

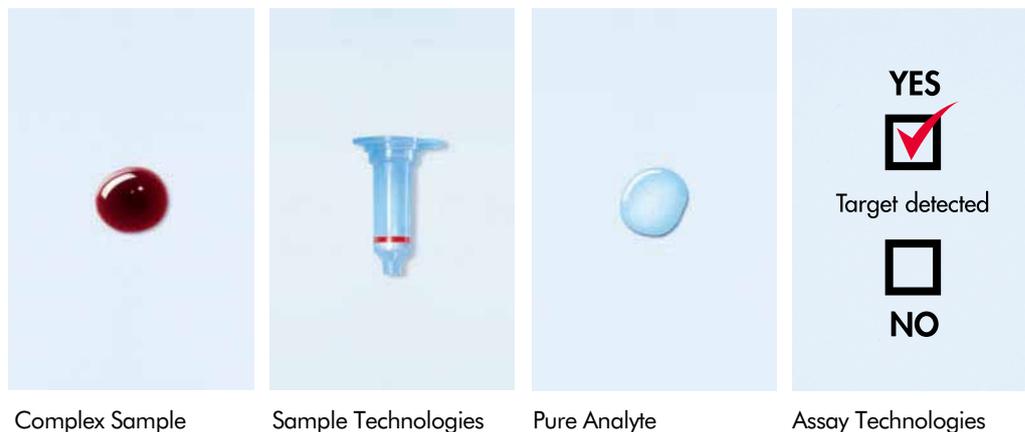
Complete Solutions for Translational Medicine



Sample & Assay Technologies

Providing complete solutions

Providing sample and assay technologies. Solutions for life sciences, molecular diagnostics, applied testing, and pharma.



It all starts with the sample. Genetic material must be extracted from a biological sample and specifically processed before scientists from academia and industry can actually work with it. QIAGEN made the handling of nucleic acids routine. QIAGEN is the world's leading provider of innovative technologies, products, and automated solutions for the isolation and handling of DNA, RNA, and proteins — the building blocks of life.

Beyond extraction of genetic information from any type of biological sample, QIAGEN's technologies also allow targeted detection of hereditary material. QIAGEN is one of the world's leading providers of molecular diagnostic solutions for prevention, profiling, and personalized healthcare applications, as well as a standard setter in the emerging field of point-of-need testing. Additionally, QIAGEN testing technologies enable detection of food-borne pathogens, and widespread animal disease, and determination of a person's lineage or the origin of traces of biological material found at a crime scene. QIAGEN provides more molecular diagnostic reagents and testing solutions than any other company.

Around the world, QIAGEN helps customers from diagnostic laboratories, academic research institutions, and pharmaceutical and biotech companies to achieve outstanding success and breakthroughs. QIAGEN's technological leadership and specific know-how drive the markets for preanalytical and testing solutions. When it comes to accessing and analyzing content from biological samples for breakthroughs in biomedical research, drug development, and molecular testing, more than 500,000 customers worldwide trust QIAGEN products. QIAGEN makes improvements in life possible.

Translational medicine

Translational research refers to the whole process that can rapidly translate research results into applicable theories, technologies, and applied or therapeutic interventions. Translational medicine aims to build a highway between bench and bedside, and will impact medical research through the following aspects.

Molecular biomarker identification and validation

Biomarkers include early diagnostic, disease prognostic biomarkers, and possibly drug targets. Identification and validation of these biomarkers is the initial step for translational research.

