	Sporadic	RCC		(Suzuki et al., 1997)	*
	c.	391A>T	Asn131Tyr	TV/MS	2451	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	392A>C	Asn131Thr	TV/MS	86	Familial	VHL Type 1		(Stolle, Glenn et al., 1998)	*
	c.			TV/MS	1 family; 1 affected	Familial	RCC, RA, CNS HB		(Ong et al., 2007)	
	c.	392A>G	Arg131Ser	TS/MS	Family 87:	Familial	VHL Type 2: Pheo, CNS		(Yoshida et al., 2000)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
					Japanese; 2 affected		HB, RA, Pancreatic cysts or tumor			
	c.	393C>A	Asn131Lys	TV/MS	V233	Familial	VHL Type 2A		(Olschwang, Richard et al., 1998)	*
	c.	393CC>A	Asn131FS	FS	Fam 26: 2 affected	Familial	VHL: RA, Renal & Pancreatic cysts		(Hes et al., 2007)	H
	c.	393_396del4	Frameshift	Del/FS	1167	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			Del/FS	2446	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
132	c.	394C>T	Gln132X	TS/NS	VHL 30: German; 1 affected	Familial	VHL Type 1: RA, CNS HB, Liver & Pancreatic cysts		(Glavac et al., 1996)	*
	c.			TS/NS	Family 108: Japanese; 1 affected	Familial	VHL Type 2B: Pheo, CNS HB, RA		(Yoshida et al., 2000)	H
	c.	395A>C	Gln132Pro	TV/MS	1 family; 2 affected	Familial	1 patient with RCC, 1 with RA, 1 with CNS HB		(Ong et al., 2007)	
	c.			TV/MS		Familial	CNS HB, rest unknown		(Glasker et al., 1999)	H
	c.	395delA	Stop at 158	Del/FS		Sporadic	RCC		(Bailly, Bain et al., 1995)	*
	c.			Del/FS	64	Familial	Type 1		(Stolle, Glenn et al., 1998)	*
	c.	395_396delAA	Gln132His Stop at 133	Del/FS	57	Sporadic	RCC		(Whaley, Naglich et al., 1994)	*
	c.	396A>C	Gln132His	TV/MS	15	Sporadic	Cerebellar HB		(Lee, Dong et al., 1998)	*
133	c.	397-398insTTAACCAAA	Stop at 179	Ins/FS	T116	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	397A>T	Thr133Ser	TV/MS	C10	Sporadic	RCC		(Foster et al., 1994b)	*
	c.	397_400delACTG	Thr133Asn Stop at 157	Del/FS	T40	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
134	c.	400G>T	Glu134X	TV/NS	A48	Sporadic	RCC		(Lemm, Lingott et al., 1999)	*
	c.			TV/NS	1 family; 1 affected	Familial	CNS HB		(Ong et al., 2007)	
	c.	402insT	Glu134Asp Stop at 143	Ins/FS	C50	Sporadic	RCC		(Foster et al., 1994b)	*
135	c.	404T>A	Leu135X	TV/NS	3710	Familial	VHL Type 1		(Chen, Kishida et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TV/NS	8	Familial	VHL: Phenotype not described		(Whaley, Naglich et al., 1994)	*
	c.		Leu135X	NS	F3	Familial	Retinal HB, Cerebellar HB, and Pancreatic Cysts (Family history of RCC, paragangliomas, and epydidimal cysts)		(Ruiz-Llorente et al., 2004)	H
	c.	404 del T	Stop at 158	Del/FS	SKRC 48	Sporadic	RCC		(Gnarra, Joly et al., 1999)	
	c.			Del/FS	1 family; 2 affected	Familial	2 patients with RA, 1 with CNS HB		(Ong et al., 2007)	
	c.	405A>C	Leu135Phe	TV/MS	4	Sporadic	Cerebellar HB with tumor recurrence >2 times		(Kanno et al., 1994)	*
	c.	405delA	Stop at 158	Del/FS	177	Sporadic	RCC		(Shuin et al., 1994b)	*
	c.			Del/FS	T11	Sporadic	RCC		(Gnarra et al., 1994)	
	c.	405_409delATTTG	Leu135Phe Stop at 177	Del/FS	T100	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	405-406insT	Stop at 179	Ins/FS	T112	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.			Ins/FS	134	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
136	c.	406_408del3	In-Frame Del	InF Del	559	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	406ins1-nt	Frameshift	Ins/FS	854	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.	406delT	Stop at 158	Del/FS	1699	Sporadic	RCC: Renal Oncocytic Adenoma		(Brauch et al., 2004))	
	c.	406T>A	Phe136Ile	TV/MS	121	Sporadic	RCC		(Shuin et al., 1994b)	*
	c.	407T>A	Phe136Tyr	TV/MS	107	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	407T>C	Phe136Ser	TS/MS	V53	Familial	VHL Type 1		(Olschwang, Richard et al., 1998)	*
	c.			TS/MS	V94	Familial	VHL Type 1		(Olschwang, Richard et al., 1998)	*
	c.			TS/MS	53F	Familial	VHL Type 1		(Kishida, Stackhouse et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	Family 12: Brazilian; 8 affected	Familial	VHL Type 1: RCC, RA, CNS HB		(Rocha et al., 2003)	H
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	27	Familial	VHL: Phenotype not described		(Crossey et al., 1994)	
	c.			TS/MS	481	Familial	RCC		Utrecht, This report	
	c.	407T>G	Phe136Cys	TV/MS	1 Case	Familial	VHL Type 2		(Neumann et al., 2002)	*
	c.			TV/MS	VHL 78	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.			TV/MS	10	Familial	VHL: Phenotype not described		(Whaley, Naglich et al., 1994)	
	c.	408ins1-nt	137_Phe136dup	Ins/FS	UMRC11	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.	408delT	Stop at 158	Del/FS	1687	Sporadic	RCC after trichloroethylene exposure		(Brauch, Weirich et al., 1999)	*
	c.			Del/FS	2078	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	408T>G	Phe136Leu	TV/MS	777	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
137	c.	409delG	Stop at 158	Del/FS	309	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
138	c.	413C>G	Pro138Arg	TV/MS	UOK102g	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.	413_414del2	Frameshift	Del/FS	2449	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	414delA	Ser139Leu Stop at 158	Del/FS	G3	Sporadic	RCC		(Foster et al., 1994b)	*
139	c.	415insC	Stop at 143	Ins/FS	352	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.	417T>A	Ser139Ser	TV	947	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			TV	1003	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	417 to 418delTC	Leu140Gln Stop at 142	Del/FS	V73	Familial	VHL Type 1		(Olschwang, Richard et al., 1998)	*
	c.			Del /FS	V80	Familial	VHL Type 2B		(Olschwang, Richard et al., 1998)	
140	c.	418delC	Leu140Ser Stop at 158	Del/FS		Sporadic	RCC		(Zhuang et al., 1996)	*
	c.	418insC	Leu140Pro Stop at 143	Ins/FS		Sporadic Germline /De novo	VHL Type 1: Cerebellar and cerebro-spinal HB, Pancreatic cysts, RA		(Brieger et al., 1999)	*
	c.	418_425del8	Frameshift	Del/FS	670	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.	419_420delTC	Leu140Gln Stop at 142	Del/FS	1696	Sporadic	RCC after trichloroethene exposure		(Brüning et al., 1997)	*
	c.		Leu140Gln Stop at 142	Del/FS	AvB41	Somatic	RCC		Utrecht, this report	
	c.	419delT	Leu140Pro Stop at 158	Del/FS	UOK162g	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.	420delC	Asn141Met Stop at 158	Del/FS	257	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
141	c.	421delA	Asn141Met Stop at 158	Del/FS	107	Familial	VHL Type 1		(Maher et al., 1996)	*
	c.			Del/FS	1 family; 1 affected	Familial	RCC, CNS HB		(Ong et al., 2007)	
	c.	421_422delAA	Asn141Cys Stop at 142	Del/FS	3	Sporadic	Spinal HB		(Oberstrass et al., 1996)	*
	c.	422_423delAT	Asn141Ser Stop at 178	Del/FS	T106	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	422_428del	Asn141Thr Stop at 156	Del/FS	369	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.	423delT	Asn141Lys Stop at 158	Del/FS	C5	Sporadic	RCC		(Foster et al., 1994b)	*
	c.	423insA	Frameshift	Ins/FS	ST36	Sporadic	RCC		(Brieger et al., 1999)	*
142	c.	424delG	Val142Leu Stop at 158	Del/FS	1680	Sporadic	RCC after trichloroethene exposure		(Brüning et al., 1997)	*
	c.	425del5-nt	Frameshift	Del/FS	A598	Sporadic	RCC		(Latif et al., 1993)	
	c.	426_429delTGAC	Stop at 157	Del/FS	A498	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.			Del/FS	1657 Patient also has 241 C>T	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	426T>G and 321_323del3	Stop at 158	TV & InF Del	954	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
143	c.	429del10-nt	Stop at 169	Del/FS	Family 26: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, and RA		(Kishida, Stackhouse et al., 1995) (Zbar, Kishida et al., 1996) (Japan, 1995)	*
	c.	429C>G	Asp143Glu	TV/MS	335	Sporadic but Unknown if somatic or Germline	Unilateral Pheo		(Eng, 1995)	*
	c.			TV/MS	ST56	Sporadic	RCC		(Brieger et al., 1999)	*
	c.	429-430insGGAC	Frameshift Stop at 173	Ins/FS	281	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.	429delC	Asp143Glu Stop at 158	Del/FS	KTCL 13	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.	429_439del	Gly144Phe Stop at 169	Del/FS					(Japan, 1995)	*
144	c.	430_433delGGAC	Gly144Ser Stop at 157	Del/FS	254	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.	430_434dup	Gln145Arg Stop at 174	Ins/FS					Database only	*
	c.	430G>T	Gly144X	TV/NS	65	Familial	VHL Type 2		(Stolle, Glenn et al., 1998)	
	c.			TV/NS	442	Sporadic, Germline	Bilateral RCC, HB		Utrecht, this report	
	c.			TV/NS	Fam 19: 1 affected, of note, the patient was adopted	Germline (patient was adopted)	Multiple RA		(Hes et al., 2007)	H
	c.	430G>A	Gly144Arg	TS/MS	1 Case	Familial	Heterozygous; Polycythemia		(Randi et al., 2005)	
	c.	430delG	Stop at 158	Del/FS	119	Familial	VHL Type 1		(Stolle et al., 1998)	*
	c.	431delG	Stop at 158	Del/FS	461	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			Del/FS	1655	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			Del/FS	SS78	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.			Del/FS	Family E: 3 affected of 11 family members; All peripheral blood samples did not show Germline mutations	Familial: However only a Somatic Mutation was found in the HB tissue	VHL Type 1: Central Neuroaxial HB, Pancreatic Cysts		(Kanno et al., 1996)	
	c.	431G>A	Gly144Gln	TV/MS	48	Germline	Unilateral, benign, Adrenal Pheo – The patient, who was originally thought to have had a Sporadic Pheo, has not been given a specific diagnosis yet.		(van der Harst et al., 1998)	*
	c.	431G>C	Gly144Ala	TV/MS	9	Sporadic	Cerebellum HB		(Lee et al., 1998)	*
145	c.	433C>T	Gln145X	TV/NS	1 family; 1 affected	Familial	RCC, CNS HB		(Ong et al., 2007)	
	c.			TV/MS		Familial	CNS HB, other phenotypes not described		(Glasker et al., 1999)	H
	c.	435G>T	Gln145His	TV/MS	T184	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.	435_436delGC	Gln145His Stop at 172	Del/FS	9	Familial	VHL: Phenotype not described		(Whaley, Naglich et al., 1994)	*
146	c.	436delC	Pro146Leu Stop at 158	Del/FS	C44	Sporadic	RCC		(Foster et al., 1994b)	*
	c.			Del/FS	Family 13: Brazilian; 1 affected	Familial	VHL Type 1: RCC, RA, CNS HB (The patient's mother is an ASx carrier.)		(Rocha et al., 2003)	H
	c.	437_450del	Pro146His Stop at 168	Del/FS	G76	Sporadic	RCC		(Foster et al., 1994b)	*
	c.	437delC and 501del1-nt	Stop at 158 and 169	Del/FS	306	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			Del/FS	1600	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
