

Adenosine Monophosphate Deaminase 1 (AMPD1) Deficiency: *AMPD1* Gene Deletion/Duplication

Test Code: DAMPD

Turnaround time: 2 weeks

CPT Codes: 81228 x1

Condition Description

Adenosine monophosphate deaminase 1 (AMPD1) deficiency, also known as myoadenylate deaminase (MADA) deficiency, is a disorder of purine metabolism that leads to a deficiency in the production of ATP. It is the most common enzyme deficiency identified in muscle, with a prevalence of almost 2% in the general population. The typical age of presentation is late adolescence to early adulthood. Affected individuals have generalized exertional muscle pain, cramps and fatigue. Other presenting features include post-exertional myoglobinuria and rhabdomyolysis. Completely asymptomatic individuals have also been reported.

Serum creatine kinase (CK) is usually normal or only slightly elevated. Aerobic exercise testing is typically normal. Muscle histology is normal but muscle histochemistry shows reduced AMPD1 enzyme activity. AMPD1 deficiency is caused by mutations in the *AMPD1* gene (1p21). AMPD1 deficiency is an autosomal recessive condition.

Two mutations, c.133C>T (p.Q45X, previously known as p.Q12X) and c.242C>T (p.P81L, previously known as p.P48L), account for the majority of reported mutations in Caucasians and African Americans. Full gene sequence analysis is also available for individuals with documented AMPD1 deficiency when no or one mutation identified by common mutation testing.

[Click here](#) for the OMIM summary on this condition.

For patients with suspected adenosine monophosphate deaminase 1 deficiency, sequence analysis is recommended as the first step in mutation identification. For patients in whom mutations are not identified by full gene sequencing, deletion/duplication analysis is appropriate.

Reference:

- Brian A. van Adel, et al. Metabolic Myopathies: Update 2009. J Clin Neuromusc Dis. 2009, 10(3): 97-121.

Genes

[AMPD1](#)

Indications

This test is indicated for:

- Confirmation of a biochemical diagnosis of AMPD1 deficiency when common mutation testing identified no or one mutation and when sequence analysis was negative.
- Carrier testing in adults with a family history of AMPD1 deficiency when common mutation testing identified no or one mutation and when sequence analysis was negative.

Methodology

DNA isolated from peripheral blood is hybridized to a CGH array to detect deletions and duplications. The targeted CGH array has overlapping probes which cover the entire genomic region.

Detection

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 (EDTA)

Specimen Requirements:

EDTA (Purple Top)

Infants and Young Children (2 years of age to 10 years old: 3-5 ml

Older Children & Adults: 5-10 ml

Autopsy: 2-3 ml unclotted cord or cardiac blood

Specimen Collection and Shipping:

Ship sample at room temperature for receipt at EGL within 72 hours of collection. Do not freeze.

Type: DNA, Isolated**Specimen Requirements:**

Microtainer

3µg

Isolation using the Perkin Elmer™ Chemagen™ Chemagen™ Automated Extraction method or Qiagen™ Puregene kit for DNA extraction is recommended.

Specimen Collection and Shipping:

Refrigerate until time of shipment in 100 ng/µL in TE buffer. Ship sample at room temperature with overnight delivery.

Special Instructions

Submit copies of diagnostic biochemical test results with the sample, if appropriate. Contact the laboratory if further information is needed.

Sequence analysis is required before deletion/duplication analysis by targeted CGH array. If sequencing is performed outside of EGL Genetics, please submit a copy of the sequencing report with the test requisition.

Related Tests

- Common mutation testing for the two common *AMPD1* mutations is available and is recommended before *AMPD1* full gene sequencing.
- Sequence analysis of the *AMPD1* gene is available and is required before deletion/duplication analysis.
- A two-tiered rhabdomyolysis panel that includes testing for the two common *AMPD1* mutations is also available.
- Sequence and deletion/duplication analysis are available for the *AMPD3* gene.
- [Custom diagnostic mutation analysis \(KM\)](#) is available to family members if mutations are identified by targeted mutation testing or sequencing analysis.
- Prenatal testing is available to couples who are confirmed carriers of mutations. Please contact the laboratory genetic counselor to discuss appropriate testing prior to collecting a prenatal specimen.