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What is Leigh Syndrome, French Canadian Type?
Leigh syndrome, French Canadian type (LSFC) is an inherited disease characterized by developmental delays, low muscle tone, distinctive facial features, and severe episodes of illness that can lead to early death.[1] It is caused by defects in a protein that affects the levels of an enzyme, called COX, which is crucial for energy production in cells. Symptoms are believed to be due to low levels of the COX enzyme, leading to abnormal energy production in the cells and (ultimately) cell death, especially in the nervous system and liver.[2,3] LSFC is also known as COX deficiency, French Canadian type.[1]

What are the symptoms of Leigh Syndrome, French Canadian Type and what treatment is available?
Signs of LSFC are usually noticed soon after birth. Symptoms may include[4,5]:

- Hypotonia (low muscle tone)
- A distinctive facial appearance
- Mental and physical developmental delay
- Ataxia (difficulty coordinating movements)
- Metabolic or neurological crisis (serious episode of illness) often triggered by an infection

During a crisis, symptoms can progress to breathing problems, seizures, coma, and possibly death.[5]

There is no cure for LSFC. Treatment includes supportive care of symptoms. Most individuals with LSFC do not survive infancy; however, there are some individuals who survive into childhood or later, but they typically have mild mental retardation and seizures.[5]

How is Leigh Syndrome, French Canadian Type inherited?
LSFC is an autosomal recessive disease caused by mutations in the *LRPPRC* gene.[3] An individual who inherits one copy of an *LRPPRC* gene mutation is a "carrier" and is not expected to have related health problems. An individual who inherits two mutations in the *LRPPRC* gene, one from each parent, is expected to be affected with LSFC.

If both members of a couple are carriers, the risk of having an affected child is 25% in each pregnancy; therefore, it is especially important that the reproductive partner of a carrier be offered testing.

Who is at risk for Leigh Syndrome, French Canadian Type?
LSFC is most common in individuals of French Canadian ancestry, specifically those from the Saguenay-Lac-Saint-Jean (SLSJ) region of Quebec, and it has a carrier frequency estimated at 1 in 23 and a calculated incidence of approximately 1 in 2000 individuals.[4]

Having a relative who is a carrier or who is affected can increase an individual's risk of being a carrier. Consultation with a genetics health professional may be helpful in determining carrier risk and appropriate testing.

What does a positive test result mean?
If a gene mutation is identified, an individual should speak to a physician or genetics health professional about the implications of the result and appropriate testing for the reproductive partner and at-risk family members.

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What does a negative test result mean?
A negative result reduces, but does not eliminate, the possibility that an individual carries a gene mutation. The likelihood of being a carrier is also influenced by family history, medical symptoms, and other relevant test results.

Where can I get more information?

- Genetics Home Reference: http://ghr.nlm.nih.gov/condition/leigh-syndrome
- National Institutes of Neurological Disorders and Stroke: http://www.ninds.nih.gov/disorders/leighsdisease/leighsdisease.htm

References

1. Leigh Syndrome, French Canadian type; LSFC *OMIM* Available at: http://omim.org/entry/220111#reference2 Accessed March 15, 2012.
2. Leigh syndrome. *Genetics Home Reference*. Available at http://ghr.nlm.nih.gov/condition/leigh-syndrome. Accessed March 15, 2012.
3. Mootha VK *et al.* Identification of a gene causing human cytochrome c oxidase deficiency by integrative genomics. *Proc. Natl. Acad. Sci.* 2003; 100(2): 605-610.
4. Morin C *et al.* Clinical, Metabolic, and Genetic Aspects of Cytochrome C Oxidase Deficiency in Saguenay-Lac-Saint-Jean. *Am. J. Hum. Genet.* 1993; 53: 488-496.
5. Debray F *et al.* LRPPRC mutations cause a phenotypically distinct form of Leigh syndrome with cytochrome c oxidase deficiency *J Med Genet* 2011; 48:183-189.

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