147	c.	439insT	Stop at 179	Ins/FS	T75	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.			Ins/FS	310	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.	439delA	Stop at 158	Del/FS	C38	Sporadic	RCC		(Foster et al., 1994b)	*
	c.	440delT	Stop at 158	Del/FS	1	Sporadic Germline /De novo	VHL Type 1: RCC, Recurrent Spinal HB, Pancreatic & Renal cysts		(Decker et al., 1996)	*
	c.			Del/FS	2174	Sporadic	RCC		(Bailly et al., 1995)	*
	c.			Del/FS	T67	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.			Del/FS	KTCL26A	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.	440_441delTT	Phe148Cys Stop at 178	Del/FS	T79	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	440T>C	Ile147Thr	TS/MS	19	Germline	Unilateral, Benign, Adrenal Pheo – The patient, who was originally thought to have had a Sporadic Pheo, has not been given a specific diagnosis yet.		(van der Harst et al., 1998)	*
148	c.	443insC	Stop 179	Ins/FS	T201	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	443T>C	Phe148Ser	TS	31	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	443_455delinsA	Phe148fs	Del/Ins/FS	401	Sporadic Germline	Multiple bilateral RA		Utrecht, This report	
	c.	444delT and 304C>G	Stop at 158 &	Del/FS&TV/	176	Sporadic	RCC		(van Houwelingen, van	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
			Pro102Ala	MS					Dijk et al., 2005)	
	c.	444delT, 241C>T and 464-2A>G	Stop at 158, Pro81Ser, Splice	Del & TS/MS & Splice	1665	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
149	c.	445G>A	Ala149Thr	TV/MS	3969	Familial	VHL Type 2		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.	445G>T	Ala149Ser	TV/MS	McCoy Family: 25 affected	Familial	VHL Type 2A: (Same Family) 4 Pts: Pheo only 9 Pts: Pheochromocytomas (Mean age of Diagnosis 18yo) and RA 5Pts: RA only (Mean age of diagnosis 12yo) 1Pt: CNS HB only 2 Pts: Pheo, RA, and CNS HB 2Pts: Pheo, RA, and Pancreatic adenoma There are two cases of RCC with Pheo (Type 2B). However, the family as a whole is diagnosed as Type 2A.		(Atuk et al., 1998)	H
	c.	445delG	Stop at 158	Del/FS	Family 13; Polish; 3 affected	Familial	VHL: RCC, RA, CNS HB		(Cybulski et al., 2002)	H
	c.	445G>C	Ala149Pro	TV/MS	C41	Sporadic	RCC		(Foster et al., 1994b)	*
	c.	446del126-nt	Frameshift	Large Del	G73	Sporadic	RCC		(Foster et al., 1994b)	*
	c.	446del C	Stop at 158	Del/FS	T683	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.	446_452del	Asn150His Stop at 158	Del/FS	T43	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
150	c.	448delA	Asn150Ile Stop at 158	Del/FS	3575	Familial	VHL Type 1		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.	449delA	Stop at 158	Del/FS	15	Sporadic	RCC		(Suzuki et al., 1997)	*
	c.	449del14-nt	Ala149 Truncation	Del/FS	VHL 75	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.	450delT	Asn150Lys Stop at 158	Del/FS	12	Sporadic	Cervical Spinal Cord HB that recurred one time		(Kanno et al., 1996)	*
	c.			Del/FS	25	Sporadic	RCC		(Suzuki et al., 1997)	*
	c.	450T>A	Asn150Lys	TV/MS	ST22	Sporadic	RCC		(Brieger et al., 1999)	*
151	c.	451insA	Frameshift	Ins/FS	52	Sporadic	RCC		(Suzuki et al., 1997)	*
	c.	452insA	Frameshift	Ins/FS	11	Familial	VHL Type 1		(Zbar, Kishida et al., 1996)	*
	c.	452T>G	Ile151Ser	TV/MS	UOK123	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.			TV/MS	29982	De novo germline	CNS HB		Rotterdam, this report	
	c.			TV/MS	TIII-I	Sporadic	Tumor from patient with Familial RCC with constitutional translocation t(3;8)(p14;q24)		(Gnarra, Tory etal. 1994)	*
	c.			TV/MS	2440	Sporadic	RCC		(Bailly et al., 1995)	*
	c.	452T>C	Ile151Thr	TS/MS	Fam 11: 1 affected	Familial	VHL: RCC, CNS HB		(Hes et al., 2007)	H
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TS/MS		Familial	CNS HB, other phenotype		(Glasker et al., 1999)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
							unknown			
	c.	453C>G	Ile151Met	TV/MS	11	Sporadic	RCC		(Whaley, Naglich et al., 1994)	*
152	c.	454A>C	Thr152Pro	TV/MS	Fam 12: 1 affected	Sporadic Germline /De Novo	VHL: CNS HB, Epididymal cysts, Renal & Pancreatic Cysts		(Hes et al., 2007)	
	c.	455insA	Frameshift	Ins/FS	1 family; 1 affected	Familial	RA		(Ong et al., 2007)	
	c.			Ins/FS	151	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.	456_457delAC	Thr152fs	Del/FS	AvB45	Somatic	RCC		Utrecht, this report	
153	c.	457delC	Leu153Cys Stop at 158	Del/FS	41	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			Del/FS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			Del/FS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			Del/FS	99	Familial	VHL: No phenotype described		(Crossey et al., 1994)	*
	c.	457_463del7-nt	Frameshift	Del/FS	651	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	458ins4-nt	Frameshift	Ins/FS	1334	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	458T>C	Leu153Pro	TS/MS	UOK 130	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.			TS/MS	US-001-01-SPO-0	Sporadic	RCC		(Zhuang et al., 1996)	*
154	c.	461C>T	Pro154Leu	TS/MS	1 family; 6 affected	Familial	3 patients with RCC, 2 with Pheo, 1 with RA, 2 with CNS HB		(Ong et al., 2007)	*
	c.			TS/MS	49	Familial	VHL Type 2		(Crossey et al., 1994)	
	c.			TS/MS	18	Familial	VHL: Phenotype not described		(Whaley, Naglich et al., 1994)	*
	c.	462A>C	Pro154Pro	TV	V78: 2 affected and 2 ASx carriers	Familial	VHL Type 2A		(Olschwang et al., 1998)	*
	c.	462delA	Val155Cys Stop at 158	Del/FS	3616	Familial	VHL Type 1		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.	462ins1-nt	Frameshift	Ins/FS	952	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
155	c.	463G>A	Val155Met	TS/MS	366	Sporadic	RCC	α Helical	(Gallou et al., 2001)	
	c.	463G>C	Val155Leu	TV/MS	2 affected in kindred	Familial	RA, other phenotype unknown		(Dollfus et al., 2002)	H
	c.	463G>A		Splice	Family 32: Japanese; 9 affected	Familial	VHL Type 1: RCC, CNS HB, RA, Pancreatic cysts or tumor		(Japan 1995)	
	c.	463+1G>A		Splice	Family 107: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, RA, Pancreatic cysts or tumor		(Yoshida et al., 2000)	H
	c.	463+1G>T		Splice	C42	Sporadic	RCC		(Foster et al., 1994a)	
	c.	463+1G>C		Splice	VHL45: German; 1 affected	Familial	VHL Type 1: RCC, RA, CNS HB, Renal & Pancreatic Cysts		(Glavac et al., 1996)	
	c.	463+2T>C	Exon 2 Splice site	Splice	Patient A	Sporadic	RCC: exposure to trichloroethylene, as well as exposure to cutting oils asbestos and is a smoker		(Charbotel et. al. 2007)	
	c.	463+1G>C	Exon 2 Splice site	Splice	Patient D	Sporadic	RCC		(Charbotel et. al. 2007)	
	c.	463+2C>T		Splice	VHL7: Croatian; 3 affected	Familial	VHL Type 1: RA, CNS HB, Renal & Pancreatic cysts		(Glavac et al., 1996)	
	c.	463+2T>C		Splice	Fam 33: 1 affected	Sporadic	VHL: CNS HB, RA		(Hes et al., 2007)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
						Germline/ De novo				
	c.	463+5T>A and 183delC	Splice & Stop at 66	Splice &Del	2109	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	463+3A>T		Splice	398	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			Splice	1 family	Familial	RA, and 1 patient with CNS HB		(Ong et al., 2007)	
	c.			Splice	1 family	Familial	RA		(Ong et al., 2007)	
	c.	463+8C>T		Splice	2092	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			Splice	VHL 97, 102	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.	463+8>T		Splice	54	Germline	Unilateral, benign, Adrenal Pheo – The patient, who was originally thought to have had a Sporadic Pheo.		(van der Harst et al., 1998)	
	c.	463+23A>G		Splice	989	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	463G>A & del8-nt in intron	Loss of intron splice donor and exon 3 in mRNA	Splice	T1	Sporadic	RCC		(Gnarra et al., 1994)	
	c.	464T>A	Val155Glu	TV/MS	1 family; 3 affected	Familial	1 patient with Pheo, 1 with RA, 1 with CNS HB		(Ong et al., 2007)	
	c.	464delT	Frameshift	Del/FS	24	Sporadic	RCC		(Suzuki et al., 1997)	
	c.			Del/FS	35	Sporadic	RCC		(Suzuki et al., 1997)	
	c.	464-1G>A		Splice	VHL48: German; 1 affected	Familial	VHL Type 1: CNS HB		(Glavac et al., 1996)	
	c.		Intronic Mutation causing loss of exon three's splice acceptor site (ccagTGTA to ccaaTGTA)	Splice	Patient W (Parents unavailable for testing)	Sporadic Germline / Likely de novo	VHL Type 1: RCC, HB		(Martin et al., 1996)	
	c.			Splice	Family 68: Japanese; 1 affected	Familial	VHL Type 1: RCC, RA, Pancreatic cysts or tumor		(Yoshida et al., 2000)	H
	c.			Splice	2455	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	464-1G>C		Splice	1332	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			Splice	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			Splice	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.	464-1G>C, 241C>T and 598C>T		Splice	1693	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	464-1G>T		Splice	143	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			Splice	Family C: 10 members with 3 affected and four ASx carriers	Familial	VHL Type 1 Case 1:RCC Case 2 & 3: CNS HB, RA Case 4,5,7, & 8: ASx carriers		(Kanno et al., 1996)	
	c.			Splice	Family 3: Japanese; 7 affected	Familial	VHL Type 1: RCC, CNS HB, RA, Pancreatic cysts or tumor		(Yoshida et al., 2000) (Zbar, Kishida et al., 1996)	H
	c.			Splice	16	Not	Cerebellar HB		(Oberstrass et al., 1996)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
						Determined					
	c.	464-2A>G, 444delT and 241C>T		Splice	1665	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.	464-?_642+?del (deletion exon 3)	?	Splice	195	Familial	VHL (specifics unknown)			Utrecht, This report	
	c.	464-2A>G		Splice	VHL31: Italian; 1 affected	Sporadic Germline /De Novo	VHL Type 1: RCC, RA, CNS HB, Renal & Pancreatic cysts			(Glavac et al., 1996)	*
	c.			Splice	1 family; 3 affected	Familial	1 patient with RA, 2 CNS HB			(Ong et al., 2007)	
	c.	464-2A>T		Splice	VHL57: German; 1 affected	Familial	VHL Type 1: CNS HB, Renal & Pancreatic cysts			(Glavac et al., 1996)	*
	c.	464-2A>C		Splice	4	Familial	VHL Type 1			(Zbar, Kishida et al., 1996)	
	c.	464-2_469del 8-nt		Splice	1325	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	*
	c.	465-466insA; 464_473del	Stop at 173	Ins&Del/FS	320	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
156	c.	466T>A	Tyr156Asn	TV/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.	466T>G	Tyr156Asp	TV/MS	V87	Familial	VHL Type 2B			(Olschwang et al., 1998)	*
	c.			TV/MS	Only one affected	Germline	Did not have RA; other phenotypes unknown.			(Dollfus et al., 2002)	H
	c.	467A>G	Tyr156Cys	TS/MS	V265	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TS/MS	2 Cases	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.			TS/MS	18	Sporadic	Bilateral Pheo			(Bauters et al., 2003)	H
