

Table S1 Summary of *PITX2* intragenic mutations

Nucleotide change	Predicted protein change	Exon	Domain	Reference
c.47-1G>T	Splice site	IVS4		(Maciolek <i>et al.</i> , 2006)
c.47-1G>C	Splice site	IVS4		(Perveen <i>et al.</i> , 2000)
c.114del	p.Q39Kfs*116	5		(Strungaru <i>et al.</i> , 2007)
c.127C>T	p.R43W	5	HD	(Idrees <i>et al.</i> , 2006)
c.134dupA	p.H45Qfs*154	5	HD	(Reis <i>et al.</i> , 2012)
c.134_137del	p.H45Lfs*109	5	HD	(Wang <i>et al.</i> , 2003)
c.137_138del	p.F46Yfs*152	5	HD	(D'haene <i>et al.</i> , 2011)
c.143_144del	p.S48Tfs*150	5	HD	(Reis, <i>et al.</i> , 2012)
c.151_171dup	p.F58Lfs*222	5	HD	(Priston <i>et al.</i> , 2001)
c.160-252_253-734del	p.L55Qfs*46	5-6	HD and OAR	(De La Houssaye <i>et al.</i> , 2006)
c.161T>A	p.L54Q	5	HD	(Semina <i>et al.</i> , 1996)
c.163G>T	p.E55*	5	HD	(Vieira <i>et al.</i> , 2006)
c.172T>C	p.F58L	5	HD	(D'haene, <i>et al.</i> , 2011)
c.174C>G	p.F58L	5	HD	(Vieira, <i>et al.</i> , 2006)
c.175C>T	p.Q59*	5	HD	(D'haene, <i>et al.</i> , 2011)
c.185G>A	P.R62H	5	HD	(Amendt <i>et al.</i> , 2000)
c.191C>G	p.P64R	5	HD	(Weisschuh <i>et al.</i> , 2006)
c.191C>T	p.P64L	5	HD	(Phillips, 2002)
c.198_201delinsTTTCT	p.M66Ifs*133	5	HD	This study
c.199C>T ^a	p.Q67*	5	HD	(Law <i>et al.</i> , 2011)
c.202A>C	p.T68P	5	HD	(Semina, <i>et al.</i> , 1996)
c.206G>A	P.R69H	5	HD	(Kulak <i>et al.</i> , 1998)
c.224G>A	p.W75*	5	HD	(D'haene, <i>et al.</i> , 2011)
c.225G>A	p.W75*	5	HD	(Reis, <i>et al.</i> , 2012)
c.247G>C	p.V83L	5	HD	(Priston, <i>et al.</i> , 2001)
c.250C>T	p.R84W	5	HD	(Alward <i>et al.</i> , 1998)
c.252+5G>C	Splice site	IVS5		(Semina, <i>et al.</i> , 1996)
c.253-11A>G	Splice site	IVS5		(Semina, <i>et al.</i> , 1996)
c.253-2A>T	Splice site	IVS5		(Doward <i>et al.</i> , 1999)
c.253-1G>A	Splice site	IVS5		(Reis, <i>et al.</i> , 2012)
c.257G>C	p.W86S	6	HD	(Reis, <i>et al.</i> , 2012)
c.258G>T	P.W86C	6	HD	(Li <i>et al.</i> , 2008)
c.262A>G	p.K88E	6	HD	(Perveen, <i>et al.</i> , 2000)
c.268C>T	p.R90C	6	HD	(Perveen, <i>et al.</i> , 2000)
c.269G>C	p.R90P	6	HD	(Phillips, 2002)
c.272G>C	p.R91P	6	HD	(Semina, <i>et al.</i> , 1996)
c.282G>A	p.W94*	6	HD	(Amendt, <i>et al.</i> , 2000)
c.286_287del	p.K96Efs*102	6	HD	(Perveen, <i>et al.</i> , 2000)
c.289_290del	p.R97Gfs*101	6	HD	(D'haene, <i>et al.</i> , 2011)
c.301C>T	p.Q101*	6		(D'haene, <i>et al.</i> , 2011)
c.304C>T	p.Q102*	6		(D'haene, <i>et al.</i> , 2011)
c.313C>G	p.L105V	6		(Phillips, 2002)
c.323A>C	p.N108T	6		(Phillips, 2002)
c.356del	p.Q119Rfs*36	6		(Perveen, <i>et al.</i> , 2000)
c.363C>A	p.Y121*	6		(Vieira, <i>et al.</i> , 2006)
c.366del	p.D122Efs*33	6		(Saadi <i>et al.</i> , 2001)
c.398G>A	p.W133*	6		(Semina, <i>et al.</i> , 1996)
c.410G>T	p.G137V	6		(Knestedt <i>et al.</i> , 2006)
c.416del	p.T139Nfs*16	6		(Strungaru, <i>et al.</i> , 2007)
c.500dup	p.P168Tfs*31	6		(Perveen, <i>et al.</i> , 2000)
c.652_653delinsAAG	p.Y218Qfs*11	6		(Perveen, <i>et al.</i> , 2000)
c.662_669dup	p.P224Rfs*18	6		(Vieira, <i>et al.</i> , 2006)
c.679del	p.Y227Mfs*12	6		(Brooks <i>et al.</i> , 2004)
c.690del	p.C231Vfs*8	6		(Borges <i>et al.</i> , 2002)
c.698C>T	p.S233L	6	OAR	(Kelberman <i>et al.</i> , 2011)
c.708_730del	p.S237Afs *48	6	OAR	(Reis, <i>et al.</i> , 2012)