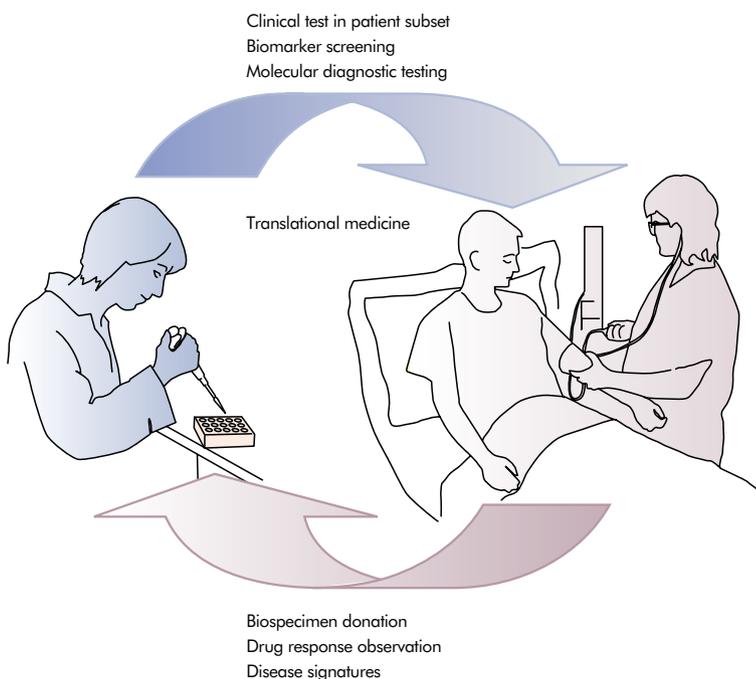
Personalized treatment based on genotyping

Diseases like cancer, cardiovascular diseases, and diabetes are all chronic diseases caused by multiple risk factors with complicated molecular mechanisms and are therefore very difficult to treat using a single one-fit-all clinical protocol. If a genotyping profile of each patient with such diseases can be set up based on patients' genetic information, disease molecular mechanism, and clinical features, a more personalized, cost-effective, and less toxic drug treatment will be achieved.

Drug-response prediction

Using well-validated biomarkers to predict patients' response rate to some drugs will allow clinicians to choose the most appropriate drug and also the proper dose of that drug.

QIAGEN provides comprehensive solutions for translational research, ranging from clinical sample processing all the way to downstream molecular analysis assays. Whatever questions you are facing right now for your translational research — no matter if it is a biobank set-up issue, or a biomarker discovery project, or you are attempting to achieve a personalized treatment for your patients — QIAGEN's total solutions, equipped with our highly automated instruments, will unquestionably make your work more efficient and reliable.