	c.			TS/MS	523	Familial	Pheo			Utrecht, This report	
	c.	468_469delTA	Frameshift	Del/FS	51	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.	468T>G	Tyr156X	TS/NS	1825F					(Kishida, Stackhouse et al., 1995)	*
	c.			TS/NS	41F	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TS/MS						(Zbar et al., 1996)	
	c.	468_471delTACT	Thr157 Stop at 157	Del/FS	60	Sporadic	RCC			(Suzuki et al., 1997)	*
157	c.	469delA	Stop at 158	Del/FS	UOK 139	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
	c.			Del/FS	UOK T26	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
	c.			Del/FS	331(T1)	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
	c.	470C>T	Thr157Ile	TS/MS	4402	Familial	VHL Type 2			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	V240	Familial	VHL Type 2A			(Olschwang et al., 1998)	
	c.			TS/MS	Family 45: Japanese; 2 affected	Familial	VHL Type 2B: RCC, Pheo			(Japan, 1995)	*
	c.			TS/MS	1660	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.			TS/MS	45A					(Kishida, Stackhouse et al., 1995)	*
	c.	471insT	Stop at 179	Ins/FS	T123	Sporadic	RCC			(Gallou, Joly et al., 1999)	*
	c.	471T>A and 1_17del17	Thr157Thr & Del	TV & Del/FS	962	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TV & Del/FS	963	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
158	c.	472delC	Stop at 158	Del/FS	T103	Sporadic	RCC		Elongin BC Binding	(Gallou, Joly et al., 1999)	*
	c.	472insT	243aa Long Protein	Ins/FS	6	Familial	VHL: Phenotype not described			(Whaley, Naglich et al., 1994)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.	472C>G	Leu158Val	TV/MS	91	Familial	VHL Type 1			(Crossey et al., 1994)	
	c.			TV/MS	1 family; 1 affected	Familial	RA, CNS HB			(Ong et al., 2007)	
	c.			TV/MS	Family 69: Japanese; 2 affected	Familial	VHL Type 2B: RCC, Pheo, CNS HB, Pancreatic cysts or tumor			(Yoshida et al., 2000)	H
	c.			TV/MS	1303	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TV/MS	255	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
	c.		Leu158Val	MS	F35	Familial	Retinal HB, Cerebellar HB, Renal & Pancreatic cysts (Family history of pancreatic tumors)			(Ruiz-Llorente et al., 2004)	H
	c.	472 Ins	Frameshift	Ins/FS	76	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.	472insT	Frameshift	Ins/FS	6	Familial	No detailed family history			(Zbar, Kishida et al., 1996)	*
	c.	472ins1-nt	Frameshift	Ins/FS	76	Familial	VHL Type 1			(Zbar, Kishida et al., 1996)	*
	c.	472insTTT	In-Frame Ins Phe	InF Ins	43F	Familial	VHL Type 1			(Zbar, Kishida et al., 1996)	*
	c.	472_473delCT and 205C>T	Frameshift & Arg69Cys	Del/FS & TS/MS	1676	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.	472_477del	Leu158_Lys159 In frame del	InF del	335	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
	c.	473insT	Leu158FS Stop at 173	Ins/FS	V235	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			Ins /FS	Fam 29: 8 patients	Familial	VHL: RCC, CNS HB, RA, Renal & Pancreatic cysts			(Hes et al., 2007)	H
	c.	473T>A	Leu158Gln	TV/MS	53	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.	473T>C	Leu158Pro	TS/MS	UOK 117g	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
	c.			TS/MS	ST48	Sporadic	RCC			(Brieger et al., 1999)	
	c.			TS/MS	4408	Familial	VHL Type 1			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	V252: 2 affected, 1 ASx carrier	Familial	VHL Type 1			(Olschwang et al., 1998)	
	c.			TS/MS	Fam 13: 2 affected	Familial	RA Only			(Hes et al., 2007)	H
	c.			TS/MS	Family 4475: 51 affected	Familial	VHL Type 2			(Kishida, Chen, et al., 1995)	
	c.			TS/MS	4485	Familial	VHL Type 2			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	1	Familial	VHL: Phenotype not described			(Whaley, Naglich et al., 1994)	*
	c.			TS/MS	2	Familial	VHL: Phenotype not described			(Whaley, Naglich et al., 1994)	*
	c.	474_476delGAAinsC	Frameshift	Del/Ins/FS	1 family; 5 affected	Familial	1 patient with RCC, 3 with CNS HB			(Ong et al., 2007)	
159	c.	475A>G	Lys159Glu	TS/MS	4489	Familial	VHL Type 2			(Zbar, Kishida et al., 1996)	*
	c.	475delA	Stop at 170	Del/FS	16	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.	477_478insCA	Frameshift	Ins/FS	Family 14; Polish; 1 affected	Familial	VHL: RA, CNS HB			(Cybulski et al., 2002)	H
160	c.	478G>T	Glu160X	TV/NS	23	Sporadic	RCC			(Whaley, Naglich et al., 1994)	*
	c.	480delG and 482_483del2	Stop at 170	Del & Del	682	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
161	c.	481insG	Stop at 173	Ins/FS	C19	Sporadic	RCC			(Foster et al., 1994b)	*
	c.		Stop at 173	Ins/FS	T131	Sporadic	RCC			(Gallou, Joly et al., 1999)	*
	c.	481insC	Stop at 173	Ins/FS	4	Sporadic	Cerebellar HB			(Oberstrass et al., 1996)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.	481_483del3-nt	In-Frame Del	InF Del	170	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	481C>G	Arg161Gly	TV/MS	VHL Family 13: German; 1 affected	Familial	VHL Type 2B: Pheo, RCC, RA, CNS HB, Renal Cysts			(Glavac et al., 1996)	*
	c.			TV/MS	VHL Family 005: Mom: 005/02	Somatic Mosaicism	VHL Type 2: At 48yo had a clinically silent Pheo and Renal Cysts; Her son inherited this same mutation (See below).			(Murgia et al., 2000)	*
	c.			TV/MS	VHL Family 005: Son: 005/01	Germline	VHL Type 2: 26yo: Bilateral Pheo, Multiple bilateral Renal Cysts, CNS HB, RA			(Murgia et al., 2000)	*
	c.	481C>T	Arg161X	TS/NS	692	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			TS/NS	T27	Sporadic	RCC			(Gallou, Joly et al., 1999)	
	c.			TS/NS	22	Familial	VHL Type 1			(Stolle, Glenn et al., 1998)	*
	c.			TS/NS	93	Familial	VHL Type 1			(Stolle, Glenn et al., 1998)	*
	c.			TS/NS	184	Familial	VHL Type 1			(Stolle, Glenn et al., 1998)	*
	c.			TS/NS	31	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.			TS/NS	55	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.			TS/NS	96	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.			TS/NS	109	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.			TS/NS	V3a	Familial	VHL Type 1			(Olschwang et al., 1998) (Zbar, Kishida et al., 1996)	*
	c.			TS/NS	V46	Familial	VHL Type 1			(Olschwang et al., 1998) (Zbar, Kishida et al., 1996)	*
	c.			TS/NS	92	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.			TS/NS	Korean; Patient 2	Familial	22yo male with CNS HB			(Cho et al., 2009)	
	c.			TS/NS	VHL49: German; 3 affected	Familial	VHL Type 1: RCC, RA, CNS HB, Renal & Pancreatic Cysts, Cyst adenoma of epididymus			(Glavac et al., 1996)	*
	c.			TS/NS	VHL32: German; 2 affected	Familial	VHL Type 1: RCC, RA, CNS HB, Renal & Pancreatic cysts, cyst adenoma of epididymus			(Glavac et al., 1996)	*
	c.			TS/NS	Fam 20: 1 affected	Familial	VHL: RA, Renal & Pancreatic Cysts			(Hes et al., 2007)	H
	c.			TS/NS	Family 15; Polish; 1 affected	Familial	VHL: RCC, RA, CNS HB			(Cybulski et al., 2002)	H
	c.			TS/NS	4885	Familial	VHL Type 2			(Zbar, Kishida et al., 1996)	*
	c.			TS/NS	92	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	*
	c.			TS/NS	VHL 13: German; 1 affected	Familial	VHL Type 2B: RCC, Pheo, RA, CNS HB, Renal cysts			(Glavac et al., 1996)	*
	c.			TS/NS	Case 2	Familial	VHL Type 2B: RCC, Pheo, and Pancreatic microcyst adenomas			(Vortmeyer, 1997)	
	c.			TS/NS	306	Familial	RA, pancreatic cysts			Utrecht, This report	
	c.			TS/NS	90	Familial	VHL: Phenotype not described			(Crossey et al., 1994)	
	c.			TS/NS	105	Familial	VHL: Phenotype not described			(Crossey et al., 1994)	
	c.			TS/NS	1393: Duke VHL	Familial	VHL			(Loeb et al., 1994)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
					family						
	c.			TS/NS	Case 1	Sporadic	Clear Cell Papillary Cystadenoma of the Epididymis			(Gilcrease et al., 1995)	
	c.			NS	F9	Germline	RA, Cerebellar HB, Pancreatic cysts			(Ruiz-Llorente et al., 2004)	H
	c.	482_483del 2-nt and 480del1-nt	Frameshift	Del/FS	682	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	482ins1-nt	Frameshift	Ins/FS	2127	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	482G>A	Arg161Gln	TS/MS	3	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	*
	c.			TS/MS	4942	Familial	VHL Type 2			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	
	c.			TS/MS	2005F	Familial	VHL Type 2			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	
	c.			TS/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.			TS/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.			TS/MS	1 family	Familial	Pheo			(Ong et al., 2007)	
	c.			TS/MS	1 family	Familial	Pheo			(Ong et al., 2007)	
	c.			TS/MS		Familial	VHL Type 2: Bilateral metachronous Pheo and Paraganglioma; The First tumor occurred at age 13 and the second at age 34			(Bar et al., 1997)	*
	c.			TS/MS	V32	Familial	VHL Type 2A			(Olschwang et al., 1998)	
	c.			TS/MS	V60	Familial	VHL Type 2A			(Olschwang et al., 1998)	
	c.			TS/MS	V97	Familial	VHL Type 2A			(Olschwang et al., 1998)	
	c.			TS/MS	4422	Familial	VHL Type 2B			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS		Familial	Pheo Only			(Woodward et al., 1997)Ge	
	c.			TS/MS		Familial	Pheo Only			(Woodward et al., 1997)Ge	*
	c.		Arg161Gn	MS	F69	Familial	Bilateral Pheo (Family history of pheo)			(Ruiz-Llorente et al., 2004)	H
	c.	482G>C	Arg161Pro	TV/MS	29	Familial	VHL Type 1			(Zbar, Kishida et al., 1996)	*
	c.			TV/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.	482G>C	Arg161Pro	TV/MS	AvB14	Somatic	RCC			Utrecht, this report	
	c.	483_492del	Stop at 166	Del/FS	1662	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
162	c.	484T>C	Cys162Arg	TS/MS	M	Sporadic Germline/ De novo	HB			(Martin et al., 1996)	*
	c.			TS/MS	Patient 7; Korean	Familial	30yo female with RCC, CNS HB, RA			(Cho et al., 2009)	
	c.			TS/MS	3509	Familial	VHL Type 1			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	Family D: 7 members with 2 affected	Familial	VHL Type 1: Case 1:Brain stem HB, RA Case 5:RCC, RA			(Kanno et al., 1996)	*
	c.			TS/MS	Family 4: Japanese; 6 affected	Familial	VHL Type 1: RCC, CNS HB, RA, and Pancreatic cysts or tumor			(Japan, 1995)	
	c.			TS/MS	302	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.			TS/MS	314	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
	c.	485InsG	Leu163FS Stop at 173	Ins/FS	Fam 30: 1 affected	Sporadic Germline/ De novo	VHL: CNS HB, RA			(Hes et al., 2007)	H
	c.			Ins/FS						(Neumann and Bender, 1998)	
	c.	485G>A	Cys162Tyr	TS/MS	Family 11: Japanese; 4 affected	Familial	VHL Type 1: CNS HB			(Japan, 1995)	*
	c.			TS/MS	42	Familial	VHL Type 1			(Maher et al., 1996)	*
