

LightCycler[®] 1536 Real-Time PCR System
High Throughput – Redefined



Break through to a new era in true high-throughput real-time PCR with this unprecedented innovation in qPCR technology – the LightCycler® 1536 Real-Time PCR System. The LightCycler® 1536 System is a powerful real-time PCR platform explicitly designed for true high-throughput analyses of gene expression and genotyping variation.

This industry-first complete solution for the most demanding high-throughput PCR studies, includes the fast LightCycler® 1536 Real-Time PCR Instrument and novel software, unique LightCycler® 1536 Multiwell Plates, as well as the next generation of real-time PCR reagents, and convenient ready-to-use assays.

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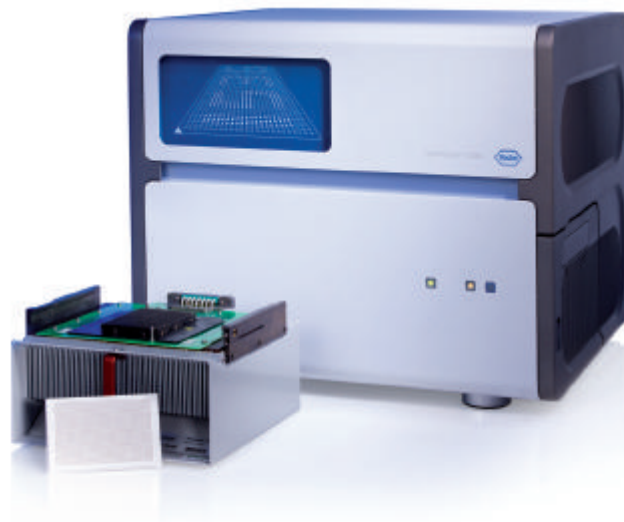
LightCycler® 1536 Real-Time PCR System

High Throughput – Redefined

Forge ahead into a new era in high-throughput real-time PCR with the new LightCycler® 1536 System, precisely engineered for miniaturization and parallelization.

- ***Increase single-run throughput fourfold.***
Generate 1536 sensitive and accurate data points in less than 50 minutes.
- ***Cut your cost per data point in half.***
Next-generation miniaturization uses lower reagent and sample volumes.
- ***Acquire precise raw data you can rely on.***
Confirm legacy results with high-performance real-time PCR, using even very low reaction volumes.
- ***Complement and multiply the throughput of your existing workflow.***
Take advantage of this streamlined system, explicitly designed for automation and high-throughput workflows.

A breathtaking surge in throughput for real-time PCR.



LightCycler® 1536 Real-Time PCR System

Proven high-performance technology

Since their introduction in 1998, LightCycler® Real-Time PCR Systems from Roche Applied Science have been at the cutting edge of innovation in real-time PCR. LightCycler® Real-Time PCR Systems are used for the most demanding applications in gene expression and genetic variation analyses. With the launch of the novel LightCycler® 1536 Real-Time PCR System, Roche Applied Science continues this tradition, setting a new standard for real-time PCR, handling 1536 samples in less than 50 minutes, an industry-first in high-throughput.

This revolutionary addition to the LightCycler® Real-Time PCR Instrument family is explicitly engineered for miniaturization and parallelization in qPCR, paving the way to a new era in high-throughput real-time PCR. Processing 1536 samples at one time significantly increases the currently available throughput of the 96- and 384-well format, sixteenfold and fourfold, respectively. The LightCycler® 1536 Instrument sets new standards of precision, easily assaying 1536 samples in a single run with either gene expression or genetic variation assays.

The LightCycler® 1536 Instrument builds on the high-performance technology of the LightCycler® 480 Instrument, Roche Applied Science's proven platform for 96-format and 384-format plate-based real-time PCR. Using high-throughput modified and optimized technologies in the thermal block cycler and optical system, the LightCycler® 1536

Instrument delivers the sensitivity, accuracy and reproducibility one has come to value in all the LightCycler® Instruments.

Forward looking technological enhancements and novel developments have been integrated to produce the complete solution for high-throughput applications. The LightCycler® 1536 System is an innovative instrument with a streamlined powerful software and a flexible 1536-well plate design, using next generation premium reagents.

Take advantage of our over ten years expertise with the next generation of groundbreaking LightCycler® 1536 Instrument technology:

Break free from the limitations of the past.

