

## Glycogen Storage Disease V (McArdle Disease): *PYGM* Common Mutation Panel

**Test Code:** MA

**Turnaround time:** 2 weeks

**CPT Codes:** 81401 x1

### Condition Description

Myophosphorylase deficiency is an autosomal recessive disorder caused by a mutation in the *PYGM* gene which is located on chromosome 11. Patients experience exercise intolerance with premature fatigue, myalgias and cramps that are exacerbated by exercise. A second wind phenomena is described in many patients and is characterized by an improved exercise tolerance after a brief reduction in the intensity of exercise or a brief rest. This response is mediated by an adaptation to the substrate-limited oxidative phosphorylation by increased mobilization and delivery of free fatty acids to muscle as an energy source, increased blood flow and increased glucose oxidation. About half of patients experience acute muscle necrosis and myoglobinuria after exercise. This rhabdomyolysis can produce acute renal failure. Muscle weakness is present in approximately 33% of patients. The onset of exercise intolerance is often observed in childhood, but clinical ascertainment is usually in the second or third decade. Atypical variants of the disease may occur and be confined to complaints of easy fatigability without cramps or myoglobinuria. In some individuals, weakness may not be apparent until the seventh or eighth decade of life.

Serum creatine kinase is elevated in over 90% of patients with myophosphorylase deficiency. Forearm ischemic exercise testing produces essentially no increase in venous lactate. Muscle pathology often shows subsarcolemmal and intermyofibrillar vacuoles filled with glycogen. Histochemical staining for myophosphorylase activity is absent. Three point mutations (R49X, G204S, and K542T) are tested in the *PYGM* gene. These mutations account for 71% of the McArdle disease alleles.

### Genes

[PYGM](#)

### Indications

This test is indicated for:

- Confirmation of a clinical/biochemical diagnosis of myophosphorylase deficiency.
- Carrier testing in adults with a family history of myophosphorylase deficiency.

### Methodology

Presence or absence of three point mutations are detected by Sanger sequencing.

### Detection

Nearly all the *R49X*, *G204S*, and *K542T* alleles will be detected by this assay. Testing for these specific mutations will detect 71% of all carriers.

### Reference Range

Qualitative assay.

### 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.