	c.			TS/MS	Family 16; Polish; 5 affected	Familial	VHL: RA, CNS HB			(Cybulski et al., 2002)	H
	c.			TS/MS	4	Familial	VHL Type 2: Unilateral Pheo			(Bauters et al., 2003)	H
	c.			TS/MS	Family 104: Japanese; 1 affected	Familial	VHL Type 2B: RCC, Pheo, RA, Pancreatic cysts or tumor			(Yoshida et al., 2000)	H
	c.			TS/MS	SKRC 62	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
	c.			MS	F61	Familial	RA, Unilateral Pheo, Renal cysts (Family history of RCC)			(Ruiz-Llorente et al., 2004)	H
	c.	485G>T	Cys162Phe	TV/MS	3820	Familial	VHL Type 1			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TV/MS	69	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.	486C>G	Cys162Trp	TV/MS	3618	Familial	VHL Type 1			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TV/MS	VHL42: German; 1 affected	Familial	VHL Type 1: RA, CNS HB, Renal & Pancreatic cysts			(Glavac et al., 1996) (Zbar, Kishida et al., 1996)	
	c.			TV/MS	Patient 9: Korean	Possible de novo	39yo male with CNS HB; No family history			(Cho et al., 2009)	
	c.			TV/MS	24907	Inconclusive wheter de novo germline	VHL (specifics unknown)			Rotterdam, this report	
	c.			TV/MS	150	Familial	VHL Type 2			(Stolle, Glenn et al., 1998) Previously reported by (Chen et al., 1995) or (Zbar et al., 1996)	
	c.			TV/MS	V345	Familial	VHL Type 2B			(Olschwang et al., 1998)	*
	c.			TV/MS	1695 Patient also has 241 C>T, 357 C>G, and 562 C>G	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.	486delC	Leu163Ser Stop at 169	Del/FS	T162	Sporadic	RCC			(Gallou, Joly et al., 1999)	*
163	c.	487delC	Stop at 169	Del/FS	960	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	488delT	Leu163Pro Stop at 169	Del/FS	120	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.			Del/FS	T37	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
	c.	488 T>C	Leu163Pro	TS/MS	Patient 12: Korean	Germline/ Possibly de novo	48yo male with RCC, CNS HB; No family Hx			(Cho et al., 2009)	
	c.			TS/MS	German patient	Sporadic	RCC and paraneoplastic erythrocytosis			(Wiesener et al., 2002)	
	c.	488T>A	Leu163His	TV/MS						(Chen et al., 1995)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.	488T>C; 489C>T	Leu163Pro	TS/MS	8		RCC			(Wenzel et al., 1997)	*
164	c.	490C>T	Gln164X	TS/NS	UOK161gf	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
	c.			TS/NS	C54	Sporadic	RCC			(Foster et al., 1994b)	*
	c.			TS/NS	141	Familial	VHL Type 1			(Stolle et al., 1998)	*
	c.			TS/NS	VHL65: Iranian; 1 affected	Familial	VHL Type 1: RCC, RA, CNS HB, Renal & Pancreatic Cysts, Pancreatic Islet Cell Tumor			(Glavac et al., 1996)	*
	c.			TS/NS	Fam 21: 1 affected	Familial	VHL: RCC, CNS HB, Epididymal Cysts			(Hes et al., 2007)	H
	c.			TS/NS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.	491A>G	Gln164Arg	TS/MS	3748	Familial	VHL Type 1			(Zbar, Kishida et al., 1996)	*
	c.			TS/MS	1 family; 1 affected	Familial	Pheo, RA			(Ong et al., 2007)	
	c.			TS/MS	343	Sporadic	Unilateral Pheo			(Eng, 1995)	*
	c.	491G>C	Gln164His	TV/MS	Family with 2 affected; #9 and #10	Familial	#9: Abdominal paraganglioma #10: Unilateral Pheo			(Bauters et al., 2003)	H
	c.	492G>T	Gln164His	TV/MS	T185	Sporadic	RCC			(Gallou, Joly et al., 1999)	*
165	c.	493insTTG	Stop at 173	InF Ins	T37	Sporadic	RCC			(Gallou, Joly et al., 1999)	*
	c.	494T>A	Val165Asp	TV/MS	1329	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	*
	c.	494T>G	Val165Gly							(Baker et al., 2000)	H
	c.	495insTT	Frameshift	Ins/FS	47	Sporadic	RCC			(Suzuki et al., 1997)	*
166	c.	496G>T	Val166Phe	TV/MS	V49a: 1 affected, 8 ASx carriers	Familial	VHL Type 2			(Olschwang et al., 1998)	*
	c.			TV/MS	4533	Familial	VHL Type 2			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TV/MS	363	Sporadic Germline	Bilateral Pheo			Utrecht, This report	
	c.			TV/MS	50	Familial	VHL Type 2			(Maher et al., 1996)	*
	c.			TV/MS	25 member Jewish Kurdish Family	Familial	VHL Type 2A: (All pheos were bilateral except in II2 and II10) II4: Pheo, RA II7: Pheo, Cerebellar HB, carotid body chemodectoma VHL Type 2C: I1, II2: Pheo II9: Pheo, abdominal paraganglioma (This patient had locally recurring, malignant disease) II5, II10: Pheo, died from disease complications Presymptomatic: III1,3,7,12: <5yo gene carriers			(Gross et al., 1996)	*
	c.	497T>G	Val166Gly	TV	944	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.	497T>A	Val166Asp	TV/MS	4480	Familial	VHL Type 1			(Chen et al., 1995) (Zbar,	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
										Kishida et al., 1996)	
	c.			TV/MS						(Gallou et al., 1999)	H
	c.	497T>C	Val166Ala	TS/MS	Fam 14: 1 affected	Sporadic Germline/ De novo	VHL Type 2C: 15yo Female with Bilateral Pheo			(Hes et al., 2007)	H
	c.	497_501delTCCGG	Stop at 171	Del/FS	C34	Sporadic	RCC			(Foster et al., 1994a)	*
	c.	498C>G	Val166Phe	TV/MS	1 family	Familial	VHL Type 2			(Ong et al., 2007)	
	c.	498delC	Stop at 169	Del/FS	162	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.			Del/FS	307	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
167	c.	499C>G	Arg167Gly	TV/MS	137	Familial	VHL Type 2B : RCC and Pheo			(Crossey et al., 1994)	*
	c.			TV/MS	Same family: Patient 5 and 6	Familial	#5: Bilateral Pheo #6: Unilateral Pheo			(Bauters et al., 2003)	H
	c.			TV/MS	1	Familial	Bilateral Pheo			(Bauters et al., 2003)	H
	c.			TV/MS	7	Familial	Bilateral Pheo			(Bauters et al., 2003)	H
	c.			TV/MS	13	Familial	Bilateral Pheo			(Bauters et al., 2003)	H
	c.			TV/MS	14	Familial	Bilateral Pheo			(Bauters et al., 2003)	H
	c.	499C>T	Arg167Trp	TS/MS	97	Familial	VHL Type 1			(Stolle, Glenn et al., 1998)	
	c.			TS/MS	152	Familial	VHL Type 1			(Stolle, Glenn et al., 1998)	
	c.			TS/MS	181	Sporadic Germline	CNS HAB, liver cysts, eye abnormalities			Utrecht, This report	
	c.			TS/MS	70	Familial	VHL Type 1			(Crossey et al., 1994)	*
	c.			TS/MS	3699	Familial	VHL Type 1			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	
	c.			TS/MS	102	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	
	c.			TS/MS	106	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	
	c.			TS/MS	153	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	
	c.			TS/MS	202	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	
	c.			TS/MS	47	Familial	VHL Type 2			(Stolle, Glenn et al., 1998) Previously reported by (Chen et al., 1995) or (Zbar et al., 1996)	
	c.			TS/MS	109	Familial	VHL Type 2			(Stolle, Glenn et al., 1998) Previously reported by (Chen et al., 1995) or (Zbar et al., 1996)	
	c.			TS/MS	95	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.			TS/MS	116	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.			TS/MS	4609	Familial	VHL Type 2			(Zbar, Kishida et al., 1996)	*
	c.			TS/MS	30F	Familial	VHL Type 2			(Zbar, Kishida et al., 1996)	*
	c.			TS/MS	1F	Familial	VHL Type 2			(Zbar, Kishida et al., 1996)	*
	c.			TS/MS	1048F	Familial	VHL Type 2			(Zbar, Kishida et al., 1996)	*
	c.			TS/MS	2338	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	3490	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	4477	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	4405	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	Family 15: Brazilian; 2	Familial	VHL Type 2: CNS HB, Pheo			(Rocha et al., 2003)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
					affected						
	c.			TS/MS	Spainish Family – 15 members studied, over 2 Generations	Familial	VHL Type 2: III6: Bialteral Pheo, Cerebellar HB II3: Bilateral Pheo, RA, Likely to have CNS HB II1, II5 (died at a young age): Likely to have CNS HB and definitively had Bilateral Pheo III2, III9: Bilateral Pheo III4: Unilateral Pheo			(Garcia et al., 1997)	
	c.			TS/MS	Family 102; Japanese; 2 affected	Familial	VHL Type 2: Pheo, CNS HB, RA			(Yoshida et al., 2000)	H
	c.			TS/MS	V30	Familial	VHL Type 2A			(Olschwang et al., 1998)	*
	c.			TS/MS	V1: 5 affected; 14Asx carriers	Familial	VHL Type 2B			(Olschwang et al., 1998)	*
	c.			TS/MS	VHL63 – Newfoundland kindred. Initial paper showed 38 affected.	Familial	VHL Type 2B: Pheo (68%), RCC (36%) RA, CNS HB (Cerebellar and Spinal Cord)			(Crossey et al., 1994) (Previously cited in Green et al., 1986)	
	c.			TS/MS	Family 19; Japanese; 1 affected	Familial	VHL Type 2B: RCC, Pheo, CNS HB, RA			(Japan 1995)	
	c.			TS/MS	Family 31; Japanese; 2 affected	Familial	VHL Type 2B: RCC, Pheo, CNS HB			(Japan 1995)	
	c.			TS/MS	Family 66; Japanese; 2 affected	Familial	VHL Type 2B: RCC, Pheo, CNS HB			(Yoshida et al., 2000)	H
	c.			TS/MS	Family 386: Polish	Familial	VHL Type 2C Mother: bilateral Pheos Son: bilateral Pheo Son: unilateral Pheo			(Crossey et al., 1995)	
	c.			TS/MS	Family 1	Familial	Pheo Only			(Woodward et al., 1997)Ge	
	c.			TS/MS	Family 2	Familial	Pheo Only			(Woodward et al., 1997)Ge	
	c.			TS/MS	153	Familial	VHL: Pheo phenotype not described			(Maher et al., 1996)	*
	c.			TS/MS	3	Familial	VHL: Pheo phenotype not described			(Whaley, Naglich et al., 1994)	*
	c.			TS/MS	T91	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
	c.			TS/MS	59	Sporadic	RCC			(Suzuki et al., 1997)	*
	c.			TS/MS	1659 Patient also has 241C>T	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.			MS	F34	Germline	RA, Cerebellar HB, Unilateral RCC, Renal & Pancreatic cysts			(Ruiz-Llorente et al., 2004)	H
	c.			MS	F64	Germline	RA, Bilateral Pheo, Pancreatic cysts			(Ruiz-Llorente et al., 2004)	H
	c.			MS	F40	Germline	RA, Bilateral Pheo, RCC			(Ruiz-Llorente et al., 2004)	H
	c.	499ins8-nt	167_Arg167dup	Ins/FS	VA					(Latif et al., 1993)	*
	c.	500G>A	Arg167Gln	TS/MS	V322	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.			TS/MS	14482; Belgian	Inconclusive wheter germline de	VHL, specifics unknown			Rotterdam, This report	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
						novo					
	c.			TS/MS	32165, Turkish family	Familial	Bilateral Pheo, CNS HB			Rotterdam, This report	
	c.			TS/MS	152	Familial	VHL Type 1			(Crossey et al., 1994)	
	c.			TS/MS	OYO	Familial	VHL Type 1			(Kishida, Stackhouse et al., 1995; Zbar, Kishida et al., 1996)	
	c.			TS/MS	2012F	Familial	VHL Type 1			(Zbar, Kishida et al., 1996)	*
	c.			TS/MS	Mol-D	Familial	VHL Type 1			(Zbar, Kishida et al., 1996)	*
	c.			TS/MS	Family 5: Japanese; 2 affected	Familial	VHL Type 1: RCC, CNS HB, RA			(Japan 1995)	*
	c.			TS/MS	Fam 17: 2 patients	Familial	VHL: RCC, CNS HB, RA			(Hes et al., 2007)	H
	c.			TS/MS	42	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	*
	c.			TS/MS	44	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	*
