

NBS Follow-up: Panel Methylmalonic Acidemia (MMA)/Propionic Acidemia (PA)

Test Code: BNBSF

Turnaround time: 7 days

CPT Codes: 82017 x1, 82139 x1, 82379 x1, 82542 x1, 82570 x1, 83090 x1, 83789 x1, 83921 x1

Condition Description

This panel is designed to be a comprehensive evaluation when a metabolic condition is suspected based on an elevated propionylcarnitine (C3) concentration and/or propionyl (C3)/acetyl (C2) carnitine ratio on newborn screening. Patients may be asymptomatic or present with varying symptoms including lethargy, coma, hypotonia, seizures, ataxia, vomiting, failure to thrive or metabolic acidosis. The panel includes the following six tests: Organic Acid Analysis (OA), plasma Acylcarnitine Profile (AR), Carnitine Profile (CN), Amino Acids (AA), Methylmalonic Acid (MQ) and Homocysteine (HO).

Urine Organic Acid Analysis: Qualitative and quantitative determination of organic acids. This test can detect lactic acid, pyruvic acid, 2-methylcitric acid, methylmalonic acid, 3-hydroxypropionic acid and propionylglycine to aid in the diagnosis of an organic acidemia associated with elevated C3 and/or C3/C2 ratio.

Acylcarnitine Profile: Plasma acylcarnitine analysis provides quantitative evaluations of individual acylcarnitine species in the plasma. Pattern recognition and quantitative analysis against age matched reference ranges can be used to identify organic acidemias that could be causative of C3 and/or C3/C2 ratio elevations on newborn screening.

Carnitine Profile: Provides plasma free, total, and esterified carnitine levels of the patient. Secondary carnitine deficiency can be seen in patients with B12 deficiency, methylmalonic acidemia or propionic aciduria.

Amino Acids Profile: Plasma amino acids analysis will detect specific amino acid disorders and some elevations of homocysteine. For patients who are found to be affected with a metabolic disease, plasma amino acid analysis will provide a baseline for nutritional management.

Methylmalonic Acid: Elevated plasma methylmalonic acid can be seen in vitamin B12 deficiency, as well as several inherited forms of methylmalonic acidemia. The magnitude of elevation can be useful in the differential diagnosis, and as a baseline for monitoring treatment in an affected patient.

Homocysteine: Elevated plasma total homocysteine can be seen in combined forms of methylmalonic acidemia/homocystinuria.

Indications

This panel is offered as a comprehensive starting point for patients with an abnormal newborn screening (NBS) with elevated C3 and/or C3/C2 ratio. Patients may be asymptomatic or present with varying symptoms including lethargy, coma, hypotonia, seizures, ataxia, vomiting, failure to thrive or metabolic acidosis.

Methodology

- Urine Organic Acid Analysis: Gas chromatography-mass spectrometry
- Acylcarnitine Profile: Electrospray tandem mass spectrometry
- Carnitine Profile: Electrospray tandem mass spectrometry
- Amino acid Profile: Ion exchange liquid chromatography
- Methylmalonic Acid: Liquid chromatography-electrospray tandem mass spectrometry
- Homocysteine: Liquid chromatography-electrospray tandem mass spectrometry

Detection

This panel can detect most cases of metabolic conditions that are triggered by a positive newborn screen for elevated C3 and/or C3/C2 ratio. Correlation with other laboratory tests (particularly plasma vitamin B12 levels) and the patient's clinical status at still needed. In infants, a positive newborn screen can be caused by maternal B12 deficiency, particularly in vegan mothers or those who have undergone gastric bypass surgery. Correlation with the mother's B12 levels, clinical and dietary history is also necessary in such cases.

Specimen Requirements

Type: Urine

Specimen Requirements:

Clean container without additives

2-5 ml

Freeze sample. Fasting or first void sample is preferable.

Specimen Collection and Shipping:

Ship frozen sample on dry ice with overnight delivery.

Type: Plasma

Specimen Requirements:

EDTA (Purple Top)

1-5 ml

Sample should be collected while fasting or 2-4 hours post prandial. Centrifuge to separate plasma and freeze. Separate plasma within 30 minutes of collection

Specimen Collection and Shipping:

Ship frozen sample on dry ice with overnight delivery.

Type: Plasma**Specimen Requirements:**

Sodium Heparin (Green Top)

2-5 ml

Sample should be collected while fasting or 2-4 hours post prandial. Centrifuge to separate plasma and freeze.

Specimen Collection and Shipping:

Ship frozen sample on dry ice with overnight delivery.

Special Instructions

Both plasma AND urine are required for this panel. Please indicate on the test requisition form any medications or dietary changes.

Related Tests

The components of this panel can be ordered separately when a specific metabolic condition is suspected.

- Acylcarnitine Profile, Quantitative and Qualitative, Plasma (AR), Carnitine Profile, Quantitative, Plasma (CN) and Organic Acid Profile, Quantitative and Qualitative, Urine (OA) are used in the diagnosis and evaluation of patients with organic acidemias, or fatty acid disorders.
- Amino Acid Profile, Quantitative, Plasma (AA) is used in the diagnosis and evaluation of patients with aminoacidopathies.
- Homocysteine, Total Quantitative, Plasma (HO) is used for individuals suspected to have homocystinuria, B12 deficiency, or hyperhomocyst(e)inemia.
- Methylmalonic Acid, Quantitative, Plasma (MQ) is indicated to obtain accurate methylmalonic acid measurement in the patient with methylmalonic aciduria or B12 deficiency, before and after treatment.