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Supplemental Data

Comprehensive Rare Variant Analysis via Whole-Genome Sequencing to Determine the Molecular Pathology of Inherited Retinal Disease

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Supplemental tables, legends and references

Table S1: Genes that are associated with IRD. The list includes some genes associated with syndromic phenotypes and albinism.
This list has been curated according to previously described criteria.[4] Associated disease information is from OMIM or the cited journal article.

Table S2: Patient and variant information.
Pathogenic variants in 722 patients with inherited retinal disease. Genomic coordinates refer to genome build GRCh37. WES = whole-exome sequencing, WGS = whole-genome sequencing, MEH = Moorfields Eye Hospital (London, UK), GOS = Great Ormond Street Hospital For Children (London, UK), CUH = Cambridge University Hospitals (Cambridge, UK), GUYS = Guy's And St Thomas' NHS Foundation Trust (London, UK), NWL = North West London Hospitals NHS Trust (London, UK), UCL = University College London Hospitals NHS Foundation Trust (London, UK), RP = retinitis pigmentosa, RD = retinal dystrophy, CRD = cone-rod dystrophy, Other = any phenotype with frequency of less than eight patients, CSNB = congenital stationary night blindness, Multiple = more than one phenotype including syndromic cases, LCA = Leber congenital amaurosis, FEVR = Familial exudative vitreoretinopathy.

Table S3: Supporting evidence for 19 novel biallelic candidate genes that may cause IRD.

Phenotype	Gene	Human Retina Expression * (ref 181)	Literature evidence for candidate gene for IRD	Reference	Strength of data
Multiple	*SCAPER*	yes	Rare variants identified in Parkinson's disease	182	Weak
RD	*FUT5*	yes	None	-	Weak
RD	*PODNL1*	yes	None	-	Weak
RP	*NAALADL1*	yes	None	-	Weak
CRD	*WASF3*	yes	Strong expression in brain	183	Moderate
Usher	*PLD4*	yes	Gene involved in the cerebellar cortex circuit development	184	Moderate
RP	*FAM71A*	no	None	-	Weak
Cone dystrophy	*POMZP3*	yes	None	-	Weak
RP	*IRX5*	yes	Required for retinal cone bipolar development in mouse	185	Strong
Stargardt	*ITIH2*	yes	Reduced expression in human retina in type 1 diabetic retinopathy	186	Moderate
RP	*SLC37A3*	yes	None	-	Weak
CRD	*NUMB*	yes	Required for the production of terminal asymmetric cell	187	Strong

			divisions in the developing mouse retina		
CRD	*FAM57B*	yes	None	-	Weak
RP	*FOXI2*	yes	Inhibition of gene in gdf6a (-/-) Zebrafish embryos reduces eye size	188	Moderate
RP	*CROCC*	yes	Mouse knock out shows photo-degeneration over time	189	Strong
RP	*CCZ1B*	yes	None	-	Weak
Other	*OR2M7*	no	None	-	Weak
RP	*PRTFDC1*	yes	None	-	Weak
RP	*UBAP1L*	yes	None	-	Weak

*
The human retina expression was obtained from https://oculargenomics.meei.harvard.edu/index.php/ret-trans/110-human-retinal-transcriptome;
RD = retinal dystrophy, RP = retinitis pigmentosa, CRD = cone-rod dystrophy, Other = any phenotype with frequency of less than eight patients in the studied sample set.

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