	c.			TS/MS	105	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	*
	c.			TS/MS	100	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	*
	c.			TS/MS	88	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	*
	c.			TS/MS	135	Familial	VHL Type 2			(Stolle, Glenn et al., 1998)	*
	c.			TS/MS	4421	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	33	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.			TS/MS	65	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.			TS/MS	72	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.			TS/MS	121	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.			TS/MS	3718	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	3767	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	3493	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	3731	Familial	VHL Type 2			(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	30	Familial	VHL Type 2			(Zbar, Kishida et al., 1996)	*
	c.			TS/MS	1 Case	Familial	VHL Type 2			(Neumann et al., 2002)	
	c.			TS/MS	Family 16: Brazilian; 4 affected	Familial	VHL Type 2: Pheo, CNS HB			(Rocha et al., 2003)	H
	c.			TS/MS	Family 17: Polish; 1 affected	Familial	VHL Type 2: Pheo, RA			(Cybulski et al., 2002)	H
	c.			TS/MS	Family 18: Polish; 8 affected	Familial	VHL Type 2: Pheo, RA, CNS HB			(Cybulski et al., 2002)	H
	c.			TS/MS	8	Familial	VHL Type 2: Pheo and Paraganglioma			(Bauters et al., 2003)	H
	c.			TS/MS	Family 77: Japanese; 3 affected	Familial	VHL Type 2: Pheo, CNS HB, RA, Pancreatic cysts or tumor			(Yoshida et al., 2000)	H
	c.			TS/MS	Family 79: Japanese; 1 affected	Familial	VHL Type 2: Pheo, RA			(Yoshida et al., 2000)	H
	c.			TS/MS	V36	Familial	VHL Type 2B			(Olschwang et al., 1998)	*
	c.			TS/MS	V262	Familial	VHL Type 2B			(Olschwang et al., 1998)	*
	c.			TS/MS	Fam 16: 4 patients	Familial	VHL Type 2: Pheo, CNS HB, RA, One patient with RCC			(Hes et al., 2007)	H

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
	c.			TS/MS	VHL43: German; 5 affected	Familial	VHL Type 2B			(Glavac et al., 1996)	*
	c.			TS/MS	Japanese Family	Familial	VHL Type 2B: RCC, Bilateral Pheo, RA, CNS HB			(Wu et al., 2000)	*
	c.			TS/MS	Fam 15: 5 patients	Familial	VHL: RCC, CNS HB, RA, Renal & Pancreatic cysts, One patient with Pheo			(Hes et al., 2007)	H
	c.			TS/MS	5	Familial	VHL: Phenotype not described			(Whaley, Naglich et al., 1994)	*
	c.			TS/MS	G31	Sporadic	RCC			(Foster et al., 1994a)	*
	c.			TS/MS	1658 Patient also has 241C>T	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.			TS/MS	1672 Patient also has 582G>T	Sporadic	RCC after trichloroethylene exposure			(Brauch et al., 1999)	*
	c.		Arg167Gln	MS	F8	Germline	Multiple RA			(Ruiz-Llorente et al., 2004)	H
	c.			MS	F18	Germline	RA, Cerebellar HB, Pancreatic cysts			(Ruiz-Llorente et al., 2004)	H
	c.			MS	F56	Germline	RA, Cerebellar HB, Renal cysts			(Ruiz-Llorente et al., 2004)	H
	c.			MS	F71	Germline	Unilateral Pheo, RA, Cerebellar HB			(Ruiz-Llorente et al., 2004)	H
	c.	501 ins8-nt	Frameshift	Ins/FS	VA	Familial	VHL: Phenotype not described			(Latif et al., 1993)	
	c.	501del G and 437del1-nt	Stop at 169 & 158	Del & Del/FS	306	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
	c.			Del & Del/FS	1600	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005)	
168	c.	502insTTGTTCGT	Stop at 172	Ins/FS	3003	Familial	VHL Type 1			(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.	502_511del	Stop at 198	Del/FS	UMRC6	Sporadic	RCC			(Latif et al., 1993)	*
	c.	503delG	Stop at 169	Del/FS	Family 63: Japanese; 3 affected	Familial	VHL Type 1: RCC, CNS HB; Pancreatic cysts or tumor			(Yoshida et al., 2000)	H
	c.	504_509del	In-Frame Del	InF Del	372	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
	c.	504del8-nt	Frameshift	Del/FS	UMRC6	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
169	c.	506T>C	Leu169Pro	TS/MS	1 family; 4 affected	Familial	2 patients with RCC, 3 with RA			(Ong et al., 2007)	*
	c.			TS/MS	1	Sporadic	RCC			(Suzuki et al., 1997)	
	c.			TS/MS	Patient C	Sporadic	RCC: High exposure to trichloroethylene, as well as exposure to chlorinated solvents, cutting oils, lead, ionizing radiation, asbestos, welding fumes, and is a smoker			(Charbotel et. al. 2007)	
	c.			TS/MS	334	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
170	c.	508G>T	Val170Phe	TV/MS	26	Familial	VHL Type 2			(Crossey et al., 1994)	*
	c.	509delT	Stop at 201	Del/FS	165	Sporadic	RCC			(Shuin et al., 1994a)	*
	c.	509T>C	Val170Gly	TS/MS	1 family; 4 affected	Familial	1 patient with RCC, 1 with Pheo, 3 with RA			(Ong et al., 2007)	
	c.	509T>A	Val170Asp	TV/MS	Family E	Familial	VHL Types 1			(Wittebol-Post et. al.,	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
							I1:RCC II2, III6: CNS HB III8: Bilateral RCC III11: RCC, CNS HB III12: RA, Bilateral RCC, CNS HB III13: RA VHL Type 2 II3: Pheo, Bilateral RCC, RA, CNS HB, Cysts in Pancreas, Adrenals, & Cerebellum II4: Pheo, RCC, CNS HB II5: Bilateral Pheo, Unilateral RCC, CNS HB II7: Pheo, CNS HB, Pancreatic & Adrenal cysts III4: Bilateral Pheo, RCC, RA, CNS HB, Pancreatic & Liver cysts III7: Bilateral Pheo, RA III10: Pheo, Bilateral RCC, RA, CNS HB			1998)	
	c.			TV/MS	Fam 18: 14 patients	Familial	VHL Type 2B: Pheo, RCC, CNS HB, RA, Renal & Pancreatic cysts			(Hes et al., 2007)	H
	c.			TV/MS	R-D	Familial	VHL Type 2			(Zbar, Kishida et al., 1996)	*
	c.			TV/MS	77	Familial	VHL: Phenotype not described			(Maher et al., 1996)	*
	c.			TV/MS	Kind deRu					(Kishida, Stackhouse et al., 1995)	
	c.			TV/MS	Kind deR					(Kishida, Stackhouse et al., 1995)	*
	c.	509T>G	Val170Gly	TV/MS	4397F					(Kishida, Stackhouse et al., 1995)	*
	c.			TV/MS	V81a	Familial	VHL Type 1			(Olschwang et al., 1998)	*
	c.	510insA	Lys171Gln Stop at 173	Ins/FS	C16	Sporadic	RCC			(Foster et al., 1994a)	*
171	c.	512_516delAGCCT	Lys171Arg Stop at 231	Del/FS	345	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
	c.	513G>C	Lys171Asn	TV/MS	A109	Sporadic	RCC			(Lemm, Lingott et al., 1999)	*
172	c.	514delC	Pro172Leu Stop at 201	Del/FS	8	Sporadic	Cerebellar HB with two recurrent tumors			(Oberstrass et al., 1996)	*
	c.	516delT	Stop at 201	Del/FS	Family 105: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, Pancreatic cysts or tumor			(Yoshida et al., 2000)	H
173	c.	517G>T	Glu173X	TV/NS	VHL-4	Familial	CNS HB, RA, multiple pheos, renal cysts, Pancreatic cysts or tumor			(Mandich et al., 1998)	H
174	c.	520delA	Asn174Ile Stop at 201	Del/FS	2684	Sporadic	RCC			(Bailly et al., 1995)	*
175	c.	523delT	Stop at 201	Del/FS	568	Sporadic	RCC			(van Houwelingen, van Dijk et al., 2005),	
	c.			Del/FS	UOK118g	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.			Del/FS	3	Sporadic	RCC		(Suzuki et al., 1997)	*
	c.	523T>G	Tyr175Asp	TV/MS	7	Familial	VHL Type 1		(Stolle, Glenn et al., 1998)	*
	c.	523A>G	Tyr175Cys	TS/MS	Patient 6; Portuguese	Familial	Heterozygous; 18yo female with polycythemia and Ataxia telangiectasia.		(Bento et al., 2005)	
	c.	524delA	Stop at 201	Del/FS	UMRC5	Sporadic	RCC		(Latif et al., 1993) (Gnarra, Tory et al., 1994)	*
	c.			Del/FS	UOK118	Sporadic	RCC		(Latif et al., 1993)	*
	c.	525C>A	Tyr175X	TV/NS	251	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.			TV/NS	1170	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005),	*
	c.	525C>G	Tyr175X	TV/NS	V63a	Familial	VHL Type 1		(Olschwang et al., 1998)	*
	c.			TV/NS	VHL 103	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.			TV/NS	2060				(Kishida, Stackhouse et al., 1995)	*
	c.	525delC	Frameshift	Del/FS	1 family; 2 affected	Familial	1 patient with RA, 1 with CNS HB		(Ong et al., 2007)	
	c.	525_529delCAGGA	Stop at 177	Del/FS	T42	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	525_532del8-nt	Frameshift	Del/FS	1314	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005),	
	c.		Tyr175Cys	MS	F15	Familial	Unitlateral Pheo (Family history of pheochromocytomas)		(Ruiz-Llorente et al., 2004)	H
	c.		Tyr175Asn	MS	F11	Familial	VHL Type 2: Multiple RA, Bilateral Pheo		(Ruiz-Llorente et al., 2004)	H
176	c.	526A>T	Arg176Trp	TV/MS	T211	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	526delA	Stop at 201	Del/FS	3624	Familial	VHL Type 1		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			Del/FS	1 family	Familial	VHL Type 1: 1 with RCC		(Ong et al., 2007)	
	c.			Del/FS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			Del/FS	115	Familial	VHL Type 2		(Stolle, Glenn et al., 1998) Previously reported by (Chen et al., 1995) or (Zbar et al., 1996)	
	c.	528delG	Stop at 217	Del/FS	T29	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.			Del/FS	1 family; 7 affected	Familial	3 patients with RCC, 3 with CNS HB		(Ong et al., 2007)	
	c.			Del/FS	54	Familial	VHL Type 1		(Crossey et al., 1994)	*
177	c.	529del A	Stop at 201	Del/FS	1297	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	529ins 1-nt	Frameshift	Ins/FS	787	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	529A>T	Arg177X	TV/NS	Caki-2	Sporadic	RCC		(Whaley, Naglich et al., 1994)	*
	c.			TV/NS	36	Familial	VHL Type 1		(Maher et al., 1996)	*
	c.			TV/NS	1 family; 1 affected	Familial	RCC, RA, CNS HB		(Ong et al., 2007)	
	c.			TV/NS	37	Familial	VHL Type 2		(Maher et al., 1996)	*
	c.	531ins18-nt CTGAGAGTAAAGCCT GAA	Arg177_Leu178ins6AA	InF Ins	V31: 3 affected	Familial	VHL Type 1		(Olschwang et al., 1998)	*
178	c.	532_540del	Leu178_Ile180del	Del/FS	T120	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	533ins2-nt	Frameshift	Ins/FS	G74	Sporadic	RCC		(Foster et al., 1994a)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.	533T>A	Leu178Gln	TV/MS	VHL29: German; 2 affected	Familial	VHL Type 2A: Pheo, RA, CNS HB		(Glavac et al., 1996)	*
	c.			TV/MS	Four generation Jewish-Yemenite family in Israel	Familial	VHL Type 2A – Pheo and HB (one patient also has Hodgkin's Disease that had allelic 3p loss in the tumor)		(Jakobovitz-Picard et al., 1999)	*
	c.	533T>C	Leu178Pro	TS/MS	3314	Familial	VHL Type 1		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	4419	Familial	VHL Type 1		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	4403	Familial	VHL Type 1		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	44	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			TS/MS	Family 34: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, RA		(Japan, 1995)	*
	c.			TS/MS	1 family; 3 affected	Familial	2 patients with RCC, 3 with RA, 3 with CNS HB		(Ong et al., 2007)	
