Pulmonary Arterial Hypertension genetic testing patient information

It is important that you discuss the benefits and limitations of genetic testing with your physician, a medical geneticist or a genetic counsellor before you have genetic testing.

What is Pulmonary Arterial Hypertension (PAH)?

PAH is characterized by increased blood pressure in the arteries that connect the heart to the lungs. It is different from generalized high blood pressure as PAH can lead to destruction of the arteries in the lungs resulting in progressive elevation of pulmonary artery pressure as the heart tries counteract the resistance to blood flow. This condition can present many symptoms including dyspnoea, fatigue, chest pain, syncope, leg oedema, and palpitations. Poor management of PAH can eventually lead to progressive heart failure.

There are many causes of PAH. Heritable pulmonary arterial hypertension (HPAH) accounts for approximately 4% of all PAH cases. HPAH includes familial PAH (where two or more family members are affected) and cases where the genetic cause of PAH is already known. We offer genetic testing for the multiple genetic causes of PAH. To understand how genetics affects our health, it is important to understand the basics of genetics.

What is DNA?

DNA is the basic unit of genetics. It is the genetic material that we inherit from our parents and pass to our children. DNA is comprised of four separate molecules (chemicals) that are called bases. Each base is assigned a different letter. These letters are A (adenine), T (thymine), G (guanine), and C (cytosine). These four bases are joined together in very long strings of DNA within our cells. These long strings of DNA are called DNA sequences (also called the DNA code or the genetic code). DNA is what genes are composed of.

What is a gene?

A gene is a specific pattern of DNA bases; this pattern is called a DNA sequence. We have approximately 20,000 genes and each gene has a specific function within our body. Each gene creates a different protein, which are the building blocks for our body. Our genes determine how our bodies develop and function from hair and eye colour to how our brain cells communicate and how we develop during pregnancy. There are multiple genes that can cause HPAH.

Why pursue genetic testing?

It is important to have an accurate diagnosis as it can it can help with finding the correct therapies for your child and prevent further complications before they happen. Genetic testing can help find the cause of a patient's PAH. Identification of the genetic basis for PAH can help determine if there is a risk for future pregnancies. PAH can be caused by many genes. When genetic testing is ordered, all the known genes associated with PAH are analysed for changes within the genes that may stop them from functioning properly. We still do not know all of the genes that can cause PAH, therefore it is possible that we will not identify the genetic basis for this condition in your child.

How is testing performed?

In general, DNA testing is done from a blood sample, although less frequently other samples can be obtained from other sources such as saliva. DNA is extracted from the sample and is then analysed via sequencing machines.

How long before the results are ready?

The results of genetic testing are generally ready between 3-4 weeks. Depending on what you have agreed with you healthcare provider, results may be delivered over the phone or in person

Possible results –

There are three possible results that could be reported on your whole exome sequencing test report.

Positive – Genetic changes are identified which confirms the genetic diagnosis for HPAH

Negative – No variants were identified which could explain the patient's condition. There are approximately 15% of HPAH families with no genetic finding. *A negative result does not always rule out a genetic basis for PAH.*

Uncertain – A variant is classified as uncertain when there is insufficient evidence to determine if the variant is either disease causing (pathogenic) or has no effect (benign). *As more research is conducted, it is possible that uncertain variants may be reclassified in the future.*

Unexpected results – In rare situations, it is possible that a genetic diagnosis, not directly related to your child's condition is identified. These findings could have implications for the healthcare of your child.

It is important to follow up with your physician, a medical geneticist or a genetic counsellor to discuss the results of your genetic testing.