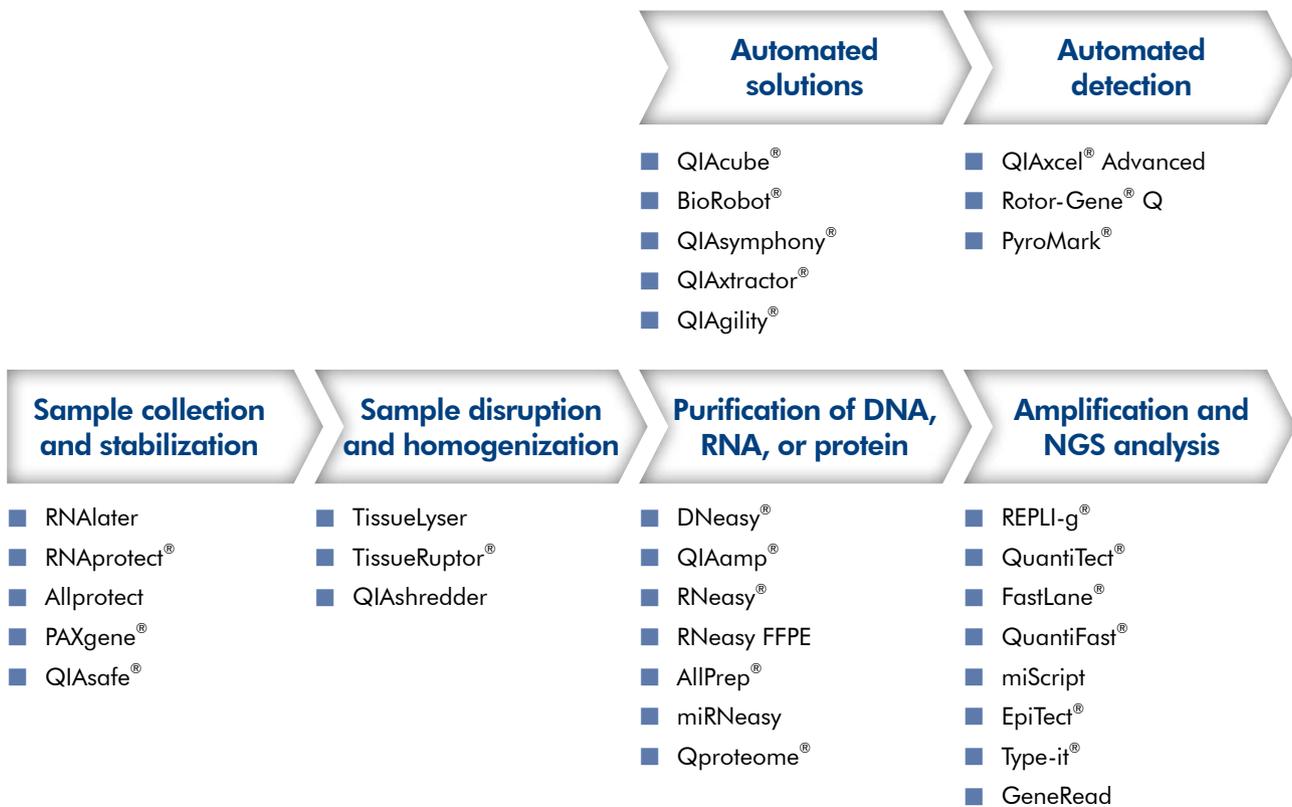
Index of QIAGEN offerings in translational research

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Technologies for content retrieval and analysis

Biobanking is becoming an engine for translational research. QIAGEN's Tissue Management System addresses the major issues in sample processing and analysis for biobanking: the low degree of standardization and insufficient quality-controlled protocols. QIAGEN provides a comprehensive range of solutions for your research studies, from sample collection and stabilization to analyte purification and ready-to-use downstream assays. Up-to-date product information, protocols, news, and articles are available at www.qiagen.com/tissuemangement.

QIAGEN offers more than 20 years of experience in handling, stabilization, and purification of different analytes. Complete matching solutions are available to standardize all steps of the workflow. This ensures comparability and reproducibility of data in clinical case-controlled and population-based studies, facilitating biomarker discovery and the development of diagnostics and therapeutics.



QIAGEN's comprehensive range of solutions.

Sample collection, stabilization, and purification

Effective sample collection is vital to ensure biobank quality and integrity, which in turn guarantees the efficiency of translational research. To obtain a true representation of the sample content in future experiments, analytes must be satisfactorily preserved at the point of collection.

The PAXgene Blood DNA/RNA/miRNA System is a revolutionary, enabling technology that consolidates and integrates the key steps of whole blood collection, nucleic acid stabilization and purification. By minimizing the unpredictability associated with nucleic acid processing, the system provides enhanced accuracy of DNA/RNA/miRNA analysis. The PAXgene system supplies pharmaceutical, CRO, and research institutes with a completely integrated approach to nucleic acid purification.

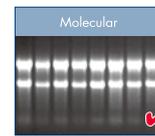


The QIAamp Circulating Nucleic Acid Kit greatly simplifies the isolation of circulating DNA and RNA from plasma or serum. Nucleic acids are efficiently purified and concentrated from starting materials that contain low concentrations of mostly fragmented DNA and RNA (typically 1–100 ng/ml circulating DNA in human plasma). Starting sample volumes can be up to 5 ml. Purification of circulatory RNA is possible by optional on-column DNA digestion with the RNase-Free DNase Set.



QIAamp Mini columns. shown with tube extenders for processing up to 5 ml blood sample on the QIAvac 24 Plus.

