

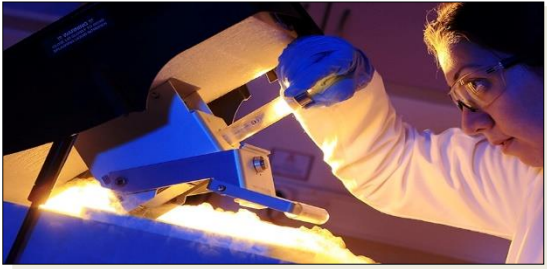


**CENTRAL LABORATORY  
(MERLAB)**

**Molecular Biology and Biotechnology R & D Center (MBB)**

**METU, Ankara**

**Genome Analysis Laboratory (GEN)**



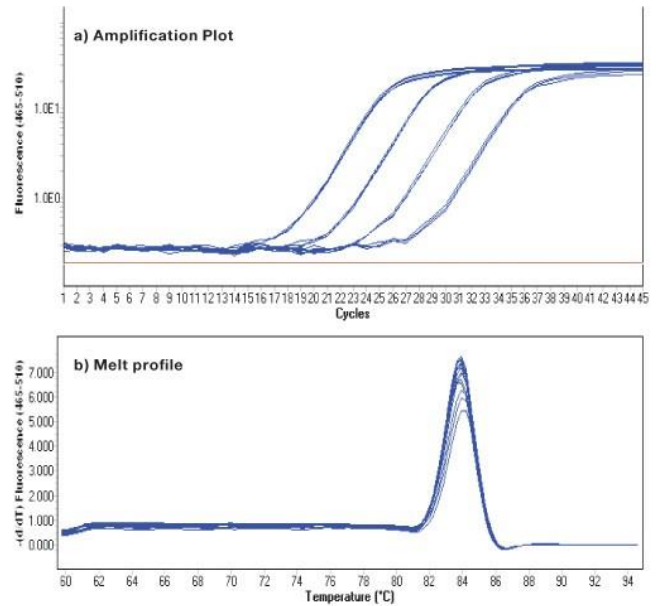
Genome Analysis Laboratory working in molecular life sciences is situated in the quality management system established in accordance with the TS EN ISO / IEC 17025 Standard in Central Laboratory. Genome Analysis Laboratory aims to ensure the effectiveness and continuity of this system and to produce accurate, fast and reliable results to the academic, public and industrial institutions's research and development activities.

In Genome Analysis Laboratory characterization of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) from different tissues can be performed. Gradient and Classical Polymerase Chain Reaction (PCR), LightCycler 1.5 and 480 Real Time PCR, Affymetrix GeneChip DNA microarray, Agilent Bioanalyzer, AlphaSpect Low-Volume Spectrophotometer, ABI 310 DNA Sequencing, ABI 3900 High Throughput DNA Synthesizer instruments are available to perform analysis of Gene Expression Analysis, Gene sequence Analysis, Single Nucleotide Polymorphism Analysis and Fragment Analysis from the isolated DNA and RNA samples.

**BASIC PRINCIPLES**

**Classical PCR:** Amplification of the target gene region is essential in the first stage of analysis based on the nucleic acid molecule. Polymerase Chain Reaction (PCR) is based on enzymatic amplification of a specific region of a DNA chain.

**Real Time PCR:** Real Time PCR is most widely used PCR method giving both qualitative and quantitative results. In contrast to classical PCR based on end product analysis, Real Time PCR Systems monitor PCR reaction simultaneously as the reaction occurs. In such systems, amount of PCR product produced in successive cycles is proportional to the released fluorescence signal. This signal increases in proportion to the amount of the resulting PCR products generated in each reaction cycle. Amount of fluorescence signal is recorded at each cycle and PCR reaction is monitored during its logarithmic phase.