▼ **Figure 1: LightCycler® Real-Time PCR Systems – PCR Evolution Takes a Quantum Leap.**



LightCycler® 1536 Instrument

Precise data using exceptional technologies

Using cutting-edge technologies, the LightCycler® 1536 Instrument delivers high-quality results showing outstanding accuracy and reproducibility, with an industry-first processing of 1536 samples in a single PCR run in less than 50 minutes.

Innovative thermal block cycler design

The LightCycler® 1536 thermal block cycler uses the same revolutionary Thermo-Base™ technology for efficient, fast well-to-well temperature homogeneity first found in LightCycler® 480 Instruments.

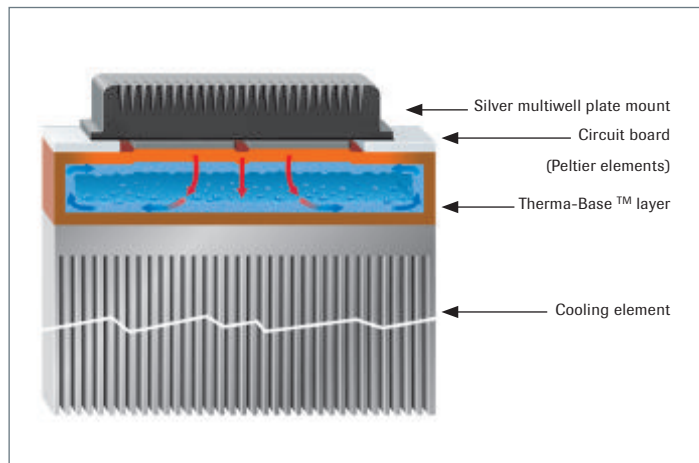
- Obtain outstanding data reproducibility across the entire multiwell plate.
- Generate 1536 data points in less than 50 minutes.

Advanced optical system design

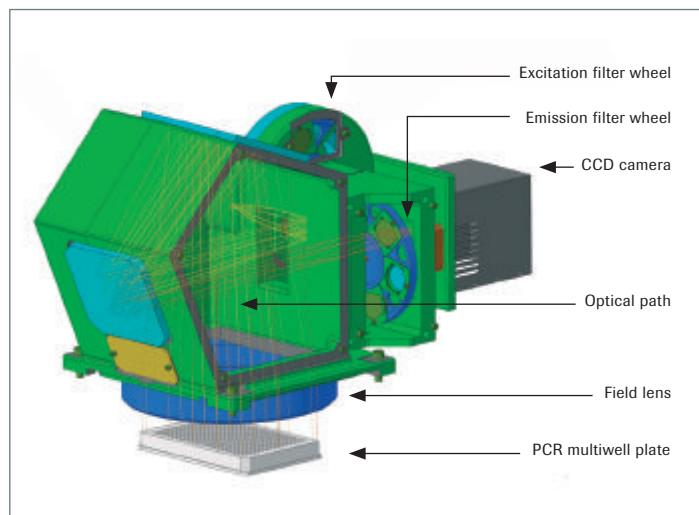
The forward looking optical system of the LightCycler® 1536 Instrument, characterized by an innovative arrangement of optical components produces a high resolution optical focal length explicitly designed to capture and quantify fluorescent real-time PCR signals. Superb signal excitation and reproducible data acquisition eliminate the need for passive reference dyes, such as ROX, making calibration assays unnecessary.

- Profit from advanced and homogenous data capture across the entire multiwell plate.
- Enjoy the freedom not to use reference dyes or calibration runs for data normalization.

Learn more about the innovative technologies of the plate-based LightCycler® Instruments at: www.lightcycler480.com and www.lightcycler1536.com



▲ **Figure 2: Schematic of the LightCycler® 1536 thermal block cycler.** The innovative thermal block cycler architecture comprising the Thermo-Base™ layer enables unparalleled well-to-well temperature homogeneity across the entire multiwell plate.



▲ **Figure 3: Schematic of the LightCycler® 1536 detection unit.** The optical system is optimized for standard dyes, such as FAM, VIC, HEX, and Yellow 555, in both mono- and dual-color hydrolysis probes-based assays, such as Universal ProbeLibrary (UPL) probes, and green intercalating dyes, such as Roche Applied Science's BrightGreen.