PAXgene Tissue System offers a solution for simultaneous stabilization of molecular content and preservation of morphology. Without crosslinking, the PAXgene Tissue System enables histological analysis and extraction of high-quality RNA, miRNA, and DNA from the same specimen. Together, the container and kits provide a complete preanalytical solution for collection, fixation, and stabilization of tissue, and purification of high-quality nucleic acid for research molecular analysis.



FFPE Kits are specially designed for analyte purification from FFPE tissue using innovative procedures to reverse the cross-linking process, which would otherwise block downstream applications.

Selected QIAGEN kits.

Kit	Purpose
QIAamp DNA FFPE Tissue Kit	Purification of DNA
RNeasy FFPE Kit	Purification of total RNA down to 70 nucleotides
miRNeasy FFPE Kit	Purification of total RNA down to approximately 18 nucleotides
Qproteome FFPE Tissue Kit	Isolation of full-length proteins
REPLI-g FFPE Kit	Whole genome amplification
AllPrep DNA/RNA FFPE Kit	Simultaneous purification of genomic DNA and total RNA (including small RNAs)

Solutions for automation

Automated platforms, with highly efficient and standardized operating procedures, become an essential part for the workflow of translational research. Whatever your application requirements and throughput needs, QIAGEN provides cutting-edge automation solutions to fit your workflow and free up your time for translational research with increased productivity and standardized results.



The QIAcube.

Low-throughput purification of DNA, RNA, or proteins with the QIAcube

The award-winning QIAcube uses advanced technology to process QIAGEN spin columns, enabling seamless integration of automated nucleic acid or protein purification into your laboratory workflow. All steps in the purification procedure are fully automated and up to 12 samples can be processed per run.



The BioRobot Universal System.

Fully automated medium- to high-throughput applications with the BioRobot Universal System

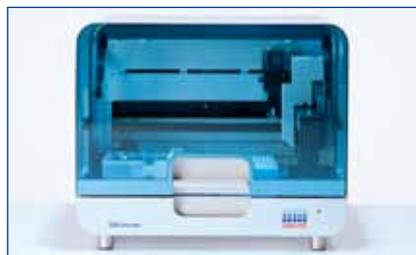
The BioRobot Universal System integrates all the instrumentation, software, purification, and enzyme technologies that are required for medium- to high-throughput applications in 96-well format. Application Packs are available for gene expression, genotyping, sequencing, and forensic applications. Optimized protocols enable automated RNA or DNA purification, as well as PCR cleanup. Downstream reaction setup includes RT-PCR, PCR, sequencing reaction, and forensic assay setup.



The QIASymphony SP.

QIASymphony SP for high-performance in molecular biology

The QIASymphony SP meets the demand for a high-performance automated system with flexible processing of a wide range of samples. Up to 96 samples, in batches of up to 24 samples, can be processed per run. Innovative functions, optimized protocols, unrivaled flexibility, plus a novel kit concept place the QIASymphony SP at the cutting edge of laboratory automation for all disciplines in molecular biology.



QIAextractor.

QIAextractor[®]

The QIAextractor is a compact instrument that provides walkaway purification of nucleic acids from 8–96 samples per run. The easy-to-use, economical system comprises instrument, reagents, plasticware, and optimized protocols, enabling purification of nucleic acids from a wide range of sample types in 96-well format. The instrument has low tip consumption, reducing waste and improving cost-efficiency.

QIAgility

The QIAgility is a compact benchtop instrument that enables various high-precision pipetting applications and rapid, reliable automated PCR setup in a wide range of formats, including PCR assays for the Rotor-Gene Q. The high precision of the QIAgility delivers the reproducible results you need in your quantitative PCR assays and sensitive experiments, from sample to sample and experiment to experiment.



QIAgility.