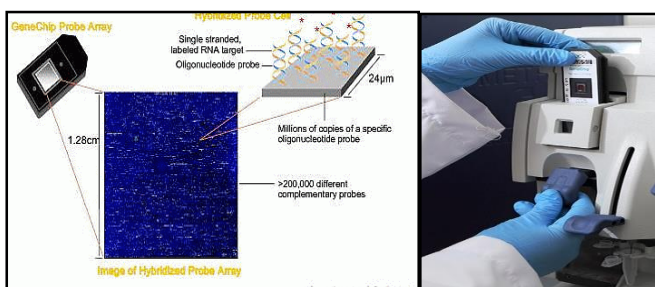
**Real-Time PCR Analysis Profile :**

- \*Gene expression analysis
- \*Genotyping analysis
- \*miRNA analysis
- \*HRM (High-Resolution Melting) analysis
- \*Epigenetic analysis

**Low-Volume Spectrophotometer:** Spectrophotometric measurements based on the light passing through a solution at a certain spectrum and the extent of its absorbance. Maximum absorption of DNA and RNA is at 260 nm, while it is 280 nm for protein solutions. 260 and 280 nm (A<sub>260</sub>/A<sub>280</sub>) ratio in the measurement range gives the purity of nucleic acids.



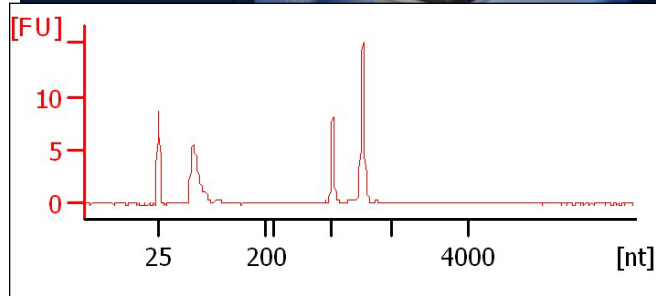
**Microarray System :** DNA microarrays allow the analysis of thousands of genes simultaneously. Affymetrix GeneChip DNA Microarray is used to determine the gene expression levels, gene copy numbers and SNPs in different tissues derived from various organisms. In gene expression level studies; for each mRNA molecule in the actual RNA population; labeled, single-stranded, conjugate cDNA is prepared. The probes are generally produced in the presence of labeled nucleotides by reverse transcription of mRNA to single stranded cDNA. Biotin marked cDNAs are applied onto the chip surface.



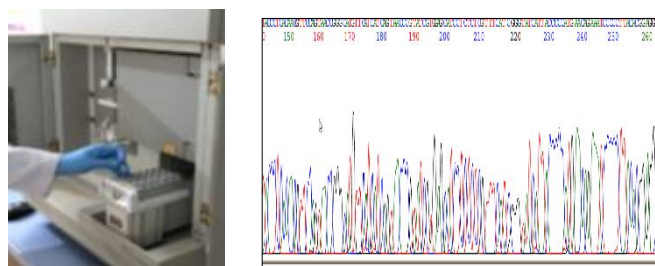
**Microarray Analysis Profile:**

- \*DNA Analysis
- Resequencing Analysis
- Gene Copy Number Analysis
- \*RNA Analysis
- Total transcript expression analysis and profiling
- Gene expression analysis

**Bioanalyzer:** Agilent 2100 Bioanalyzer is based on microfluidic technology platform. On a single platform, cell counting as well as quantification, sizing and quality control assays for DNA, RNA and protein can be performed.



**DNA Sequence Analysis:** Sanger-Coulson chain termination method is used in DNA sequencing instrument. The method based on DNA polymerase ability to use ddNTPs that do not have OH group at the 3rd position of deoksiribose in addition to dNTPs. The addition of a ddNTP to the synthesized DNA stops synthesis reaction since there is no OH group at the 3rd position. A series of DNA fragments occur in each of the reaction. Capillary electrophoresis is applied to DNA fragments. During electrophoresis fluorescent dye attached to DNA fragments is stimulated when scanned with light. Stimulated dye reflects light back at its characteristic wavelength. Results are evaluated by computer programs and data is transferred graphically



**DNA Sequence Analysis Profile:**

- \*Sequence analysis of dsDNA, ssDNA, PCR products and plasmids up to 650-700 bp
- \*Fragment analysis

**Agilent Bioanalyzer Analysis Profile:**

- \*RNA 6000 Nano Assay (intactness and quality)
- \*Protein 80/230 Assay (protein profiles of different organisms)
- \*Cell kit

Genome Analysis Laboratory aims to become one of the leading service and research laboratories in Turkey. Genome Analysis Laboratory continues to work on collaborative studies and on information exchange with its technical infrastructure, qualified staff and innovative values.

**CONTACT INFORMATION**

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