LightCycler® 1536 Multiwell Plate

High-performance low-volume real-time PCR analysis

Industry-first miniaturization and parallelization for plate-based real-time PCR

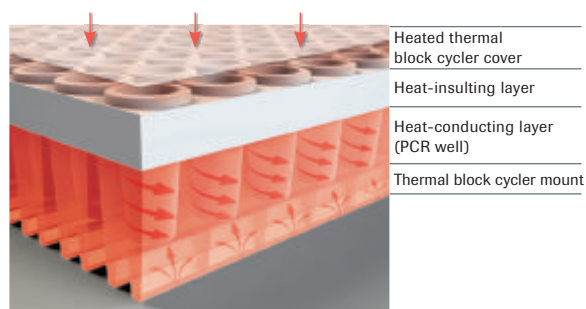
Harnessing unique multiwell plate ThermoMaxis® technology, the specially designed LightCycler® 1536 Multiwell Plate easily handles very low-volume reactions of 0.5 – 2 µl with unprecedented accuracy and reproducibility.

ThermoMaxis® technology uses composite layers of two custom-blended polymers for superior thermal accuracy, speed and uniformity. The heat-conducting lower layer is precision molded to fit exactly into the unique V-groove of the mount of the LightCycler® 1536 thermal block cycler, effectively thermal-coupling the block to the liquid volume. The upper layer serves as a heat barrier by isolating the heated block cycler cover from the liquid volume, for stable and uniform heating across the entire LightCycler® 1536 Multiwell Plate.

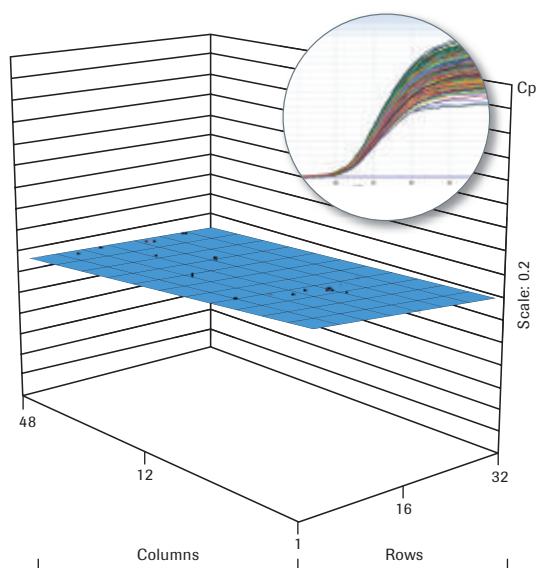
- **Reduce the volume of your PCR reactions to 0.5 – 2 µl.**
- **Produce data of the highest quality previously only possible in higher volume formats (96-/384-well formats).**
- **Take advantage of the novel setup miniaturization:**
 - Reduce the cost per data point at least in half.
 - Reduce volume input and conserve valuable sample/reaction mix.
- **Enjoy highest layout flexibility using the convenient 1536-well format.**
- **Reduce the risk of sampling error with four-times higher throughput per plate.**



▲ **Figure 4: LightCycler® 1536 Multiwell Plates (front and back view).**



▲ **Figure 5: Schematic of the LightCycler® 1536 Multiwell Plate.**



▲ **Figure 6: High level crossing point (Cp) homogeneity across a LightCycler® 1536 Multiwell Plate.**

