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MEDGENOME | ACTIA Inherited Disease Genetics

CAP ACCREDITED COLLEGE of AMERICAN PATHOLOGISTS

Opthalmic Genetics

Genetic eye diseases affect around one in ~1000 people worldwide and one-third of ~5000 known monogenic inherited diseases involve the eye. Advances in molecular genetics and sequencing methods enables the detection of disease causing variants in this genetically heterogeneous group of diseases. The identification of disease-causing gene variants allows better understanding of the disease, its prognosis, inheritance and the right choice of treatment modalities and management.

Genetics of Ophthalmic Disorders

Monogenic:

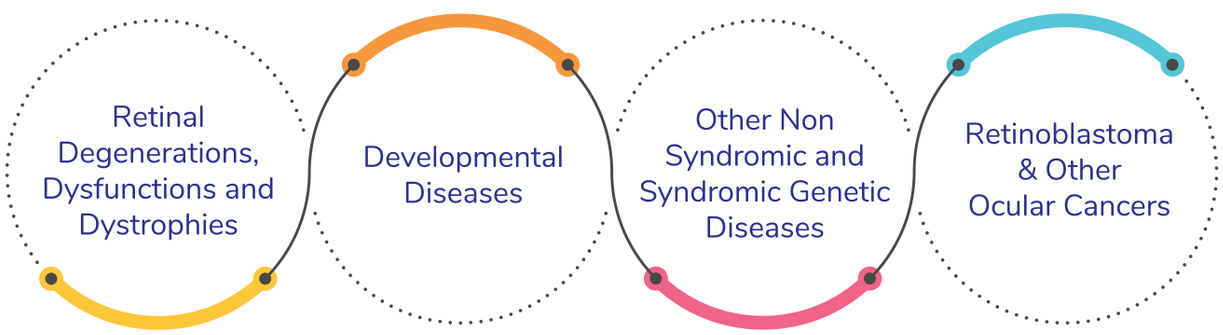
Inherited monogenic forms are autosomal dominant, autosomal recessive, or X-linked diseases with genetic and clinical heterogeneity. Digenic forms have also been reported.

Complex/Polygenic:

Glaucoma, age related macular degeneration, Kertoconus, cataracts etc. are multifactorial disease caused by a combination of several genetic and non-genetic factors. Population specific genetic risk variants contribute to the risk of developing these complex phenotypes.

Inherited Monogenic Ophthalmic Diseases:

There are hundreds of different eye diseases and disorders affecting various parts of the eye from the anterior to the posterior segment.



MedGenome Comprehensive Ophthalmic Genetic Disorder Panel

Over 675 Genes covered	Assessment of non-coding variants	Maternally inherited mitochondrial genes

This comprehensive panel is designed to cover all known inherited ocular diseases, broadly classified as anterior segment dysgenesis disorders (ASDD) and inherited retinal disorders (IRD) including those with broad or non-specific ocular phenotypes.

Retinal Degenerations, Dysfunctions and Dystrophies:

Impaired functioning of retinal genes that affect different parts of the retinal leading to progressive or non-progressive retinal degeneration or dysfunction, result in vision impairment or vision loss. Eg. Leber congenital amaurosis (LCA), Stargardt disease, Retinitis pigmentosa, Choroideremia etc.

Test Code	Test Name
MGM249/MGM704*	Congenital stationary night blindness gene panel
MGM252/MGM705*	Leber congenital amaurosis gene panel
MGM256/MGM707*	Optic atrophy gene panel
MGM257/MGM708*	Retinal degeneration gene panel
MGM259/MGM709*	Usher syndrome gene panel
MGM348#	Choroideremia (CHM) deletion/duplication analysis
MGM510#	NDP deletion / duplication analysis

Developmental Diseases:

Complications during embryonic developmental process can lead to congenital eye malformations, such as anophthalmia, microphthalmia, coloboma, aniridia and optic nerve hypoplasia or multiple layers of the anterior segment of the eye as in anterior segment dysgenesis.

Test Code*	Test Name
MGM254/MGM706	Microphthalmia & anophthamia gene panel
MGM2470	Congenital / Dev. glaucoma gene panel

Other Non Syndromic and Syndromic Genetic Diseases that affect the Eye:

Several genetic ocular diseases may present in isolation or part of a syndrome affecting other body systems such as the brain, kidney (e.g. Albinism, Joubert syndrome).

Test Code*	Test Name
MGM153/MGM683	Joubert syndrome gene panel
MGM244/MGM702	Bardet-Biedl syndrome gene panel
MGM1429	Duane retraction syndrome
MGM245/MGM703	Congenital cataract gene panel
MGM303/MGM723	Corneal dystrophy gene panel
MGM023	Oculocutaneous albinism gene panel
MGM272	Clinical Exome
MGM274	Whole Exome Sequencing
MGM2634	Comprehensive Ophthalmic Genetic Disorder Panel

Retinoblastoma & Other Ocular Cancers:

Retinoblastoma is a rare type of eye cancer that usually develops in early childhood, generally before the age of 5 due to inherited genetic change in the RB1 gene. ~15% is hereditary and ~60% is unilateral. Loss of two copies of this tumor suppressor gene (germinal/ somatic) leads to the tumour (Bilateral/unilateral).

Test Code	Test Name
MGM221*	RB1 gene analysis
MGM222#	RB1 Deletion / duplication analysis

Methodology: *=NGS, # = MLPA

Why is Genetic Testing Important?

- Genetic testing leads to accurate diagnosis
- Confirming the molecular diagnosis may lead to identifing potential treatment options for patients with certain genetic eye diseases, where therapies already exist or are in development, such as for Leber congenital amaurosis caused by biallelic RPE65 mutation
- Will help assess potential risk of disease in other family members by screening
- Will help estimate the severity of the phenotype and effect on other organs for treatment and management
- Genetic counselling based on genetic testing facilitates a more personalized approach for diagnosis and management of the disease

Who Needs to Get Tested?

- Individuals presenting with the symptoms of an eye disorder (syndromic/nonsyndromic) with a strong suspicion of Monogenic disease
- Individuals with a positive family history of inherited ophthalmic disease

Test Sample Requriements	
Sample type	Blood (3-5ml in EDTA tubes) Extracted DNA samples (1µg high quality DNA)
TAT	21 working days for NGS 14 working days for MLPA
Required Forms	Test request form along with relevant clinical information including all the clinical presentations and symptoms

Talk to the Experts: 1800 103 3691 diagnostics@medgenome.com www.medgenome.com