### Test Code: MD135

#### Condition Description

Albinism is a general term used to describe an absence of pigment in the eyes, skin, or hair. Individuals with any of the forms of albinism may have mild to severe oculo-visual clinical manifestations. Ocular hallmarks of all types of albinism include nystagmus, iris translucency, foveal hypoplasia, reduction in visual acuity, and misrouting of the optic nerve fibers at the chiasm (detected by altered visually evoked potentials).

Pathogenic variants in the *TYR* gene are known to cause autosomal recessive oculocutaneous albinism type 1 (OCA1) which is characterized by the ocular changes found in all types of albinism (see introduction above) along with hypopigmentation of the skin and hair. It is divided into two general subgroups: OCA1A (loss of protein function) and OCA1B (partially active/hypomorphic protein function). Throughout life, individuals with OCA1A have white hair, white skin, blue translucent irides, retinal pigment epithelium cells without melanin, and poor vision. In comparison to OCA1A, individuals with OCA1B can have a milder phenotype with hair and iris color that may darken over time.

Pathogenic variants in the *OCA2* gene (previously known as the *P* gene) are known to cause autosomal recessive oculocutaneous albinism type 2 (OCA2) which is characterized by the ocular changes found in all types of albinism (see introduction above) along with skin and hair pigmentation that ranges from very light to almost normal for a given ethnic background. Vision is stable, usually better than found in OCA1 and may improve in adolescence.

Pathogenic variants in the *TYRP1* gene are known to cause autosomal recessive oculocutaneous albinism type 3 (OCA3) which is characterized by the ocular changes found in all types of albinism (see introduction above) along with an accumulation of reddish pigment in the skin and hair.

Pathogenic variants in the *SLC45A2* gene (previously called *MATP* and *AIM1*) are known to cause autosomal recessive oculocutaneous albinism type 4 (OCA4) which is characterized by the ocular changes found in all types of albinism (see introduction above) along with hypopigmentation of the skin and hair. The clinical presentation of OCA4 and OCA2 are very similar; however, OCA4 has a higher prevalence in the Japanese population.

Pathogenic variants in the *GPR143* gene are known to cause X-linked ocular albinism type 1 (OA1, also known as Nettleship-Falls ocular albinism or XLOA) which, in males, is characterized by the ocular changes found in all types of albinism (see introduction above) along with non-progressive vision loss, strabismus, and generally minor skin findings. Carrier females may show a characteristic mosaic pigmentation pattern of the retinal pigment epithelium.

### References:

- OMIM
- GeneReviews
- Emory and Rimoin's Principles and Practice of Medical Genetics, 5th Edition

### Genes

*GPR143, OCA2, SLC45A2, TYR, TYRP1*

### Indications

This test is indicated for:

- Confirmation of a clinical diagnosis of albinism.
Carrier testing in adults with a family history albinism.

**Methodology**

**Deletion/Duplication Analysis:** DNA isolated from peripheral blood is hybridized to a gene-targeted CGH array to detect deletions and duplications. The targeted CGH array has overlapping probes that cover the entire genomic region.

Please note that a "backbone" of probes across the entire genome are included on the array for analytical and quality control purposes. Rarely, off-target copy number variants causative of disease may be identified that may or may not be related to the patient's phenotype. Only known pathogenic off-target copy number variants will be reported. Off-target copy number variants of unknown clinical significance will not be reported.

**Detection**

**Deletion/Duplication Analysis:** Detection is limited to duplications and deletions. The CGH array will not detect point or intronic mutations. Results of molecular analysis must be interpreted in the context of the patient's clinical and/or biochemical phenotype.

**Specimen Requirements**

Submit only 1 of the following specimen types

**Type: Whole Blood**

Specimen Requirements:

In EDTA (purple top) tube:
Infants (2 years): 3-5 ml
Older Children & Adults: 5-10 ml.

Specimen Collection and Shipping: Ship sample at room temperature with overnight delivery.

**Type: Isolated DNA**

Specimen Requirements:

In microtainer: 10 ug

Isolation using the Qiagen™ Puregene kit for DNA extraction is recommended.

Specimen Collection and Shipping: Refrigerate until time of shipment in 100 ng/ul of TE buffer. Ship sample at room temperature with overnight delivery.

**Special Instructions**

Please include fundus photographs, electroretinogram (ERG) findings, visual field findings, and visual acuity, if available, for expert review and clinical correlation with test results.

**Related Tests**

- Eye Disorders: Comprehensive Sequencing and Deletion/Duplication Panels.
- Albinism: Sequencing Panel.