ABI PRISM® 310 Genetic Analyzer

A Benchmark in Laboratory Automation

Molecular biology laboratories need technology that is easy to use yet sufficiently flexible for a variety of applications. To meet this need, Applied Biosystems built upon its proven multicolor fluorescent labeling technology to achieve a completely automated, yet flexible system to sequence, size, and quantitate nucleic acids. This system is the ABI PRISM® 310 Genetic Analyzer.

The 310 Genetic Analyzer is the standard in laboratory convenience. After samples are placed in the sample tray, virtually all aspects of analysis are automated. There is no need to pour conventional polyacrylamide and agarose slab gels or to load samples for electrophoresis. Instead, every function—from sample and gel loading to data collection and analysis—is computer controlled. Equally important, preformulated ABI PRISM® polymers eliminate the guesswork involved with preparing gel materials. The convenience of the system is further enhanced by ABI PRISM® reagent kits for DNA sequencing or PCR product analysis and by access to Applied Biosystems worldwide technical support.

The ABI PRISM® 310 Genetic Analyzer is an automated system for sequencing, sizing, and quantitating nucleic acids. The system achieves unparalleled ease of use through the integration of ABI PRISM® multicolor fluorescent labeling, capillary electrophoresis (CE), and software for data analysis.

Key Features

Easy Instrument Set-up

Simply install the capillary, load the gel pump with polymer, place your samples in the autosampler tray, and instrument set-up is complete.

Automated Gel Loading

The 310 system gel pump automatically fills the capillary with either DNA sequencing or fragment analysis polymer. Switching from DNA sequencing to PCR product analysis is as easy as installing a different capillary and polymer.

Automated Sample Loading

The autosampler, using an electrokinetic injection, sequentially loads each sample into the capillary for electrophoresis.

ABI PRISM® Separation Polymers

The 310 Genetic Analyzer separates DNA fragments by using POP™ Performance Optimized Polymers, which yield extremely reproducible results.

The POP™ polymer family includes POP-6™ polymer for high-resolution applications such as DNA sequencing, and POP-4™ polymer, which provides faster runs for applications such as microsatellite analysis, AFLP® Kit, and rapid sequencing. We also offer a general purpose polymer that is user-modifiable for a variety of genotyping

ABI PRISM® 310 Genetic Analyzer Specifications

	Example Applications	Performance	Polymer	Capillary*	Time† and Temperature	Size	Throughput (per 24 h)
Standard DNA Sequencing Protocol	DNA Sequencing	98.5% basecalling accuracy	POP-6™	i.d. = 50 µm Lt = 61 cm	2.75 h at 50° C	600 bases‡	5,220 base calls (9 runs x 580 base calls per run)
Rapid DNA Sequencing Protocol	Resequencing	98.5% basecalling accuracy	POP-6	i.d. = 50 µm Lt = 47 cm	60 min at 50° C	400 bases	9,120 base calls (24 runs x 380 base calls per run)
Standard POP-4™ DNA Sequencing Protocol	DNA Resequencing	98.5% basecalling accuracy	POP-4	i.d. = 50 µm Lt = 47 cm	52 min at 50° C	525 bases	13,635 base calls (27 runs x 525 base calls per run)
Rapid POP-4 DNA Sequencing Protocol	DNA Resequencing	98.5% basecalling accuracy	POP-4	i.d. = 50 µm Lt = 47 cm	38 min at 50° C	425 bases	14,985 base calls (37 runs x 405 base calls per run)
DNA Sizing	Microsatellites, AFLPs	1 base detection up to 250 bases with 0.15 SD; 2 base detection between 250–350 bases with 0.3 SD	POP-4	i.d. = 50 µm Lt = 47 cm	30 min at 60° C	350 bases	4-dye: 720 genotypes (48 runs x 15 genotypes/run) 5-dye: 960 genotypes (48 runs x 20 genotypes/run)
Mutation Validation/ Screening	SNP Analysis	Single nucleotide polymorphism identification by four-color fluorescence up to 100 bases	POP-4	i.d. = 50 µm Lt = 47 cm	30 min at 60° C	<100 bases	480 genotypes (48 runs x 10 losi)
Mutation Screening	SSCP	0.3% pattern matching precision or better	3.0% GeneScan™ polymer, 10% glycerol	i.d. = 50 µm Lt = 47 cm	20 min at 30° C	300 bases	72 SSCP samples (forward and reverse strand differentially labeled)
Quantitation	RT-PCR	4% peak height precision or better	3.0% GeneScan polymer	i.d. = 50 µm Lt = 47 cm	22 min at 30° C	1,000 bases	195 markers (65 runs x 3 dyes)