	c.			TS/MS	3786	Familial	VHL Type 2		(Chen et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.	533T>G	Leu178Arg	TS/MS	1 family; 1 affected	Familial	RA, CNS HB		(Ong et al., 2007)	
	c.			TV/MS		Familial	VHL: Ocular HB, The rest of the VHL pheonotype was not discussed		(Webster et al., 1999)	*
179	c.	535delG	Asp179Thr Stop at 201	Del/FS	2	Sporadic	RCC		(Suzuki et al., 1997)	*
	c.			Del/FS	17	Sporadic	RCC		(Suzuki et al., 1997)	
	c.	535G>A	D179N	TS/MS	972574	Sporadic	Colorectal carcinoma		(Kuwai et al., 2004)	
	c.	536delA	Asp179Ala Stop at 201	Del/FS	G5	Sporadic	RCC		(Foster et al., 1994a)	*
	c.	%36A>C & 545G>A	Asp178Ala & Arg182Lys	TV/MS	972575	Sporadic	Colorectal Carcinoma		(Kuwai et al., 2004)	
180	c.	538A>G	Ile180Val	TS/MS	79	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			TS/MS	1 family; 1 affected	Familial	VHL: RCC		(Ong et al., 2007)	
	c.	539T>A	Ile180Asn	TV/MS	A-704	Sporadic	RCC		(Whaley, Naglich et al., 1994)	*
	c.			TV/MS	769-P	Sporadic	RCC		(Whaley, Naglich et al., 1994)	
	c.	540-546del	Stop at 200	Del/FS	T191	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.	540delC	Ile180Met Stop at 201	Del/FS	T89	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.	540_543delCGTC	Val181Gly Stop at 200	Del/FS	25	Familial	VHL Type 1		(Stolle, Glenn et al., 1998)	*
181	c.	540_544CGTCA>T	? Homozygous	FS	982002	Sporadic	RCC		(Banks et al., 2006)	
182	c.	545G>A & 536A>C	Arg182Lys & Asp178Ala	TS/MS	972575	Sporadic	Colorectal Carcinoma		(Kuwai et al., 2004)	
183	c.	547del T	Stop at 201	Del/FS	11	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	548C>A	Ser183X	TV/NS	UOK151g	Sporadic	RCC		(Gnarra, Tory et al., 1994) (Lati(Kuwai et al., 2004)f et al., 1993)	*
	c.			TV/NS	T154	Sporadic	RCC		(Gallou, Joly et al., 1999)	*
	c.			TV/NS	6	Familial	VHL Type 1		(Kishida, Stackhouse et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TV/NS	VHL 6 – Italian; 3 affected	Familial	VHL Type 1: RCC, RA, CNS HB, Renal & Pancreatic Cysts		(Glavac et al., 1996)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
	c.			TV/NS	Fam 22: 1 affected	Sporadic Germline /Likely De novo	VHL: CNS HB, RA		(Hes et al., 2007)	H
	c.			TV/NS	22	Familial	VHL: Phenotype not described		(Whaley, Naglich et al., 1994)	*
	c.	548delC	Ser183Cys Stop at 201	Del/FS	9	Familial	VHL Type 1 – Cerebellar HB Only		(Oberstrass et al., 1996)	*
	c.			Del/FS	Swedish Family: 41 members; 3 affected; 2 ASx carriers	Familial			(Wiklund et al., 1995)	*
184	c.	551T>C	Leu184Pro	TS/MS	3708	Familial	VHL Type 1		(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	14	Familial	VHL Type 1		(Stolle, Glenn et al., 1998)	
	c.			TS/MS	3087	Sporadic	RCC		(Bailly et al., 1995)	*
	c.			TS/MS	347	Sporadic	RCC		(Gallou, Longuemaux et al., 2001)	*
	c.		Leu184Pro	MS	F43	Germline	RA, Spinal and Cerebellar HB, Renal & Pancreatic cysts		(Ruiz-Llorente et al., 2004)	H
	c.	551T>G	Leu184Arg	TV/MS	11	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.	551T>A	Leu184His	TV/MS	463	Familial	RCC		(Gallou et al., 2004)	H
185	c.	553delT	Stop at 201	Del/FS	172	Sporadic	RCC		(Shuin et al., 1994b)	*
	c.	554delA	Stop at 201	Del/FS	11	Sporadic	RCC		(Suzuki et al., 1997)	*
	c.	555C>G	Tyr185X	TV/NS	12	Sporadic	RCC		(Whaley, Naglich et al., 1994)	*
	c.			TV/NS	82	Familial	VHL Type 1		(Crossey et al., 1994)	
	c.			TV/NS	88	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			TV/NS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TV/NS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TV/NS	1 family	Familial	VHL Type 1		(Ong et al., 2007)	
	c.			TV/NS	50	Familial	VHL Type 1		(Stolle, Glenn et al., 1998)	*
186	c.	556G>A	Glu186Lys	TS/MS	3736	Familial	VHL Type 1		(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.			TS/MS	161	Familial	VHL Type 1		(Chen, Kishida et al., 1995; Stolle, Glenn et al., 1998)	*
	c.	556G>T	Glu186X	TV/NS	78	Familial	VHL Type 1		(Stolle, Glenn et al., 1998)	*
	c.			TV/NS	3770	Familial	VHL Type 1		(Chen, Kishida et al., 1995; Zbar, Kishida et al., 1996)	*
	c.	558_560delAGA	Glu186del	InF del	113	Familial	VHL Type 1		(Maher et al., 1996)	*
187	c.	559insC	Glu186_Asp187ins	Ins/FS	158	Sporadic	RCC		(Shuin et al., 1994b)	*
	c.	559_560del2 and 563delT	Stop at 201	Del	506	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	559_560del2 and 561_563del3	Frameshift	Del & Del/FS	496	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			Del & Del/FS	497	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	561_564del4	Frameshift	Del/FS	1001	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
188	c.	562C>G	Leu188Val	TV/MS	VHL 37: German; 6 affected	Familial	VHL Type 2 : Pheo (some extraadrenal)		(Glavac et al., 1996; Neumann et al., 1995)	*
	c.			TV/MS	VHL 38 – German;	Familial	VHL Type 2: Pheo (some		(Glavac et al., 1996)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
					3 affected		extraadrenal)			
	c.			TV/MS	1 Case	Familial	VHL Type 2		(Neumann et al., 2002)	
	c.			TV/MS	VHL Family with at least 7 affected	Familial	VHL Type 2C I1, II2, II4, II5: Bilateral adrenal Pheo I2, III1: Unilateral adrenal Pheo II1: died from a Cerebral Hemorrhage one day after childbirth with Sx of a hypertensive crisis due to adrenal and extraadrenal Pheo		(Ritter et al., 1996)	*
	c.			TV/MS	1695 Patient also has 241 C>T, 357 C>G, and 486 C>G	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.		Leu188Val and Pro81Ser (241C>T)	MS	43	Familial	VHL Type 1		(Stolle et al., 1998)	*
	c.			MS	German family; 9 affected	Familial	VHL Type 2C		(Weirich et al., 2002)	
	c.	562C>G/235C>T	Leu188Val/Arg79Cys	TS/MS& TV/MS	Patient 1	Familial	Compound Heterozygous; 33yo female with high erythropoeitin but is asymptomatic.		(Bento et al., 2005)	
	c.	562C>G/598C>T	Leu188Val/Arg200Trp	TS/MS& TV/MS	Patient 5; White American	Familial	13yo female with polycythemia. Maternal 598C>T and unknown 562C>G inheritance.		(Pastore et al., 2003b)	
	c.	562C>G/598C>T	Leu188Val/Arg200Trp	TS/MS& TV/MS	Patient 6; White American	Familial	15yo male with polycythemia. Unknown inheritance.		(Pastore et al., 2003b)	
	c.	562delC	Frameshift	Del/FS	1 family; 2 affected	Familial	2 patients with RCC, 1 with RA, 1 with CNS HB		(Ong et al., 2007)	
	c.	563delT	Leu188Arg Stop at 201	Del/FS	141	Familial	VHL Type 1		(Maher et al., 1996)	*
	c.	563delT and 559_560del2	Stop at 201	Del	506	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	563T>A	Leu188Gln	TV/MS	1	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.			TV/MS	3513	Familial	VHL Type 1		(Zbar, Kishida et al., 1996)	*
	c.	563ins20-nt	Frameshift	Ins/FS	Family 7: Japanese; 4 affected	Familial	VHL Type 2: Pheo, RA, CNS HB Pancreatic cysts or tumor		(Japan 1995; Kishida, Stackhouse et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.	563T>C	Leu188Pro	TS/MS	V269	Familial	VHL Type 1		(Olschwang et al., 1998)	*
	c.			TS/MS	73	Familial	VHL Type 2		(Stolle, Glenn et al., 1998)	
189	c.	565delG	Glu189Lys Stop at 201	Del/FS	45	Sporadic	RCC		(Suzuki et al., 1997)	*
	c.			Del/FS	Fam 27: 1 affected	Familial	VHL: CNS HB, Renal Cysts		(Hes et al., 2007)	H
	c.	566_569del4	Frameshift	Del/FS	369	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	567delA	Stop at 201	Del/FS	1004	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
190	c.	568delG and 205delCGCG	Stop at 201	Del/FS	1677	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	570_574delCCACC	His191LysStop at 231	Del/FS	425	Sporadic	RCC		(Gallou, Longuemaux et al.,	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites	Reference	DB
									2001)	
191	c.	571delC	His191Thr Stop at 201	Del/FS	2127				(Kishida, Stackhouse et al., 1995)	*
	c.			Del/FS	V51a	Familial	VHL Type 2B		(Olschwang et al., 1998)	
	c.	571C>G/571C>G	His191Asp	TV/MS	Patient 7; Croatian	Familial	Homozygous; 17yo male with polycythemia		(Pastore et al., 2003b)	
	c.	573_577del5	Frameshift	Del/FS	2086	Sporadic	RCC		(van Houwelingen, van Dijk et al., 2005)	
	c.	573delC	Pro192Gln Stop at 201	Del/FS	51F	Familial	VHL Type 2		(Zbar, Kishida et al., 1996)	*
	c.	574C>T/598C>T	Pro192Ser/Arg200Trp	TS/MS	Patient 4; White American	Familial	10yo boy with polycythemia. Maternal:598C>T and Paternal: 574C>T		(Pastore et al., 2003b)	
193	c.	578delA	Asn193Met Stop at 201	Del/FS	C40	Sporadic	RCC		(Foster et al., 1994a)	*
	c.	579_580delTG	Val194Ala Stop at 232	Del/FS	4	Sporadic	RCC		(Whaley, Naglich et al., 1994)	*
	c.			Del/FS	VHL-3	Familial	VHL Type 1:RCC, RA, CNS HB		(Ciotti et al., 2009)	
194	c.	581_582delTG	Val194Ala Stop at 232	Del/FS	G11	Sporadic	RCC		(Foster et al., 1994a)	*
	c.			Del/FS	VHL 79	Familial	VHL: Phenotype not described		(Klein et al., 2001)	H
	c.	582G>T and 500G>A	Val194Val & Arg167Gln	TV & TS/MS	1672	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
195	c.	583C>T	Gln195X	TS/NS	21	Familial	VHL Type 1		(Crossey et al., 1994)	*
	c.			TS/NS	VHL56: German; 2 affected	Familial	VHL Type 1: RA, CNS HB		(Glavac et al., 1996)	*
	c.			TS/NS	Fam 23: 2 affected	Familial	VHL Type 2: Pheo, CNS HB, RA		(Hes et al., 2007)	H
	c.			TV/NS	1 family	Familial	VHL Type 2, some with RCC		(Ong et al., 2007)	
	c.			TS/NS	1 Case	Familial	VHL Type 2		(Neumann et al., 2002)	
	c.	584_585delAG	Frameshift	Del/FS	1 family; 1 affected	Familial	RCC, RA, CNS HB		(Ong et al., 2007)	
196	c.	586 A>T	Lys196X	TV/NS	Patient 3; Korean	Familial	22yo female with CNS HB		(Cho et al., 2009)	
197	c.	589delG	Frameshift	Del/FS	1 family; 3 affected	Familial	1 patient with RCC, 1 with RA		(Ong et al., 2007)	
198	c.	592_607del	Leu198Arg Stop at 209	Del/FS	T34	Sporadic	RCC		(Gnarra, Tory et al., 1994)	*
	c.	592del2-nt	Frameshift	Del/FS	Family 67: Japanese; 1 affected	Familial	VHL Type 1: RCC, CNS HB, RA, Pancreatic cysts or tumor		(Yoshida et al., 2000)	H
	c.	593T>A	Leu198Gln	TV/MS	1 Case	Familial	VHL Type 2		(Neumann et al., 2002)	
	c.	593T>G	Leu198Arg	TV/MS	7	Sporadic	RCC		(Whaley, Naglich et al., 1994)	*
199										
200	c.	598C>T	Arg200Trp	TS/MS	1000F: 3 affected, 4 ASx carriers	Familial	VHL Type 1		(Kishida, Stackhouse et al., 1995) (Zbar, Kishida et al., 1996)	*
	c.			TS/MS	1685 Patient also has 357C>T	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.			TS/MS	1693 Patient also has 241C>T, 464-1G>C	Sporadic	RCC after trichloroethylene exposure		(Brauch et al., 1999)	*
	c.	598C>T/388G>C	Arg200Trp/Val130Leu	TS/MS &	Patient 8	Familial	5yo male with polycythemia		(Pastore et al., 2003a)	

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
				TV/MS			who inherited 598C>T from his mother and the 388G>C from his father.				
