

# LONG QT SYNDROME (LQTS) IN SOUTH AFRICAN PATIENTS AND THEIR FAMILIES

## WHAT IS THE LONG QT SYNDROME?

The Long QT Syndrome (LQTS) is a disease that affects the rhythm of the heart, which, in turn, can cause fainting. Additionally, LQTS carries an increased risk of early sudden death, even in people who have not previously had any visible symptoms of the condition. This disease may be inherited in a family. A person with LQTS often shows a longer than usual 'QT interval' on an electrocardiogram (ECG) trace, but the natural variations in both QT intervals and the nature of symptoms can complicate diagnosis of the disease.

Fainting spells most often occur during exercise or during times of excitement or anxiety. Thus, apparently healthy LQTS sufferers may faint or die suddenly when, for example, diving into a swimming pool on a warm summer's day, or when hearing an alarm clock or phone ringing unexpectedly. A rarer form may present with attacks during rest.

Together, the unusual features of LQTS may result in the true cause being missed or an incorrect diagnosis being made in affected persons. This may be especially serious as the first sign of disease may be sudden death and, as this disease may "run in the family", other relatives may unknowingly be at risk too.

## WHY ARE WE STUDYING LQTS AND WHAT HAS BEEN FOUND?

A person with LQTS has a small fault (*mutation*) in their inherited "blue-print" (DNA) that can be passed on to his/her children, who are then at risk of developing the disease. Scientists know that many different faults in at least 12 different DNA factors (*genes*) and more than 1000 mutations cause LQTS.

We would like to find out which particular DNA fault cause LQTS in South African patients and their families and use this information to help us to understand more about this disease. This knowledge will also help us to more easily identify genetically

positive individuals, especially those who have no visible symptoms or where the ECG QT interval does not clearly indicate disease. This will mean that those who are infected, can be treated more effectively or make lifestyle changes to avoid situations that may trigger sudden death.

At end of 2007, 47 different South African LQTS-affected families form part of our studies and the LQTS-causing gene and its associated fault has been found in 39 of these families. The most important finding, so far, is that 25 Afrikaner families carry the same genetic fault (*a founder mutation*), which is believed to have been introduced into the group by a common forefather from Northern Europe.

Being a common cause of LQTS in South Africa means that it is relatively easy for us to find the fault in many affected families. The search in other families, however, can be hard and long, as the genetic fault may be different in each family with the disease.

## HOW CAN YOU HELP?

The eventual success of our LQTS study is dependent on gathering as much information as possible on all relatives in an affected family. Blood samples and a clinical history, with special reference to all possibly relevant symptoms, are needed from both affected and unaffected individuals of all available generations. This helps to pinpoint which of the 12 possible genes should be screened first in order to find the causative fault.

Taking part in this study is voluntary but we believe that the willing participation of all family members can benefit many people, including yourself and your family.

Your taking part in the study will be confidential. Only the investigating doctor and his immediate colleagues will have access to any of the information that you supply or that is found in the laboratory.

## HOW IS THIS RESEARCH DONE?

If you are willing to participate, you will be asked to give a blood sample (about 3 teaspoons), from which DNA (the genetic material) is extracted in the

laboratory. The DNA extracts are first tested by a series of molecular methods for the presence of the common 'founder mutation'. If this is not present, the search for the causative fault continues, although it is more difficult and time-consuming.

## WHY IS THE RESEARCH IMPORTANT?

Finding the specific disease-causing faults in South African families affected by LQTS will allow us to design simple blood-tests to identify others who are at risk from LQTS. This is especially important for people who do not have symptoms or where clinical diagnosis is not clearcut. This will help your doctor to give relevant counseling and clinical management for affected persons, which may include lifestyle changes to avoid situations that could trigger sudden death. It will also reassure those that are not at risk of the consequences of the disease.

In addition, the large number of South African families with the same 'founder mutation' will help scientists find why there is so much variation in the presentation and symptoms of LQTS. It is thought that finding the factors which cause people to be affected differently will eventually lead to the development of treatment that is tailored to individual needs.

We have presented our findings and their implications for South African LQTS-affected persons and their families to medical scientific groups both in South Africa and internationally. We are the referral centre for molecular investigations into LQTS in South Africa.

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**Information on LQTS is provided for the public on our Sudden Death Website:** [http://www.sun.ac.za/medbiochem/sudden\\_death/home/html](http://www.sun.ac.za/medbiochem/sudden_death/home/html)

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