Rotor-Gene Q

The unique centrifugal rotary design of the Rotor-Gene Q makes it the world's most precise and versatile real-time PCR instrument. Each tube spins in a chamber of moving air, which keeps all samples at each step of the cycling program at exactly the same temperature. Optical detection is equally precise since each sample rotates past the excitation and detection optics. This unique design delivers sensitive and fast PCR analysis and eliminates the variation that typically occurs in block-based cyclers.



Rotor-Gene Q.

QIAxcel Advanced System

The exceptional QIAxcel Advanced System, in combination with new QIAxcel ScreenGel™ software, replaces traditional, labor-intensive gel electrophoresis of DNA and RNA — streamlining your workflow and reducing time to result. The QIAxcel Advanced System fully automates high-resolution capillary electrophoresis of up to 96 samples per run. Ready-to-run gel cartridges allow 96 samples to be analyzed with a minimum of hands-on interaction, reducing manual handling errors and eliminating the need for tedious gel preparation.



QIAxcel Advanced.

PyroMark Pyrosequencing systems

The PyroMark Pyrosequencing platforms integrate detection and quantification into one powerful system, providing highly accurate results in a sequence context within minutes. Multiple types of analyses, such as mutation analysis, drug resistance typing, and DNA methylation quantification, can be carried out on the same instrument and even in the same run. The versatile PyroMark platforms seamlessly integrate into epigenetics and genetic analysis workflows, and complement QIAGEN's advanced technologies for sample preparation, bisulfite conversion, and PCR amplification.

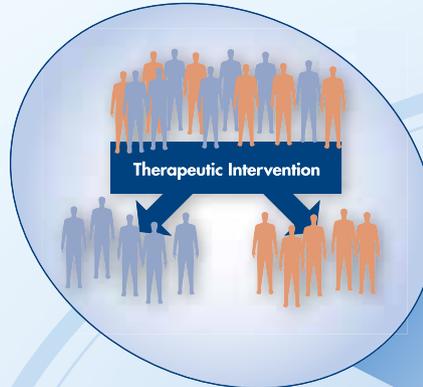


PyroMark Q24.

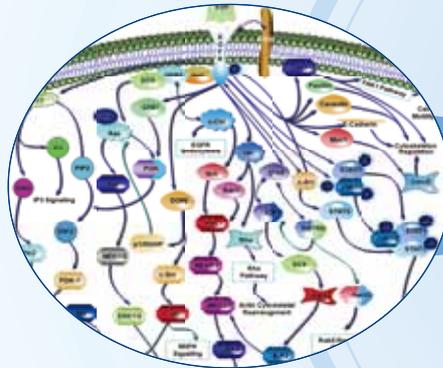
Complete solutions for

Companion diagnostics and personalized medicine (Pages 14, 15)

- KRAS mutation test
- EGFR mutation test
- BRAF mutation test
- Co-development programs



From bedside to



Biomarker identification and analysis (RNA Level) (Pages 12, 13)

- miRNA
- PCR array
- Real-time PCR



Translation
research



From bench to

Biomarker identification and analysis (DNA level) (Page 11)

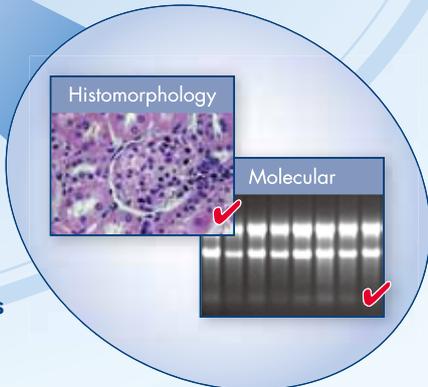
- SNP
- Epigenetics
- Mutation screening

translational medicine



Total solutions for sample preparation (Page 5)

- Sample collection
- Sample stabilization
- DNA/RNA/protein purification



Automatic sample preparation and detection pipeline (Pages 6, 7, 10)

- Sample disruption
- Sample purification
- Assay setup
- Detection analysis

Biobanking solutions (Page 4)

