INVITAE

Pharming

navigateAPDS by Pharming

navigateAPDS GENETIC TESTING PROGRAM DESCRIPTION

Pharming Healthcare, Inc. has partnered with Invitae to offer genetic testing and counseling at no charge for individuals who may carry a pathogenic variant in one of two genes known to be associated with Activated PI3K Delta Syndrome (APDS), a rare Primary Immunodeficiency.

The navigateAPDS testing program helps reduce barriers to genetic testing and increases certainty in obtaining a correct diagnosis by enabling patients suspected of having APDS, and their family members, to have access to genetic testing and counseling.

ABOUT APDS

APDS is a rare primary immunodeficiency that affects approximately 1-2 people per million.

Signs and symptoms of APDS start in childhood, and patients are vulnerable to repeat infections and autoimmune/inflammatory signs such as lymphoproliferation, splenomegaly, and even lymphoma.

APDS occurs when there is an abnormal change in either one of two specific genes, the *PIK3CD* gene or the *PIK3R1* gene, in an autosomal dominant mode of inheritance. These genes are involved in making parts of a protein that help in the growth and division of white blood cells, particularly the B-cell and T-cell lymphocytes.

Patients are often misdiagnosed with other immunodeficiencies or autoimmune disorders and have a protracted course to obtain a correct diagnosis. A definitive APDS diagnosis is made by genetic test and may help identify patients for participation in clinical research.

For more information about APDS visit: www.allaboutapds-hcp.com

PROGRAM ELIGIBILITY

This program is available to individuals in the US and Canada who meet two or more of the following bulleted criteria below:

Clinical features:

- Onset of symptoms under 12 years of age
- Documented severe recurrent sinopulmonary infections (> 2 events within 3 years of each other)
- Bronchiectasis
- Lymphadenopathy for greater than one month
- Any nodular lymphoid hyperplasia
- Chronic hepatomegaly or chronic splenomegaly
- Severe, persistent, or recurrent Herpesviridae infections (eg, EBV, cytomegalovirus)
- Autoimmune cytopenia
- Enteropathy
- Lymphoma at 0-25 years – meets the 2 eligibility criteria
- Lymphoma at ≥ 26 years of age – requires second eligibility criteria

Laboratory:

- Hypogammaglobulinemia
- Elevated levels of immunoglobulin M
- Increased number of follicular helper T cells
- Reduced number of naïve B cells

History:

- Primary Immune Deficiency diagnosis
- Common Variable Immune Deficiency (CVID) phenotype or direct family member with CVID phenotype
- Relative with *PIK3CD* or *PIK3R1* genotype (first or second degree)

PANEL INFORMATION

The **navigateAPDS** program offers testing with the choice of either the **Invitae Primary Immunodeficiency Panel** or the **Invitae Inborn Errors of Immunity and Cytopenias Panel**, which analyzes genes that are associated with inherited disorders of the immune system. Broad panel testing allows for an efficient evaluation of several potential genes based on a single clinical indication.

STANDARD CLINICAL CONSULT SERVICES AVAILABLE

Invitae's team of board-certified and experienced genetic counselors trained in medical genetics is available to assist clinicians and patients by phone and/or email. Our genetic counselors can be reached throughout the testing process to:

- review patient cases that may benefit from the Program
- aid in explaining genetic test results
- provide result-specific background regarding variants, genes, and the condition
- identify gene-specific information including relevant literature and studies, published management guidelines if available, and patient resources

For more information or to order a test, please visit
www.invitae.com/navigateAPDS

While third parties and commercial organizations may provide financial support for this program, tests and services are performed by Invitae. Healthcare professionals must confirm that patients meet certain criteria to use the program. Third parties and commercial organizations may receive de-identified patient data from this program, but at no time would they receive patient identifiable information. Third parties and commercial organizations may receive contact information for healthcare professionals who use this program. Genetic testing and counseling are available in the US and Canada only. Healthcare professionals and patients who participate in this program have no obligation to recommend, purchase, order, prescribe, promote, administer, use or support any other products or services from Invitae or from third parties or commercial organizations.