LightCycler® 1536 Software

Tailor-made for high-throughput needs

Advanced features dedicated to high-throughput workflow environments

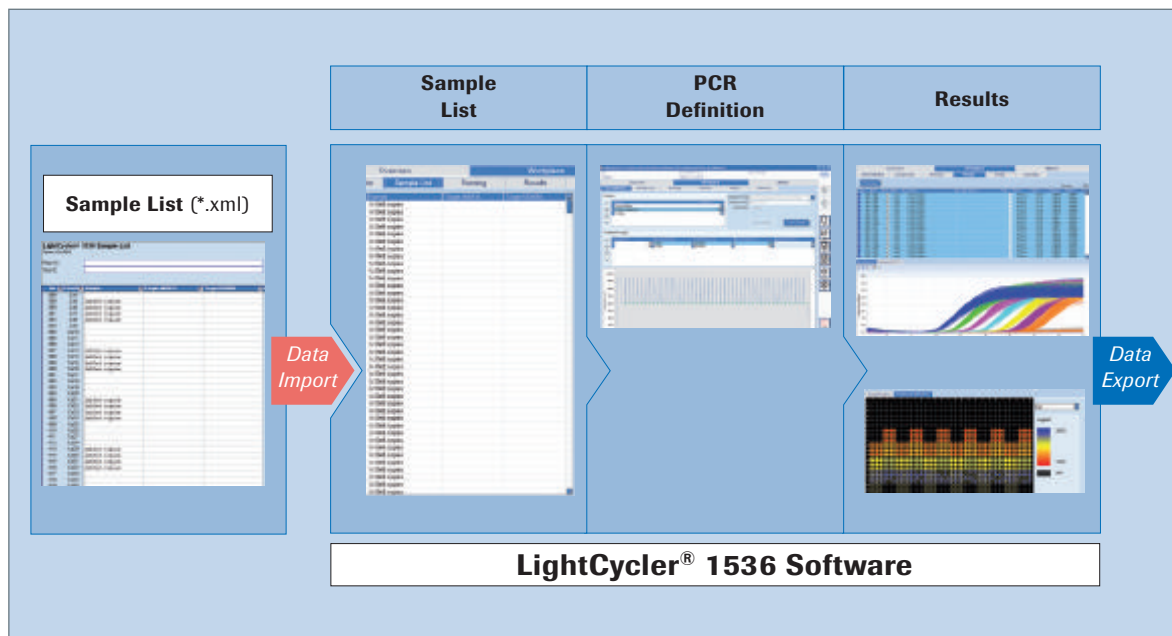
The novel LightCycler® 1536 Software is specifically designed to integrate the LightCycler® 1536 Instrument seamlessly into the automated PCR workflow. Functioning as a powerful single component in the PCR workflow, this software carries out flexible data management and allocation in both network and LIMS environments.

The LightCycler® 1536 Software provides fast, accurate, real-time PCR results in the form of Cps, as well as endpoint and slope values, for gene expression and genetic variation analyses. Powerful threshold functionalities enable the user to adapt selectable parameters (e.g., Cps) to any particular real-time PCR assay. Up-to-date software features, such as data output in the form of heatmaps, facilitate

a quick evaluation of the 1536 results produced in a single run.

Combined with the new RealTime ready Master reagents, LightCycler® 1536 Software also provides an industry-first unique surveillance capability, for verifying the performance of PCR setup pipetting during automated PCR preparation.

- Gain robust real-time PCR results using the unique surveillance capability.
- Use powerful threshold functions for data analysis adaptable to any assay.
- Easily review 1536 results using tools for data sorting, filtering and reviewing.
- Allocate and manage data in both network and LIMS environments.



▲ Figure 7: Intuitive high-throughput workflow of the LightCycler® 1536 Software.

RealTime ready Reagents

Next generation of real-time PCR chemistry

Advanced reagents designed for automated high-throughput workflows

The new RealTime ready chemistry is the next generation of sensitive PCR reagents, specially developed for demanding applications in automated high-throughput PCR workflows.

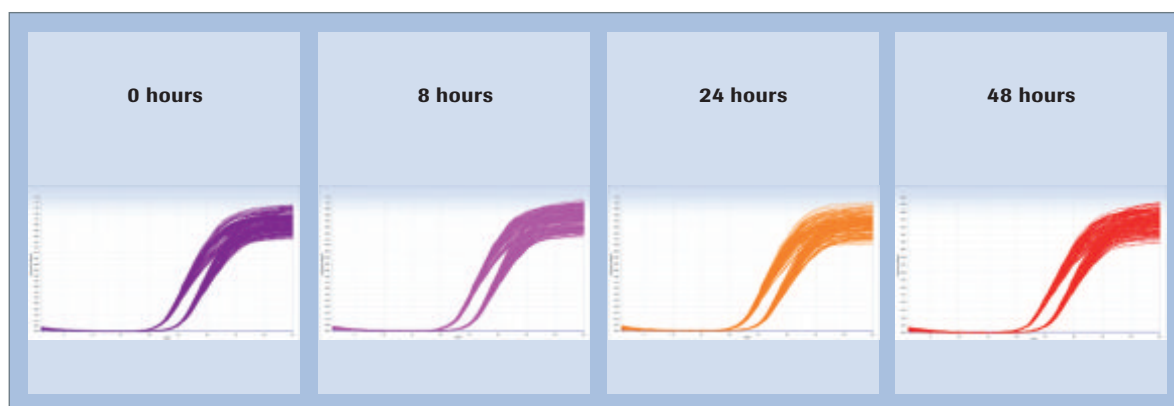
Featuring state-of-the-art, ready-to-use reagents with hot-start PCR chemistry, and the ability to carry out fast PCR protocols, RealTime ready reagents are explicitly designed for automated low-volume PCR reactions (5x concentrated).

