## Condition Description

NARP, characterized by peripheral Neuropathy, Ataxia, and Retinitis Pigmentosa, is the mild end of the Leigh disease neurodegenerative spectrum. The onset of symptoms may begin in childhood, and may increase during times of illness. Other features may include, learning delay, hearing loss, short stature, progressive external ophthalmoplegia, and cardiac conduction defects. The level of heteroplasmy (meaning the presence of both normal and rearranged mitochondrial DNA molecules) as well as the type of tissue affected, influences the severity of disease. Like Leigh disease, NARP is caused by defects in mitochondrial energy production. The 8993T>G and 8993T>C mtDNA mutations account for up to 50% of NARP mutations. The 3,243A>G mutation has been observed in patients with Leigh/NARP-like symptoms. NARP is typically associated with 70-90% heteroplasmy of mutant mitochondria. Higher levels of mtDNA mutation heteroplasmy typically result in Leigh syndrome. In some patients, mtDNA mutations are occasionally not be detectable in blood cells due to replicative segregation (uneven tissue distribution of mitochondrial molecules). For patients with a clinical diagnosis of NARP, testing for mtDNA mutations in muscle tissue may be indicated when mutations are not detected in mtDNA isolated from a blood sample.


## Indications

This test is indicated for:

- Patients with a confirmed/suspected diagnosis of NARP.
- Family members of an affected patient who may be at risk for NARP.

## Methodology

Presence or absence of m.8993T>G, m.8993T>C and m.3243A>G variants is assessed by Sanger sequencing.

### Detection

The 8993T>G and 8993T>C mutations in *MT-ATP6* account for up to 50% of NARP mutations. Over 95% of these selected mutations will be detected by this analysis. The 3243A>G mutation can be detected at approximately 10% heteroplasmy. All other mutations will be detected at approximately 15-20% heteroplasmy.

## Reference Range

Qualitative assay.

## Specimen Requirements

*Submit only 1 of the following specimen types*

### Type: DNA, Isolated

**Specimen Requirements:**

- Microtainer 10µg
- Isolation using the Perkin Elmer™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.

### 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.

## Related Tests

- Leigh Disease (QD)