	c.	598C>T/562C>G	Arg200Trp/Leu188Val	TS/MS& TV/MS	Patient 6; White American	Familial	15yo male with polycythemia. Unknown inheritance.			(Pastore et al., 2003b)	
	c.	598C>T/562C>G	Arg200Trp/Leu188Val	TS/MS& TV/MS	Patient 5; White American	Familial	13yo female with polycythemia. Maternal 598C>T and unknown 562C>G inheritance.			(Pastore et al., 2003b)	H
	c.	598C>T/574C>T	Arg200Trp/Pro192Ser	TS/MS	Patient 4; White American	Familial	10yo boy with polycythemia. Maternal:598C>T and Paternal: 574C>T			(Pastore et al., 2003b)	
	c.	598C>T/598C>T	Arg200Trp	TS/MS	Hundreds in Chuvashia, Russia	Familial	Congenital Chuvash Polycythemia			(Ang et al., 2002), (Sergeyeva et al., 1997)	
	c.			TS/MS	Patient 2 & 3 are white American siblings	Familial	38yo and 41yo males and with congenital polycythemia and thrombosis complicaitons.			(Bento et al., 2005)	
	c.			TS/MS	Patient 4	Familial	17yo female with congenital polycythemia and thrombosis complicaitons.			(Bento et al., 2005)	
	c.			TS/MS	37784	Familial,	Congenital polycythemia			Rotterdam, this report	
	c.			TS/MS	Patient 6; Russian	Germline	3yo female with polycythemia and an unknown family history			(Pastore et al., 2003a)	
	c.			TS/MS	Patient 1 & 2; Danish Siblings	Familial	14yo and 12yo male siblings with polycythemia.			(Pastore et al., 2003b)	
	c.			TS/MS	Patient 3; White American	Familial	19yo male with polycythemia at 3 days old, thrombosis at 15yo, DVT with pulmonary embolism at 19yo.			(Pastore et al., 2003b)	
	c.			TS/MS	Bangladesh Family	Familial	19yo male with polycythemia at 3 days old, thrombosis at 15yo, DVT with pulmonary embolism at 19yo.			(Pastore et al., 2003b)	
201											
202	c.	606insA	Frameshift	Ins/FS	1 family; 1 affected	Familial	CNS HB			(Ong et al., 2007)	
203	c.	607delC	Gln203Arg Stop at 214	Del/FS	UOK154fg	Sporadic	RCC			(Gnarra, Tory et al., 1994)	*
204	c.	610G>A	Glu204Lys	TS/MS	3GT	Sporadic	RCC			(Ma et al., 2001)	
	c.	611A>G	Glu204Gly	TS/MS	972724	Sporadic	RCC			(Schraml et al., 2002)	
	c.	612G>T & 535G>A	Glu204Asp & D179N	TV/MS	972574	Sporadic	Colorectal carcinoma			(Kuwai et al., 2004)	
205	c.	615delC	Stop at 219	Del/FS	290	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	*
	c.	615insAA	Frameshift	Ins/FS	290	Sporadic	RCC				*
206	c.	615_615C>AA	I206fs*10		980489	Sporadic	RCC			(Gallou, Longuemaux et al., 2001)	
207	c.	620C>T	Ala207Val	TS/MS	14	Sporadic	Glial Tumor: Astrocytoma in Right Temporal Lobe			(Kanno et al., 1997)	*
208											
209	c.	625C>T	Gln209X	NS	13GT	Sporadic	RCC			(Ma et al., 2001)	
210	c.	628C>T	Arg210Trp	TS/MS	25	Sporadic	Glial Tumor: Oligoastrocytoma in Left			(Kanno et al., 1997)	*

Codon		Mutation Event (c.DNA)	Predicted Consequence (p.Protein Change)	Mutation Type	Kindred/Case	F	Phenotype	Domains/Binding Sites		Reference	DB
							Frontal Lobe				
211	c.	633G>A	M211I	TS/MS	972740	Sporadic	RCC			(Schraml et al., 2002)	
212											
213	c.	639+10C>G	3'UTR		VHL 80	Familial	VHL: Phenotype not described			(Klein et al., 2001)	H

Additional Mutations without nucleotide numbers (either to ambiguous numbering or lack of information provided in the study article).

Large Deletion, Splicing and Rearrangements	Mutation Description	Kindred/Case	Inheritance	Phenotype	Reference
Mosaic with 47% of cells with complete deletion of one entire allele via FISH	Mosaic loss of one VHL allele	Family 1: II:2	Familial	VHL Type 1: Mosaic with Simple Renal Cysts, CNS HB, and Pancreatic Cysts	(Sgambati 2000)
Complete deletion of one entire allele (and retained one normal allele) of the VHL gene via Southern Blotting	Loss of one VHL allele	Family 1: III:1	Familial (Mother was mosaic, see below)	VHL Type 1: CNS HB and Pancreatic Cysts (Mother was mosaic, see below)	(Sgambati 2000)
Complete Deletion	Complete Deletion	Family 26, 27, 28, 29, 30	Familial	Family 26: 2 affected CNS HB Family 27: 2 affected RA and CSN HB Family 28: 4 affected CSN HB Family 29: 2 affected CNS HB Family 30: 1 affected CNS HB and RA	(Cybulski et al., 2002) (H)
Complete Deletion/Rearrangement	Complete Del	Brazilian Family #20: 6 affected	Familial	VHL Type 1: CNS HB, RCC, Pancreatic Carcinoma	(Rocha et al., 2003) (H)
Deletion 1-?_642+?/	Complete Del	Korean; Patient 10	Familial	44yo female with CNS HB, multiple pancreatic cysts, bilateral renal cysts; Father died of RCC; Sister also has this mutation	(Cho et al., 2009)
Deletion 341-?_642+?	Partial Del	Korean; Patient 6	Germline/ Possible de novo	Patient 6: 29yo female with CNS HB; No Family History of VHL	(Cho et al., 2009)
Deletion 341-?_642+?	Partial Del	Korean; Patient 8	Germline/ Possible de novo	Patient 8: 36yo male with CNS HB, RCC	(Cho et al., 2009)
Deletion 1-?_463+?	Partial Del	Korean Patient 13	Familial	49yo male with RCC and CNS HB	(Cho et al., 2009)
Deletion 464-?_642+?	Partial Del	Korean Patient 14	Germline/ Possible de novo	51yo male with RCC and CNS HB; No Family History of VHL	(Cho et al., 2009)
Partial Deletion/Rearrangement	Partial Del	Brazilian Family #17: 10 affected	Familial	VHL Type 1: RCC, Retinal and CNS HB	(Rocha et al., 2003) (H)
Partial Deletion/Rearrangement	Partial Del	Brazilian Family #18: 5 affected	Familial	VHL Type 1: Pancreatic Cystadenoma, Retinal and CNS HB	(Rocha et al., 2003) (H)
Partial Deletion/Rearrangement	Partial Del	Brazilian Family #19: 3 affected	Familial	VHL Type 1: CNS HB	(Rocha et al., 2003) (H)
Deletion: size not indicated	Partial Del	5, 23, 28, 38, 45, 87,157	Familial	VHL Type 1	(Stolle, Glenn et al., 1998)
Deletion Exon 1	Partial Del	Family 19/S1: Polish; 2 affected	Familial	VHL: RCC, RA, and CNS HB	(Cybulski et al., 2002) (H)
Deletion Exon 1	Partial Del	Family B (15): Dutch; 20 affected	Familial	VHL: RCC, Pancreatic cysts, CNS HB, RA (one patient with ovarian cysts)	(Hes et al., 2000b)
Deletion Exon 1	Partial Del	Family D (51): Belgian; 2 affected	Familial	VHL: Pancreatic cysts, CNS HB, and RA	(Hes et al., 2000b)
Deletion Exon 1	Partial Del	Family E (61): Dutch; 2 affected	Familial	VHL: RA and Neurofibromatosis	(Hes et al., 2000b)
Deletion Exon 1	Partial Del	Fam 34: 2 affected	Familial	VHL: Pheo, RCC, CNS HB, RA	(Hes et al 2007)
Deletion Exon 1	Partial Del	Fam 35: 2 affected	Familial	VHL: RA	(Hes et al 2007)

Deletion Exon 1	Partial Del	Fam 37: 8 affected	Familial	VHL: RCC, CNS HB, RA, Pancreatic cysts	(Hes et al 2007)
Deletion Exon 1	Partial Del	Fam 39: 6 affected	Familial	VHL: RCC, CNS HB, RA, Pancreatic cysts	(Hes et al 2007)
Deletion Exon 1	Partial Del	Fam 40: 1 affected	Familial	VHL: CNS HB, RA, Pancreatic cysts	(Hes et al 2007)
Deletion Exon 1, 2	Partial Del	Family A (2): Turkish; 5 affected	Familial	VHL: RCC, Pancreatic cysts, Renal cysts, CNS and RA	(Hes et al., 2000b)
Deletion Exon 1,2	Partial Del	Fam 38: 3 affected	Familial	VHL: RCC, CNS HB, RA, Renal and Pancreatic cysts	(Hes et al 2007)
Deletion Exon 2	Partial Del	Family 20/S3, 21/S2: Polish descent	Familial	Family 20/S3: 4 affected RA, and CNS HB Family 21/S2: 3 affected RCC, RA, and CNS HB	(Cybulski et al., 2002) (H)
Deletion Exon 2, 3	Partial Del	Family 22/S4; Polish; 1 affected	Familial	VHL: RA	(Cybulski et al., 2002) (H)
Deletion Exon 2,3	Partial Del	Fam 41: 1 affected	Sporadic Germline/ Likely De novo	VHL: RCC, CNS HB, RA, Pancreatic cysts	(Hes et al 2007)
Deletion Exon 2, 3 (11..5kb abnormal band on QSA)	Partial Del	Family 22/S4; Polish; 1 affected	Familial	VHL: RA	(Cybulski et al., 2002) (H)
Deletion Exon 1,2, and 3	Partial Del	Family C (23): Belgian; 5 affected	Familial	VHL: CNS HB, Pancreatic cysts, Renal cysts, and Ovarian cysts	(Hes et al., 2000b)