Liquid handling grade performance is guaranteed for even the lowest volume range of 0.5 μ l, with exceptional room temperature stability for the longer processing steps (up to at least 48 hours). These outstanding innovative reagents also enable the unique error tracking surveillance capability for verifying quality control during the automated PCR setup. Both RealTime ready DNA Master Kits, for hydrolysis probes and the intercalating dye format, are designed for convenient up- and down-scaling of

PCR reaction volumes in LightCycler[®] 480 and 1536 Systems (96-, 384-, and 1536-well format), allowing rapid adaptation to your immediate throughput needs.

For gene expression analysis, the ideal combination will use Roche Applied Science's RealTime ready Assays (Universal ProbeLibrary probes) with the new RealTime ready DNA Probes Master reagent, eliminating time-consuming assay optimization (see Figure 13).

- Obtain fast accurate results using next generation high-throughput real-time PCR chemistry.
- Take advantage of the industry-first pipetting error tracking surveillance capability in automated PCR workflows.
- Easily scale your PCR reaction mix volumes for your experimental needs (96-, 384-, and 1536-well format).

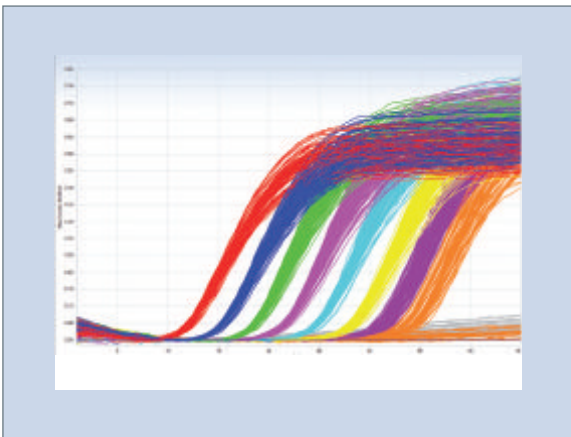


▲ **Figure 8: Long-term stability of the RealTime ready DNA Probes Master.** Tenfold dilution steps of cDNA (starting material: 500 and 50 pg total RNA equivalents) were

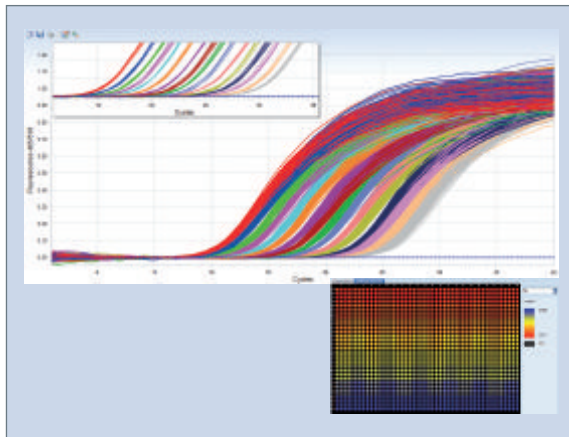
assayed either immediately after PCR setup or after 8, 24, and 48 hours at room temperature (standard deviation: 500 pg total RNA: 0.14; 50 pg total RNA: 0.15).