^a Numbering is relative to the coding DNA sequence of *PITX2B* (NM_153426), others are relative to the coding DNA sequence of *PITX2A* (NM_153427.1), where nucleotide +1 is the A of the ATG translation initiation codon. Mutation is named according to the HGVS Mutation Nomenclature Recommendations (<http://www.hgvs.org/mutnomen/recs.html>) provided in the public domain by the Human Genome Variation Society. HD, homeodomain; OAR, OAR domain

References

- Alward, W.L., Semina, E.V., Kalenak, J.W., Heon, E., Sheth, B.P., Stone, E.M., Murray, J.C., 1998. Autosomal dominant iris hypoplasia is caused by a mutation in the rieger syndrome (*rieg/pitx2*) gene, *Am J Ophthalmol.* **125**(1):98-100.
- Amendt, B.A., Semina, E.V., Alward, W.L., 2000. Rieger syndrome: A clinical, molecular, and biochemical analysis, *Cell Mol Life Sci.* **57**(11):1652-1666.
- Borges, A.S., Susanna, R., Jr., Carani, J.C., Betinjane, A.J., Alward, W.L., Stone, E.M., Sheffield, V.C., Nishimura, D.Y., 2002. Genetic analysis of *pitx2* and *foxc1* in rieger syndrome patients from brazil, *J Glaucoma.* **11**(1):51-56.
- Brooks, B.P., Moroi, S.E., Downs, C.A., Wiltse, S., Othman, M.I., Semina, E.V., Richards, J.E., 2004. A novel mutation in the *pitx2* gene in a family with axenfeld-rieger syndrome, *Ophthalmic Genet.* **25**(1):57-62.
- D'haene, B., Meire, F., Claerhout, I., Kroes, H.Y., Plomp, A., Arens, Y.H., De Ravel, T., Casteels, I., De Jaegere, S., Hooghe, S., et al., 2011. Expanding the spectrum of *foxc1* and *pitx2* mutations and copy number changes in patients with anterior segment malformations, *Invest Ophthalmol Vis Sci.* **52**(1):324-333. [doi:10.1167/iovs.10-5309]
- De La Houssaye, G., Bieche, I., Roche, O., Vieira, V., Laurendeau, I., Arbogast, L., Zeghdidi, H., Rapp, P., Halimi, P., Vidaud, M., et al., 2006. Identification of the first intragenic deletion of the *pitx2* gene causing an axenfeld-rieger syndrome: Case report, *BMC Med Genet.* **7**:82. [doi:10.1186/1471-2350-7-82]
- Doward, W., Perveen, R., Lloyd, I.C., Ridgway, A.E., Wilson, L., Black, G.C., 1999. A mutation in the *rieg1* gene associated with peters' anomaly, *J Med Genet.* **36**(2):152-155.
- Idrees, F., Vaideanu, D., Fraser, S.G., Sowden, J.C., Khaw, P.T., 2006. A review of anterior segment dysgeneses, *Surv Ophthalmol.* **51**(3):213-231. [doi:10.1016/j.survophthal.2006.02.006]
- Kelberman, D., Islam, L., Holder, S.E., Jacques, T.S., Calvas, P., Hennekam, R.C., Nischal, K.K., Sowden, J.C., 2011. Digenic inheritance of mutations in *foxc1* and *pitx2*: Correlating transcription factor function and axenfeld-riege disease severity, *Human Mutation.* **32**(10):1144-1152. [doi:10.1002/humu.21550]
- Kniestedt, C., Taralczak, M., Thiel, M.A., Stuermer, J., Baumer, A., Gloor, B.P., 2006. A novel *pitx2* mutation and a polymorphism in a 5-generation family with axenfeld-riege anomaly and coexisting fuchs' endothelial dystrophy, *Ophthalmology.* **113**(10):1791 e1791-1798. [doi:10.1016/j.ophtha.2006.05.017]
- Kulak, S.C., Kozlowski, K., Semina, E.V., Pearce, W.G., Walter, M.A., 1998. Mutation in the *rieg1* gene in patients with iridogoniogenesis syndrome, *Hum Mol Genet.* **7**(7):1113-1117.