*i.d. = capillary interior diameter, Lt = total capillary length

† The amount of time for the size fragment to be detected (includes capillary filling and electrophoresis run time)

‡ Base calling begins at base 21

applications. This polymer allows you to alter polymer concentration or add reagents such as urea or glycerol.

Multiple Dye Detection

The 310 Genetic Analyzer simultaneously detects up to five different fluorescent dyes in a single capillary providing multicolor analysis. This process is further simplified by fluorescent terminator sequencing chemistry, which allows you to perform single-tube sequencing reactions. For genotyping, multicolor detection increases throughput by allowing you to multiplex several PCR samples labeled with multiple dyes. A labeled internal standard can be added to each run to provide exceptional fragment sizing reproducibility.

ABI PRISM® System Integration

The 310 Genetic Analyzer is fully integrated with proven ABI PRISM® reagents and software for DNA sequencing and genotyping applications. The ABI PRISM® 310 Analyzer Windows®-compatible system allows data to be easily transferred between different platforms such as the ABI PRISM® 3100 and 3100-*Avant* Genetic Analyzers as well as to downstream analysis software, the industry standards for automated genotyping, sequencing, and mutation analysis.

DNA Sizing and Quantitation

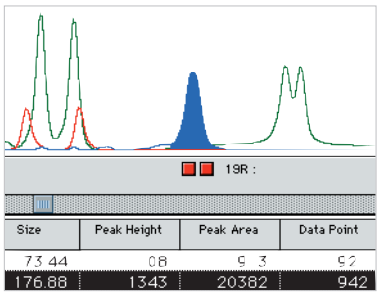
Template Types

- PCR fragments
- Restriction fragments
- cDNA

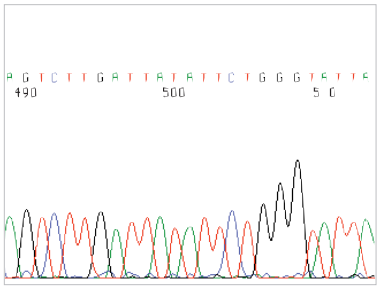
Fluorescent Dye-Labeling Strategies

- 5' dye-labeled primers

Automatic Sample Loading. After samples are placed in the sample tray, the 310 system autosampler loads them into the capillary before each electrophoresis run. This automated loading ensures that the samples are handled consistently and reproducibly.



Microsatellite Analysis Data. Color data output represents the following: GeneScan-500 [ROX™ Dye] internal lane-size standard (red); HUMTH01 (blue) and HUMF13A1 (green).



DNA Sequencing Data. The 310 Genetic Analyzer simultaneously collects data from one sample while analyzing data from the previous runs.

DNA Sequencing

Template Types

- Single-stranded DNA
- Double-stranded DNA
- PCR-generated DNA

Fluorescent Dye-Labeling Strategies

- 5' dye-labeled primers
- Dye-labeled terminators (2'-, 3'-dideoxynucleoside triphosphates) for use with unlabeled primers

Standard Primers

- M13 reverse
- -21 M13
- T3
- T7
- SP6
- SK
- KS

Hardware/Electronics

Detection Unit

CCD camera detector monitors fluorescent wavelengths from 525 to 650 nm. Virtual filter sets are optimized for ABI PRISM® dye sets.

Optics

Excites dyes by the 488 and 514 nm lines of the 10 mW argon ion laser.

Electrophoresis Power Supply

Controls voltage from 100 V to 15 kV.

Gel Pump

Loads capillary with polymer; generates pressures up to 1,800 psi.

Sample Trays

Holds 48 or 96 sample tubes for unattended operation.

Capillary Heat Plate

Controls capillary temperature between ambient and 60° C.