LightCycler® 1536 System

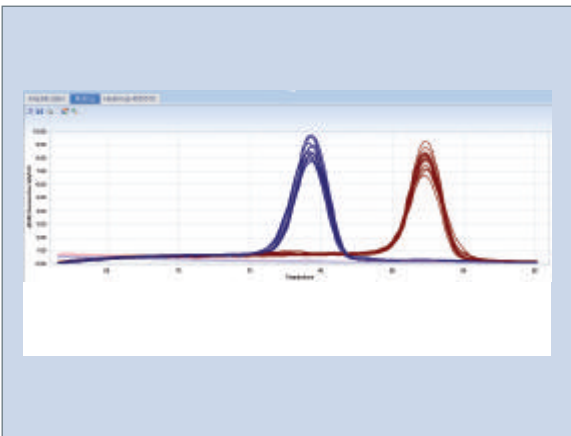
Superb results using low (down to 0.5 µl) reaction volumes



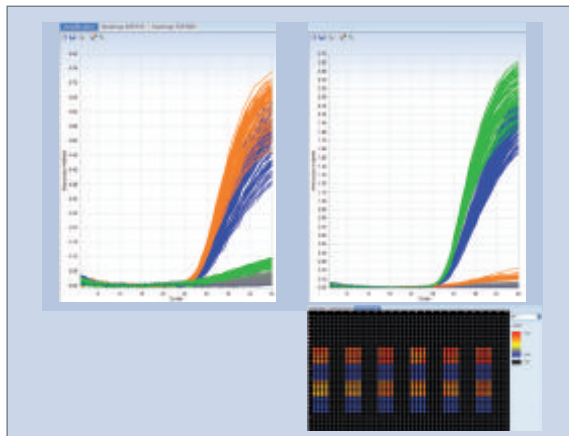
▲ **Figure 9: Superb linear range of the LightCycler® 1536 System.** Eight concentration steps of a 1:10 serial dilution from 10^7 to 10 copies/sample and negative controls (96 replicates each).



▲ **Figure 10: Outstanding sensitivity and reproducibility of the LightCycler® 1536 System.** Sixteen concentration steps of a 1:2 serial dilution from 10^6 to 3×10^1 copies/sample (96 replicates each) distributed in a checkerboard scheme across the entire multiwell plate, as depicted in the crossing point heatmap chart (6-times 4 x 4 replicates).



▲ **Figure 11: Precision melting curve analysis for DNA product identification with the LightCycler® 1536 System.** Melting peak curves of two individual target genes, illustrated as a first negative derivative plot of the fluorescence versus temperature.

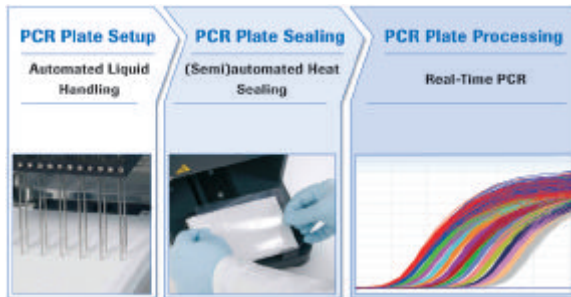


▲ **Figure 12: Sensitive detection of endpoint fluorescence (EPF) values.** Amplification curves and one corresponding heatmap showing endpoint values of a dual-color fluorescence detection analysis.

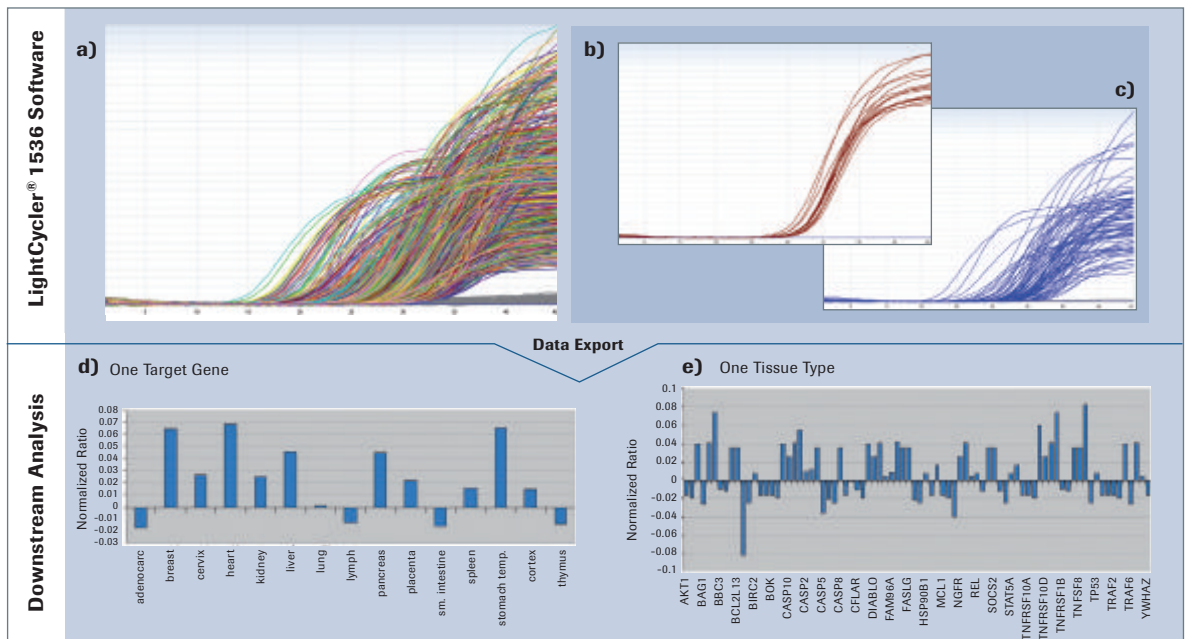
Workflow Integration – LightCycler® 1536 System