- Law, S.K., Sami, M., Piri, N., Coleman, A.L., Caprioli, J., 2011. Asymmetric phenotype of axenfeld-riege anomaly and aniridia associated with a novel *pitx2* mutation, *Mol Vis.* **17**:1231-1238.
- Li, D., Zhu, Q., Lin, H., Zhou, N., Qi, Y., 2008. A novel *pitx2* mutation in a chinese family with axenfeld-riege syndrome, *Mol Vis.* **14**:2205-2210.
- Maciolek, N.L., Alward, W.L., Murray, J.C., Semina, E.V., McNally, M.T., 2006. Analysis of rna splicing defects in *pitx2* mutants supports a gene dosage model of axenfeld-riege syndrome, *BMC Med Genet.* **7**:59. [doi:10.1186/1471-2350-7-59]
- Perveen, R., Lloyd, I.C., Clayton-Smith, J., Churchill, A., Van Heyningen, V., Hanson, I., Taylor, D., McKeown, C., Super, M., Kerr, B., et al., 2000. Phenotypic variability and asymmetry of rieger syndrome associated with *pitx2* mutations, *Invest Ophthalmol Vis Sci.* **41**(9):2456-2460.
- Phillips, J.C., 2002. Four novel mutations in the *pitx2* gene in patients with axenfeld-riege syndrome, *Ophthalmic Res.* **34**(5):324-326. [doi:65602]
- Priston, M., Kozlowski, K., Gill, D., Letwin, K., Buys, Y., Levin, A.V., Walter, M.A., Heon, E., 2001. Functional analyses of two newly identified *pitx2* mutants reveal a novel molecular mechanism for axenfeld-riege syndrome, *Hum Mol Genet.* **10**(16):1631-1638.
- Reis, L.M., Tyler, R.C., Volkmann Kloss, B.A., Schilter, K.F., Levin, A.V., Lowry, R.B., Zwijnenburg, P.J., Stroh, E., Broeckel, U., Murray, J.C., et al., 2012. *Pitx2* and *foxc1* spectrum of mutations in ocular syndromes, *Eur J Hum Genet.* **20**(12):1224-1233. [doi:10.1038/ejhg.2012.80]
- Saadi, I., Semina, E.V., Amendt, B.A., Harris, D.J., Murphy, K.P., Murray, J.C., Russo, A.F., 2001. Identification of a dominant negative homeodomain mutation in rieger syndrome, *J Biol Chem.* **276**(25):23034-23041. [doi:10.1074/jbc.M008592200]
- Semina, E.V., Reiter, R., Leysens, N.J., Alward, W.L., Small, K.W., Datson, N.A., Siegel-Bartelt, J., Bierke-Nelson, D., Bitoun, P., Zabel, B.U., et al., 1996. Cloning and characterization of a novel bicoid-related homeobox transcription factor gene, *rieg*, involved in rieger syndrome, *Nat Genet.* **14**(4):392-399. [doi:10.1038/ng1296-392]
- Strungaru, M.H., Dinu, I., Walter, M.A., 2007. Genotype-phenotype correlations in axenfeld-riege malformation and glaucoma patients with *foxc1* and *pitx2* mutations, *Investigative Ophthalmology & Visual Science.* **48**(1):228-237. [doi:10.1167/iovs.06-0472]
- Vieira, V., David, G., Roche, O., De La Houssaye, G., Boutboul, S., Arbogast, L., Kobetz, A., Orssaud, C., Camand, O., Schorderet, D.F., et al., 2006. Identification of four new *pitx2* gene mutations in patients with axenfeld-riege syndrome, *Mol Vis.* **12**:1448-1460.
- Wang, Y., Zhao, H., Zhang, X., Feng, H., 2003. Novel identification of a four-base-pair deletion mutation in *pitx2* in a rieger syndrome family, *J Dent Res.* **82**(12):1008-1012.
- Weisschuh, N., Dressler, P., Schuettauf, F., Wolf, C., Wissinger, B., Gramer, E., 2006. Novel mutations of *foxc1* and *pitx2* in patients with axenfeld-riege malformations, *Invest Ophthalmol Vis Sci.* **47**(9):3846-3852. [doi:10.1167/iovs.06-0343]