Deletion Exon 1, 3	Partial Del	Fam 42: 5 affected	Familial	VHL: CNS HB, RA, Renal and Pancreatic cysts	(Hes et al., 2007)
Deletion Exon 1,3	Partial Del	Fam 43: 1 affected	Familial	VHL: RCC, CNS HB, Renal and Pancreatic cysts	(Hes et al 2007)
Deletion Exon 3	Partial Del	Fam 36: 1 affected	Familial	VHL: RCC, CNS HB, RA, Renal and Pancreatic cysts	(Hes et al 2007)
Deletion Exon 3	Partial Del	Family 25; Polish 1 affected	Familial	VHL: RCC, RA, and CNS HB	(Cybulski et al., 2002) (H)
Deletion Exon 3 (8..5kb abnormal band on QSA)	Partial Del	Family 24; Polish 2 affected	Familial	VHL: RCC, RA, and CNS HB	(Cybulski et al., 2002) (H)
Deletion Exon 1	Partial Del	Family:1*, 3,4,5*,6,7,8	Familial	54 Families were represented (see original article for genetic information on other families in this study): Brain HB in 94% Spinal HB in 79.1% Retinal HB in 79.2% RCC in 58.5% Pheochromocytomas in 17.9% Cysts of the epididymides in 52.2% of males No broad ligament cysts in female carriers HSPC300 Gene Deleted: RCC in 2 of 8 (25%) Kidney Cysts in 2 of 9 (22%) Retinal angiomas in 1 of 9 (11%) HSPC300 Gene Retained: RCC in 22 of 33 (67%) Kidney Cysts in 24 of 32 (75%) Retinal angiomas in 37 of 39 (95%)	(Franke et al., 2009)
Deletion Exon 1 + ENST197804	Partial Del	Family: 2*	Familial		(Franke et al., 2009)
Deletion Exon 1, 2	Partial Del	Family: 9*,10,11	Familial		(Franke et al., 2009)
Deletion Exon 2	Partial Del	Family: 12, 13, 14, 15, 16, 17, 18, 19	Familial		(Franke et al., 2009)
Deletion Exon 2, 3	Partial Del	Family: 20, 21*, 22, 23	Familial		(Franke et al., 2009)
Deletion Exon 2, 3 + IRAK2	Partial Del	Family: 24*	Familial		(Franke et al., 2009)
Deletion Exon 3	Partial Del	Family: 25*, 26, 27, 28*, 29*, 30, 31*, 32, 33	Familial		(Franke et al., 2009)
Deletion Exon 3 + IRAK2	Partial Del	Family: 34*, 41*42*	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3	Partial Del	Family: 36*,37, 39, 40	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3 + putatively HSPC300 + ENST197804	Partial Del	Family: 38*	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3 + HSPC300 + ENST197804 + IRAK2 + TATDN2	Partial Del	Family: 45*	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3 + ENST197804	Partial Del	Family: 35*	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3+ ENST197804 + IRAK2	Partial Del	Family: 43*	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3, IRAK2	Partial Del	Family: 44, 46, 47	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3, IRAK2, FANCD2 part	Partial Del	Family: 49	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3, IRAK2, FANCD2	Partial Del	Family: 51, 53, 54	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3, FANCD2 , HSPC300, ENST197804, IRAK2	Partial Del	Family: 48*	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3, FANCD2 , HSPC300, ENST197804, IRAK2, TATDN2	Partial Del	Family: 50*	Familial		(Franke et al., 2009)
Deletion Exon 1, 2, 3, <FANCD2 , HSPC300, ENST197804, IRAK2,	Partial Del	Family: 52*	Familial		(Franke et al., 2009)
LOH 3p25 via genetic markers D3S1110 and D3S656		Case 1	Familial	VHL Type 2B: RCC, Pheo, Cerebellar HB, Pancreatic microcyst adenomas	(Vortmeyer, 1997)
LOH 3p25 via genetic markers D3S192, D3S1110, D3S656		Case 4	Sporadic	Pancreatic microcyst adenomas	(Vortmeyer, 1997)

LOH 3p25 via genetic markers 104/105 (intragenic)		Case 6	Sporadic	Pancreatic microcyst adenomas	(Vortmeyer, 1997)
LOH 3p25 via genetic markers D3S192		Case 7	Sporadic	Pancreatic microcyst adenomas	(Vortmeyer, 1997)
LOH 3p25 via genetic markers D3S192, D3S1110, 104/105 (intragenic)		Case 9	Sporadic	Pancreatic microcyst adenomas	(Vortmeyer, 1997)
LOH 3p25 via genetic markers D3S656		Case 11	Sporadic	Pancreatic microcyst adenomas	(Vortmeyer, 1997)
LOH 3p25 via genetic markers D3S1110		Case 12	Sporadic	Pancreatic microcyst adenomas	(Vortmeyer, 1997)
Deletion at 5' end intron, from -2 to -12, GATAGCACGGT	New splice acceptor site?	136	Sporadic	RCC	(Shuin et al., 1994a)
IVS1+1del5	Splice	V313	Familial	VHL Type 1	(Olschwang et al., 1998)
IVS1-1C>T	Splice	V224	Familial	VHL Type 1	(Olschwang et al., 1998)
IVS1-1C>G	Splice	V268	Familial	VHL Type 1	(Olschwang et al., 1998)
IVS1+1 G>T	Splice	Kuwaiti family of Arabic and Persian decent	Familial	VHL – Phenotype not described; One member clinically diagnosed had this mutation, and three other familiy members had the same mutation	(AlFadhli et al., 2003) (H)
IVS1+1G>A	Splice	V284	Familial	VHL Type 2B	(Olschwang et al., 1998)
IVS1+7G>A	Splice	Brazilian Family #8: 2 affected	Familial	VHL Type 1: CNS HB	(Rocha et al., 2003) (H)
IVS2+1G>A	Splice	Brazilian Family #14: 5 affected	Familial	VHL Type 1: RCC, Pancreatic Cystadenoma, Retinal and CNS HB	(Rocha et al., 2003) (H)
IVS2-95T>A	Splice	Brazilian Family 16		Apparently no effect	(Rocha et al., 2003) (H)
Rearrangement		24, 41, 45, 70, 107, 108, 129, 130, 134, 147, 210	Familial	VHL Type 1	(Stolle, Glenn et al., 1998)
Rearrangement		30, 32, 51, 55, 79, 149, 159	Familial	VHL Type 1	(Stolle, Glenn et al., 1998) Previously reported by (Chen et al., 1995) or (Zbar et al., 1996)
Rearrangement		15, 52	Familial	VHL Type 2	(Stolle, Glenn et al., 1998)
Rearrangement		77, 122, 186	Familial	VHL Type 2	(Stolle, Glenn et al., 1998) Previously reported by (Chen et al., 1995) or (Zbar et al., 1996)
Rearrangement		F22	Germline	Cerebellar HB and Bilateral RCC	(Ruiz-Llorente et al., 2004) (H)
Rearrangement		F28	Germline	Cerebellar HB, Unilateral Pheo, Bilateral RCC, and Renal Cysts	(Ruiz-Llorente et al., 2004) (H)
Rearrangement		F33	Germline	Cerebellar HB, Bilateral RCC, Renal Cysts and Pancreatic Cysts	(Ruiz-Llorente et al., 2004) (H)
Rearrangement		F5	Germline	Cerebellar HB, Unilateral Pheo, Renal and Pancreatic Cysts	(Ruiz-Llorente et al., 2004) (H)
Rearrangement		F27	Germline	Cerebellar HB	(Ruiz-Llorente et al., 2004) (H)
Rearrangement		F45	Germline	Cerebellar HB, RCC, Renal and Pancreatic Cysts	(Ruiz-Llorente et al., 2004) (H)
Rearrangement		F55	Germline	Spinal HB, Bilateral RCC	(Ruiz-Llorente et al., 2004) (H)
Rearrangement		F58	Germline	Cerebellar HB and RCC	(Ruiz-Llorente et al., 2004) (H)

* Apporximately defined deletions

Supp. Table S3. *VHL* nonsense mutations, the stop codon they result in and the following nucleotide. The reference VHL sequence used is NM_000551 (current version, NM_000551.2).

Codon	Mutation c.DNA	Protein Consequece p.Protein	Stop codon	Next nucleotide
46	c.136G>T	Glu46X	TGA	G
54	c.162insT	Met54X	TGA	G
65	c.194C>A	Ser65X	TAG	G
66	c.196delG	Val 66X	TGA	A
68	c.202T>A & c.203C>A	Ser68Thr & Ser68X	CAA	G
	c.203C>A	Ser68X	TAG	C
70	c.208G>T	Glu70X	TAG	C
73	c.217C>T	Gln73X	TAG	G
77	c.231C>A	Cys77X	TGA	A
88	c.263G>A	Trp88X	TAG	C
	c.264G>A	Trp88X	TGA	C
91	c.272T>A & c.273C>A	Phe91X	TAA	G
94	c.280G>T	Glu94X	TAG	C
96	c.286C>T	Gln96X	TAG	C
112	c.336C>A	Tyr112X	TAA	C
113	c.337C>T	Arg113X	TGA	G
117	c.350G>A	Trp117X	TAA	A
	c.351G>A	Trp117 X	TAA	A
129	c.386insAGA	Leu129delinsGln X	TAG	A
132	c.394C>T	Gln132X	TAA	A
134	c.400G>T	Glu134X	TAA	T
135	c.404T>A	Leu135X	TAA	T
144	c.430G>T	Gly144X	TGA	C
145	c.433C>T	Gln145X	TAG	C
156	c.468T>G	Tyr156X	TAG	A
160	c.478G>T	Glu160X	TAG	C

Codon	Mutation c.DNA	Protein Consequece p.Protein	Stop codon	Next nucleotide
161	c.481C>T	Arg161X	TGA	T
164	c.490C>T	Gln164X	TAG	G
173	c.517G>T	Glu173X	TAG	A
175	c.525C>A	Tyr175X	TAA	A
	c.525C>G	Tyr175X	TAG	A
177	c.529A>T	Arg177X	TGA	C
183	c.548C>A	Ser183X	TAG	C
185	c.555C>G	Tyr185X	TAG	G
186	c.556G>T	Glu186X	TAA	G
195	c.583C>T	Gln195X	TAG	A
196	c.586A>T	Lys196X	TAA	G
209	c.625C>T	Gln209X	TAA	C