**Abstract**

Thalassemia is an inherited disorder mainly caused by mutations in the gene of the globin chain of adult haemoglobin (HbA). Clinically, thalassemia can be a mild or silent condition, or it can cause severe diseases, leading to transfusion dependence. Studies at the gene level have identified a large number of variations in the globin gene in different populations.

In the Mediterranean area one of the most common mutation is the C→T substitution in the codon 39 of the gene.

A new procedure for detecting codon 39 mutation in the \_-globin gene is reported, based on a DNA piezoelectric biosensor.

Anoligonucletidic probe (25-mer), specific for the region around codon 39, is immobilised on the gold surface of a piezoelectric quartz crystal. The hybridisation between the immobilised probe and the complementary strand in solution is detected recording the variations of the crystal frequency.

Experiments with synthetic oligonucleotides were initially performed. Distinguishable frequency shifts were obtained from the interaction between the immobilised probe and the complementary and the mismatch oligonucleotides. A solution containing 50% of both the oligonucleotides has been also tested and distinguished from the others evaluating the resulting signals. Experiments with non-complementary oligonucleotides gave no signal variation. The biosensorwas able to distinguish between sequences differing in only one base also using polymerase chain reaction-amplified samples [771 base pairs (bp)] of DNA extracted from human blood of thalassemic and healthy (normal) patients or patients with \_-thalassemia traits.

The optimised DNA piezoelectric biosensor has been successfully applied to the determination of one of the most frequent mutation characteristic of \_thalassemia in the Mediterranean population.

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