

# Automated Genomic DNA extraction for the study of genetic variation of breast cancer genes in an Irish population

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We are studying the prevalence of germline mutations in the *CHEK2* gene on chromosome 22q12.1 in 250 Irish females who have had or have breast cancer. For the efficient and reproducible generation of results we are using an automated genomic DNA extraction system to provide high quality stable material.

## Methods

Genomic DNA was extracted from between 7 and 10 ml whole frozen blood using **chemagen** 'chemagic' chemistry with the dedicated **chemagic Magnetic Separation Module I**. Genomic DNA was analysed for integrity by agarose gel and optical density measurement. *CHEK2* exons were amplified using PCR and analysed with various mutation detection methods (Fluorescent SSCP, Phast System SSCP, WAVE dHPLC and fragment analysis using GeneScan technology) depending upon the size of the exon being investigated.

## Results

### 1. Genomic DNA Quality

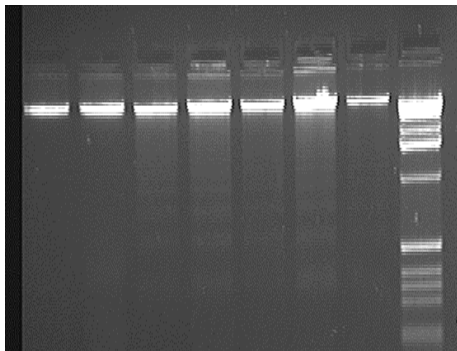


Fig. 1: **chemagic** Magnetic Isolation purified Genomic DNA from whole blood. Average yield for 96 samples was 310 µg (7 - 10 ml frozen blood)

### 2. GeneScan fragment analysis of possible 1bp deletion (patient D09) in *CHEK2* exon 10

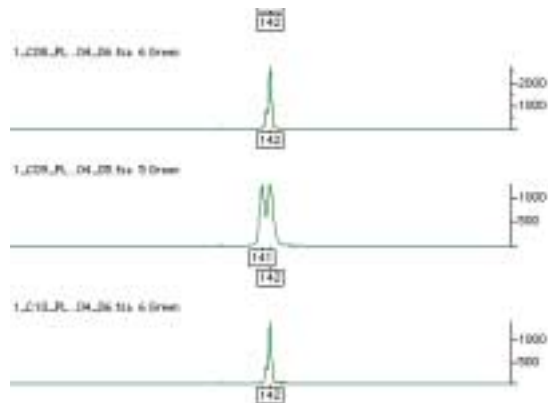


Fig.2: GeneScan fragment analysis

## The chemagic Magnetic Separation Module I



Fig.: The **chemagic Magnetic Separation Module I**.

In the present study, the **chemagic Magnetic Separation Module I** was used in the 'large-volume' configuration applying a 12-rod-head as shown below left. For smaller volumes the head can be easily substituted by the 96-rod version (below right).



Unique features of the **chemagen** system:

- Electromagnet magnetises rotating rods.
- 12/96 rod head handles large volumes up to 10ml,
- or small volumes down to 50 µl.
- Samples processed in 20 – 60 minutes.

**3. Transgenomic WAVE dHPLC Nucleic Acid Fragment Analysis** of a commonly found SNP in exon 1b of the *CHEK2* gene. Normal pattern (A) is shown on the left with the SNP (B) shown on the right.

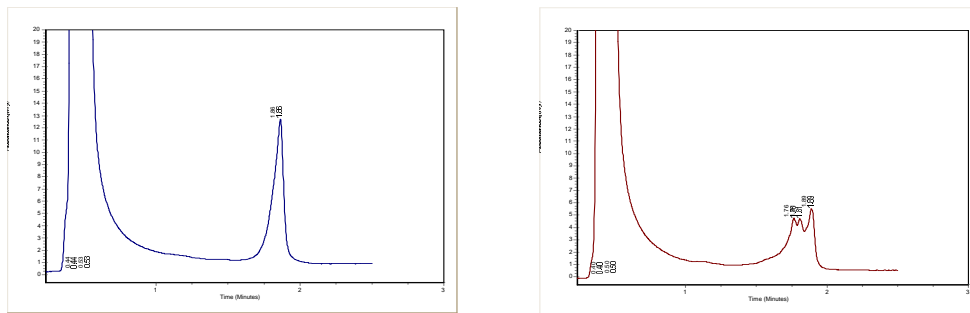


Fig. 3: Transgenomic WAVE dHPLC Nucleic Acid Fragment Analysis

#### 4. Silver Stained Phast SSCP

Patient 5 shows a mobility change which corresponds to a missense mutation in exon 10 (*CHEK2*)

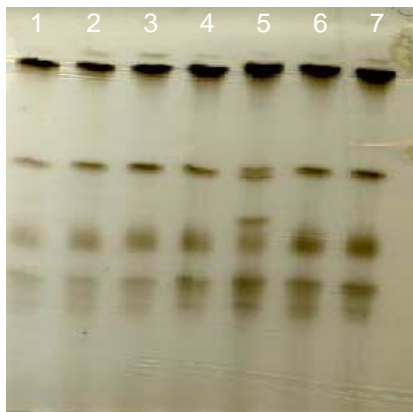


Fig. 4: Silver Stained Phast SSCP of 7 patients

#### Summary

The success of the various mutation detection techniques deployed in this project have relied upon the quality and robustness of the genomic DNA purified using the chemagen technology.

The **chemagen 'chemagic'** automated extraction system and chemistry is found to produce consistently high yields of gDNA of good purity, integrity and stability in a safe enclosed environment. The system is a cost-effective solution to the challenge of processing large numbers of large-volume samples without compromising the requirement for a high degree of consistency of yield, quality and stability of isolated gDNA.