Windows® Computer

Controls all system functions for DNA sequencing and genotyping.

Optional Compatible Color Printer

Dimensions

Electrophoresis Unit

Width*	60.96 cm (24 in)
Height	86.36 cm (34 in)
Weight	94.5 kg (210 lbs)
Depth	55.88 cm (22 in)

*Requires 12.7 cm (5 in) space on the right side of the unit for opening the door.

Service and Warranty

- One-year limited warranty on parts and labor
- Service installation and chemical installation kit
- User bulletins
- Worldwide technical support

DNA Sizing and Quantitation Reagents

- Fluorescent Internal-Lane Size Standards
- Fluorescent Dye Amidites
- Fluorescent Genotyping Demonstration Kit
- ABI PRISM® Linkage Mapping Set
- StockMarks® for Canine Kit
- StockMarks® for Cattle Kit
- StockMarks® for Horses Kit
- AFLP® Plant Mapping Kit
- AFLP® Small Genome Plant Mapping Kit
- Microbial AFLP™ DNA Fingerprinting Kit
- AmpFℓSTR® PCR Amplification Kits
- SNaPshot® Primer Focus Kit
- SNaPshot® Multiplex Kit

DNA Sequencing Kits

- ABI PRISM® BigDye Terminator Cycle Sequencing Kit
- ABI PRISM® BigDye Primer Cycle Sequencing Kit

ABI PRISM® 310 System Consumables and Reagents

Example Applications	Polymer	Capillary	Buffer
Dye Terminator DNA Sequencing	POP-6™* P/N 402844	310 Capillary 61 cm x 50 µm P/N 402840	310 Genetic Analyzer Buffer EDTA P/N 402824
Dye Terminator DNA Sequencing (Rapid Protocol)	POP-6 P/N 402844	310 Capillary 47 cm x 50 µm P/N 402839	310 Genetic Analyzer Buffer EDTA P/N 402824
Dye Terminator DNA Sequencing (Standard and Rapid Protocol)	POP-4™ P/N 402838	310 Capillary 47 cm x 50 µm P/N 402839	310 Genetic Analyzer Buffer EDTA P/N 402824
Microsatellites, AFLPs	POP-4 P/N 402838	310 Capillary 47 cm x 50 µm P/N 402839	310 Genetic Analyzer Buffer EDTA P/N 402824
SNPs	POP-4 P/N 402838	310 Capillary 47 cm x 50 µm P/N 402839	310 Genetic Analyzer Buffer EDTA P/N 402824
SSCP, RT-PCR	GeneScan™ Polymer† P/N 401885	310 Capillary 47 cm x 50 µm P/N 402839	310 Genetic Analyzer Buffer EDTA P/N 402824

*Performance Optimized Polymer
† General purpose, user-modifiable polymer

Custom Fluorescent Primer Service

- Dye-labeled Sequencing Primer Sets
- Dye-labeled GeneScan® Primers
- Five-dye compatible GeneScan® Primers

Software

- 310 Data Collection Software
- GeneMapper® Software
- GeneMapper® ID Software
- Sequencing Analysis Software
- SeqScape® Software

Included with Order

- ABI PRISM® 310 Genetic Analyzer
- ABI PRISM® 310 Genetic Analyzer User's Manual
- Choice of Sequencing Analysis or Fragment Analysis Software
- ABI PRISM® Sequencing Analysis or Fragment Analysis Software Manual
- ABI PRISM® 310 DNA Sequencing or Fragment Analysis Chemistry Guide
- One-year limited warranty on parts and labor
- Service installation and chemical installation kit
- ABI PRISM® 310 Genetic Analyzer Operator Training CD
- Windows® Operating System computer
- Choice of 48- or 96-Well Autosampler Tray

iScience™

iScience. To better understand the complex interaction of biological systems, life scientists are developing revolutionary approaches to discovery that unite technology, informatics, and traditional laboratory research. In partnership with our customers, Applied Biosystems provides the innovative products, services, and knowledge resources that make this new, **Integrated Science** possible.

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Headquarters
850 Lincoln Centre Drive
Foster City, CA 94404 USA
Phone: 650.638.5800
Toll Free: 800.345.5224
Fax: 650.638.5884

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