Discover real high-throughput

The new LightCycler® 1536 Real-Time PCR System redefines high-throughput by incorporating industry-first miniaturization, parallelization, and cost-effectiveness for the ideal solution in gene expression and genotyping assays.



- Benefit from the new customizable experimental setup.**
 Quickly adapt multiwell plate layout to your lab's changing research needs.
- Upgrade your existing real-time PCR workflow for a higher throughput.**
 Take advantage of a streamlined concept, explicitly designed for low-volume automation and high-throughput workflows.
- Verify your assays using the pipetting error tracking surveillance capability.**
 The robust surveillance concept accurately detects PCR setup pipetting errors.



▲ Figure 13: High-throughput gene expression profiling.
Experimental setup: Sixteen tissue samples were analyzed using 96 RealTime ready Assays, with 82 target genes from the apoptosis pathway, 8 reference genes, and 6 controls.
Results: **LightCycler® 1536 Software:** **a)** Amplification data for all 1536 real-time PCR assays; **b)** Single analysis of

1 target gene (AKT1) in 16 tissue samples; **c)** Single analysis of 82 target genes in 1 tissue sample (small intestine); **Downstream software:** **d)** Normalized ratios of 1 target gene (AKT1) in 15 tissue samples; **e)** Normalized ratios of 82 target genes in 1 tissue sample (small intestine).

LightCycler® 1536 System

Specifications

Dimensions	W 57.4 cm x D 58.8 cm x H 49.7 cm
Weight	55.6 kg
Reaction volume	0.5 – 2.0 µl
Run time	< 50 min
Temperature Range	37 – 95°C
Heating Rate	4.8°C/sec
Temperature Control	Peltier-based heating/cooling, Therma-Base™ heat spreading technology
Cooling Rate	2.5°C/sec
Excitation	Xenon Lamp
Detector	Cooled monochrome CCD camera
Filters (selectable)	Excitation (nm): 465, or 533 Detection (nm): 510, or 580
Multiwell Plate	Thermaxis® technology (two-component design) Barcode labeled for automated workflow tracking

Ordering Information

LightCycler® 1536 Instrument and additional products

Product	Cat. No.	Pack Size
LightCycler® 1536 Instrument	05 334 276 001	1 Instrument
LightCycler® 1536 Software	05 546 338 001	1 Software Package
LightCycler® 1536 Multiwell Plate	05 358 639 001	100 Plates
RealTime ready DNA Probes Master (5x concentrated)	05 502 381 001	5 x 1 ml (12,500 x 2 µl reactions, or 1,250 x 20 µl reactions)
RealTime ready DNA Green Master (5x concentrated)	05 573 092 001 <i>Coming soon!</i>	5 x 1 ml (12,500 x 2 µl reactions, or 1,250 x 20 µl reactions)
For detailed information, please visit www.lightcycler1536.com		
Transcriptor First Strand cDNA Synthesis Kit	04 379 012 001 04 896 866 001 04 897 030 001	50 reactions 100 reactions 200 reactions
RealTime ready Focus Panels	For detailed information, please visit www.realtimeready.roche.com	
Universal ProbeLibrary assays	For detailed information please visit www.universalprobelibrary.com	

For detailed information about Roche Applied Science's complete line of reagents and instruments for gene expression and genetic variation analysis workflows, please visit: www.roche-applied-science.com



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