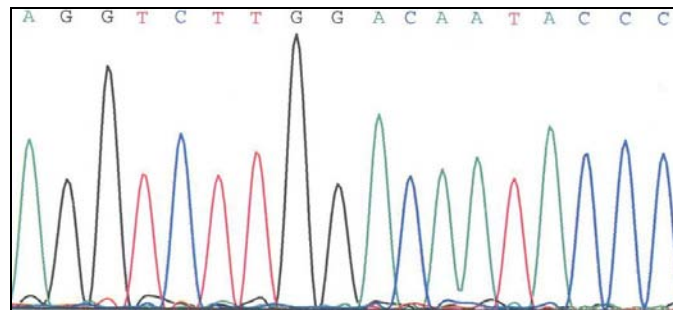


**University of Belgrade**  
**Institute of Molecular Genetics and Genetic Engineering**  
Vojvode Stepe 444a, 11010 Belgrade  
Tel: (+381 11) 3976 445  
Fax: (+381 11) 3975 808  
[www.imgge.bg.ac.rs](http://www.imgge.bg.ac.rs)  
[zmzg@sezampro.rs](mailto:zmzg@sezampro.rs)

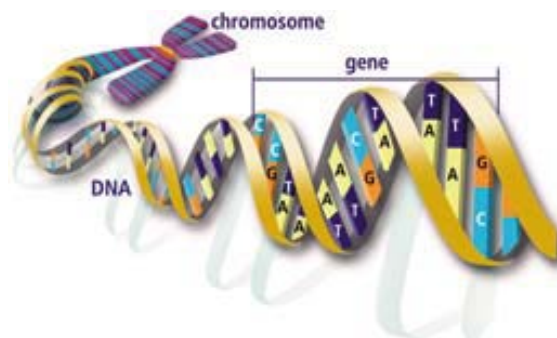
## **MOLECULAR-GENETIC MARKERS IN DIAGNOSTICS AND FOLLOW-UP OF HAEMATOLOGICAL MALIGNANCIES**

Fascinating development and accumulation of knowledge in the field of molecular genetics made a great impact on medical practice. It has been shown that the majority of human diseases is determined by genetic factors. Nowadays, research in the field of molecular haematology is very intense, resulting in successful application of molecular-genetic methods in diagnostics, follow-up and treatment of haematological diseases.



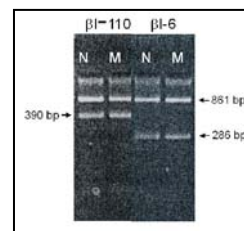
### **What are molecular-genetic markers?**

Molecular-genetic markers are changes in DNA and RNA molecules which can cause a disease or influence its course.



## Why are molecular-genetic markers important to haematologists?

- accurate diagnostics
- prognosis of the disease
- follow-up and early detection of relaps
- choice of the most suitable therapy



## What analyses are being used in diagnostics and follow-up of haematological malignancies?

Analysis	Molecular-genetic markers
Molecular diagnostics and detection of minimal residual disease of the most common translocations in AML (nested RT PCR)	RNA markers t(15; 17) t(8; 21) inv16
Molecular diagnostics and detection of minimal residual disease of the most common translocations in ALL (nested RT PCR)	RNA markers t(12; 21) t(4; 11) t(9; 22) p190 t(1; 19)
Molecular diagnostics and follow-up of CML (nested RT PCR)	RNA markers t(9; 22) p210
Characterization of rearrangements in IgH and TCR genes (PCR, RT PCR, sequencing)	DNA or RNA markers
Detection of mutations in TPMT gene (farmacogenetic marker, choice of therapeutic protocols for ALL and AML)	DNA markers
Detection of mutations in FLT3 gene (prognosis in AML)	DNA markers FLT3/ITD FLT3/D835
Detection of mutations in nucleophosmin gene (NPM1) (RT PCR, sequencing)	RNA markers
Detection of mutations in JAK2 gene (PCR)	DNA markers V617F

## Why are haematological molecular-genetic markers being analyzed in IMGGE?

Institute of Molecular Genetics and Genetic Engineering is highly specialized institution fully equipped with all instruments necessary for molecular-genetic analyses. IMGGE employs team of researchers which are experienced in diagnostics and follow-up of haematological diseases. Diagnostic protocols we apply are in concordance with the ones used in referent European laboratories and are optimized in IMGGE.

## How to prepare the sample for molecular-genetic analysis?

**Samples of blood or bone marrow cannot be collected in IMGGE. No special diet is required prior to sample collection.**

### DNA markers

The amount of sample required for the analysis is 10 ml of whole, venous blood with 3,8% Na-citrate as anticoagulant in 1:9 ratio. Blood should be collected BEFORE, not AFTER transfusion. Analyses must be performed at least one month after transfusion. The sample should be stored at -20°C.

### RNA markers and JAK2

The amount of sample required for the analysis is 3-5 ml of whole, venous blood or bone marrow with 3,8% Na-citrate as anticoagulant in 1:9 ratio. The isolation of RNA should be performed the same day the sample arrives. CAUTION: the sample MUST NOT be stored below freezing temperature.