

In this issue we cover Phenylketonuria (PKU) which played an important role in starting the concept of Newborn Screening. The Guthrie Test is performed on newborn infants to detect PKU, an inborn error of amino acid metabolism. It is named after Robert Guthrie, an American bacteriologist and physician, who devised it in 1962. The test has been widely used throughout North America and Europe as one of the core newborn screening tests since the late 1960s. Today, it is being replaced by a faster, more accurate and reliable technology known as Tandem Mass Spectrometry (which NeoGen Labs utilizes) that can detect a wider variety of IEMs.

Phenylketonuria (PKU)

Phenylketonuria (commonly known as PKU) is an inherited disorder that increases the levels of a substance called phenylalanine in the blood. Phenylalanine is a building block of proteins (an amino acid) that is obtained through the diet. It is found in all proteins and in some artificial sweeteners. If PKU is not treated, phenylalanine can build up to harmful levels in the body, causing intellectual disability and other serious health problems.

The signs and symptoms of PKU vary from mild to severe. The most severe form of this disorder is known as classic PKU. Infants with classic PKU appear normal until they are a few months old. Without treatment with a special low-phenylalanine diet, these children develop permanent intellectual disability. Seizures, delayed development, behavioral problems and psychiatric disorders are also common. Untreated individuals may have a musty or mouse-like odor as a side effect of excess phenylalanine in the body. Children with classic PKU tend to have lighter skin and hair than unaffected family members and are also likely to have skin disorders such as eczema.

Less severe forms of this condition, sometimes called variant PKU and non-PKU hyperphenylalaninemia, have a smaller risk of brain damage. People with very mild cases may not require treatment with a low-phenylalanine diet.

Babies born to mothers with PKU and uncontrolled phenylalanine levels (women who no longer follow a low-phenylalanine diet) have a significant risk of intellectual disability because they are exposed to very high levels of phenylalanine before birth. These infants may also have a low birth weight and grow more slowly than other children. Other characteristic medical problems include heart defects or other heart problems, an abnormally small head size and behavioral problems. Women with PKU and uncontrolled phenylalanine levels also have an increased risk of pregnancy loss.

How do people inherit PKU?

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

How common is PKU?

Incidence of PKU varies among ethnic groups and geographic regions worldwide. Most cases of PKU are detected shortly after birth by newborn screening, and treatment is started promptly. As a result, the severe signs and symptoms of classic PKU are rarely seen.

Resources

1. ACT Sheets

http://www.acmg.net/resources/policies/ACT/ACT-sheet_Phenylalanine_5-2-06_ljo.pdf

2. Patient Resources

<http://ghr.nlm.nih.gov/condition=phenylketonuria/show/Patient+support>

The information on PKU is reproduced from NIH
<http://ghr.nlm.nih.gov/condition=phenylketonuria>

July 2009 Statistics

- 1 Case of MMA/PA
- 1 Case of CPT-II

Treatment Monitoring

Once a metabolic disorder is identified, it is critical that the patient is monitored while undergoing treatment. The periodic monitoring could be expensive and patients may discount the importance of it. In our effort to ensure positive outcomes, NeoGen Lab will extend special pricing in these cases.

IMPORTANT:

Many of you send payment along with screening samples for analysis. Please ensure that the cheque or DD is made out to, **NeoGen Labs Private Limited** payable at Bangalore.

Logistics, Kits, Reports

Please send e-mail to info@neogenlabs.com in case you need kits, looking for reports or any general question. You can expect a reply or call within 24 hours (except for holidays) to address your request.

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First Step Newborn Screening Panel

ACYLCARNITINE PROFILE (MS)

Fatty Acid Oxidation Disorders

- Carnitine / Acylcarnitine Translocase Deficiency
- Carnitine Palmitoyl Transferase Deficiency Type I
- 3-Hydroxy Long Chain Acyl-CoA Dehydrogenase Deficiency
- 2,4-Dienoyl-CoA Reductase Deficiency¹
- Medium Chain Acyl-CoA Dehydrogenase Deficiency
- Multiple Acyl-CoA Dehydrogenase Deficiency
- Neonatal Carnitine Palmitoyl Transferase Deficiency Type II
- Short-chain Acyl-CoA Dehydrogenase Deficiency
- Short chain Hydroxy Acyl-CoA Dehydrogenase Deficiency
- Trifunctional Protein Deficiency
- Very Long Chain Acyl-CoA Dehydrogenase Deficiency

Organic Acid Disorders

- 3-Hydroxy-3-Methylglutaryl-CoA Lyase Deficiency
- Glutaric Acidemia Type I
- Isobutyryl-CoA Dehydrogenase Deficiency
- Isovaleric Acidemia
- 2-Methylbutyryl-CoA Dehydrogenase Deficiency
- 3-Methylcrotonyl-CoA Carboxylase Deficiency
- 3-Methylglutaconyl-CoA Hydratase Deficiency
- Methylmalonic Acidemias
- Methylmalonic Acidemias
 - Methylmalonyl-CoA Mutase Deficiency
 - Some Adenosylcobalamin Synthesis Defects
 - Maternal Vitamin B12 Deficiency
- Mitochondrial Acetoacetyl-CoA Thiolase Deficiency
- Propionic Acidemia
- Multiple CoA Carboxylase Deficiency
- Malonic Aciduria

AMINO ACID PROFILE (MS)

Amino Acid Disorders

- Argininemia
- Argininosuccinic Aciduria
- 5-Oxoprolinuria
- Carbamoylphosphate Synthetase Deficiency
- Citrullinemia
- Homocystinuria
- Hypermethioninemia
- Hyperammonemia, Hyperornithinemia, Homocitrullinuria Syndrome
- Hyperornithinemia with Gyral Atrophy
- Maple syrup disease
- Phenylketonuria
 - Classical/Hyperphenylalaninemia
 - Biotin Cofactor Deficiencies
- Tyrosinemia
 - Transient Neonatal Tyrosinemia
 - Tyrosinemia Type I
 - Tyrosinemia Type II
 - Tyrosinemia Type III

OTHER (MS)

- Hyeralimentation
- Liver Disease
- Medium Chain Triglyceride Oil Administration
- Presence of EDTA Anticoagulants in blood specimen
- Treatment with Benzoate, Pyvalic Acid, or Valproic Acid
- Carnitine Uptake Deficiency

BIOCHEMICAL ANALYSIS (BIO)

- Galactosemia
- Congenital Hypothyroidism
- Congenital Adrenal Hyperplasia
- G6PD
- Cystic Fibrosis
- Biotinidase