**What is Periodic Paralysis?**

Periodic paralysis is a general name for a group of disorders involving temporary muscle weakness and the inability to move muscles in the arms and legs. The episodes may last from hours to days.

**What causes Periodic Paralysis?**

Changes (mutations) in certain genes cause periodic paralysis. In an affected person mutations occur in one of several different genes that regulate the levels of potassium in the bloodstream. When potassium levels are out of balance the electrical currents involved in muscle contraction are disrupted. Episodes of muscle weakness may become so severe a person is partially or fully paralyzed which can change considerably over the course of minutes and hours until the potassium balance is restored.

**Are there different forms of Periodic Paralysis?**

Yes. Different gene mutations may impact the muscle levels of potassium in different ways. Because potassium levels that are too low or too high can lead to periodic paralysis, the disorder may be known as Hypokalemic Periodic Paralysis (hypo = low; kalemic = potassium) or Hyperkalemic Periodic Paralysis (hyper = high; kalemic = potassium). Occasionally, patients will have normal potassium levels although they are experiencing muscle weakness (Normokalemic Periodic Paralysis).

Some gene mutations cause problems in addition to periodic paralysis. Patients with Andersen – Tawil Syndrome (also known as ATS or Andersen Syndrome) may have heart rhythm irregularities in addition to periodic paralysis. Also, some patients have periodic paralysis as a symptom of hyperthyroidism associated with gene alterations that increase susceptibility to muscle weakness (thyrotoxic periodic paralysis).

**What genes are being tested?**

Four genes are screened for mutations associated with the various forms of periodic paralysis using DNA sequencing. Each of the genes regulates muscle levels of sodium, calcium, or potassium needed for normal muscle contraction and each has an abbreviation to designate the specific gene:

- **CACNA1S** = regulates calcium (approximately 60% of patients have detectable mutations in CACNA1S)
- **SCN4A** = regulates sodium (approximately 20% of patients have detectable mutations in SCN4A)
- **KCNJ2** = regulates potassium (approximately 3.5% of patients have detectable mutations in KCNJ2). Approximately 60% of patients with Andersen-Tawil syndrome have detectable mutations in KCNJ2.
- **KCNJ18** = regulates potassium (mutations in KCNJ18 are associated with thyrotoxic periodic paralysis)

**Mutation Screening Limitations**

The KCNJ2 and KCNJ18 genes are completely tested by DNA sequence analysis. However, only selected gene regions (termed “exons”) of CACNA1S and SCN4A are known to contain mutations associated with periodic paralysis. Therefore, only certain exons (exons 4, 11, 21, and 30 in CACNA1S and exons 12, 13, 22, 23, and 24 in SCN4A) are initially tested. It is possible rare cases of periodic paralysis may be caused by mutations elsewhere in CACNA1S and SCN4A, and these would not be detected by the testing. If a patient is suspected of having a mutation in a non-tested gene region, complete gene testing may be ordered (additional charges would apply).
What is the cost for screening?

The cost is $500 per individual screened - payable upon receipt of sample and paperwork. We will not be able to directly bill a patient's insurance. If the patient is referred from a medical institution, the institution can be billed for the screening cost. Patient payments may be made by credit card (please provide credit card information at the bottom of the Periodic Paralysis Mutation Screen requisition form). Payment also may be made by check (payable to the Fullerton Genetics Laboratory). Additional blood draw, shipping and processing fees may apply dependent on facility where blood is drawn and/or shipped from.

What follow-up testing is available for my family members?

If a mutation is identified, targeted DNA analysis for the specific mutation can be performed for $378 per individual.

What if my doctor's office does not draw blood?

You will need to locate a laboratory facility either within a hospital or an independent lab that will draw your blood and ship the sample to Fullerton Genetics. Please complete the requisition with your physician and include it with the sample shipment. Specimen containers and shipping supplies are available upon request from Fullerton Genetics.

When will I know my test results?

Results will be reported back to your ordering physician within approximately one month. Please contact your physician to obtain your results. Fullerton Genetics cannot be give test results directly to the patient or patient's family, only to the ordering physician.