- Blood
- Bone marrow
- FFPE samples
- Cells and tissues



Relax and let QIAGEN automate your complete workflow

Total automated solution from sample to result is much needed for translational research, providing high throughput and standardization. QIAGEN now provides everything that you need to standardize and fully automate your routine sample preparation and analysis workflow. With our dedicated range of QIASymphony Kits, the QIASymphony SP enables sample preparation of DNA, RNA, bacterial and viral nucleic acids, and 6xHis-tagged protein from a wide range of starting materials. The QIASymphony AS extends the capabilities of the QIASymphony SP by integrating automated PCR assay setup which, in combination with the Rotor-Gene Q and QIAGEN real-time and end-point PCR kits, enables you to complete your automated PCR workflow and maximize your efficiency — from sample to result.



Sample purification and reaction setup.

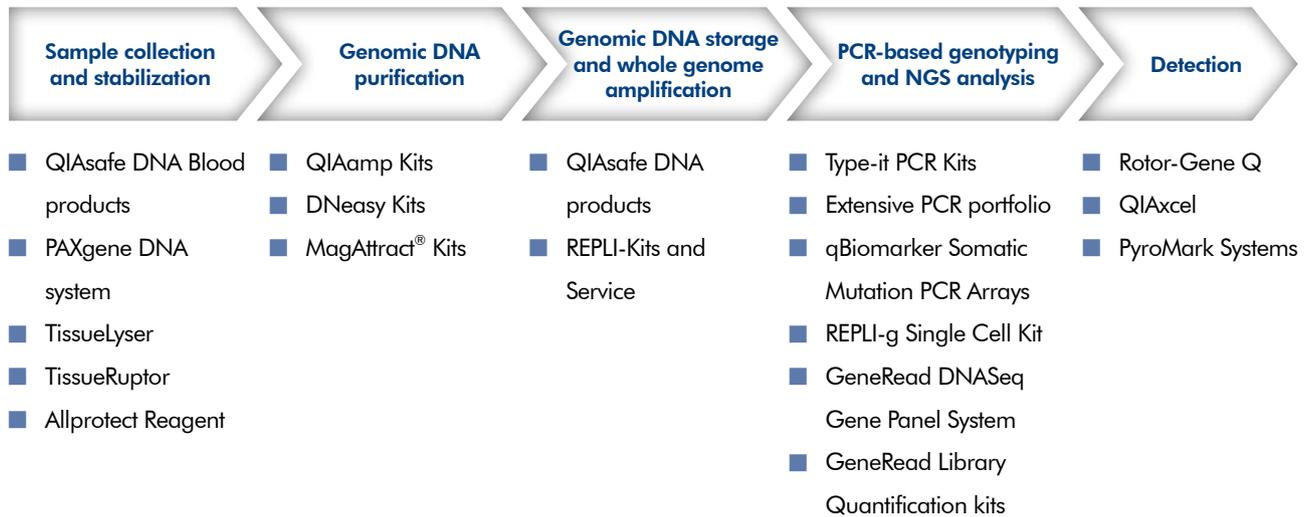


Rotor-gene Q real-time PCR.



Reliable reagents.

Biomarker identification and analysis



Accurate genotypic analysis often requires extensive optimization of experimental parameters. Sample materials may be limiting in genotyping studies, for example, when large numbers of SNPs need to be analyzed or when working with sample materials such as biopsies or FFPE tissue. QIAGEN recognizes these challenges and has developed reliable PCR-based kits that are dedicated for genotyping applications ranging from identification of microsatellite loci and analysis of SNPs to detection of mutations using different detection technologies.

SNP

The Type-it Fast SNP Probe PCR Kit provides accurate SNP genotyping using the Rotor-Gene Q, even for difficult templates or SNPs and low template amounts. Outstanding separation and tight allele clustering, together with the allelic discrimination or scatter plot analysis functions of the Rotor-Gene Q software, ensure high call rates and accurate, reproducible, and reliable genotyping results.

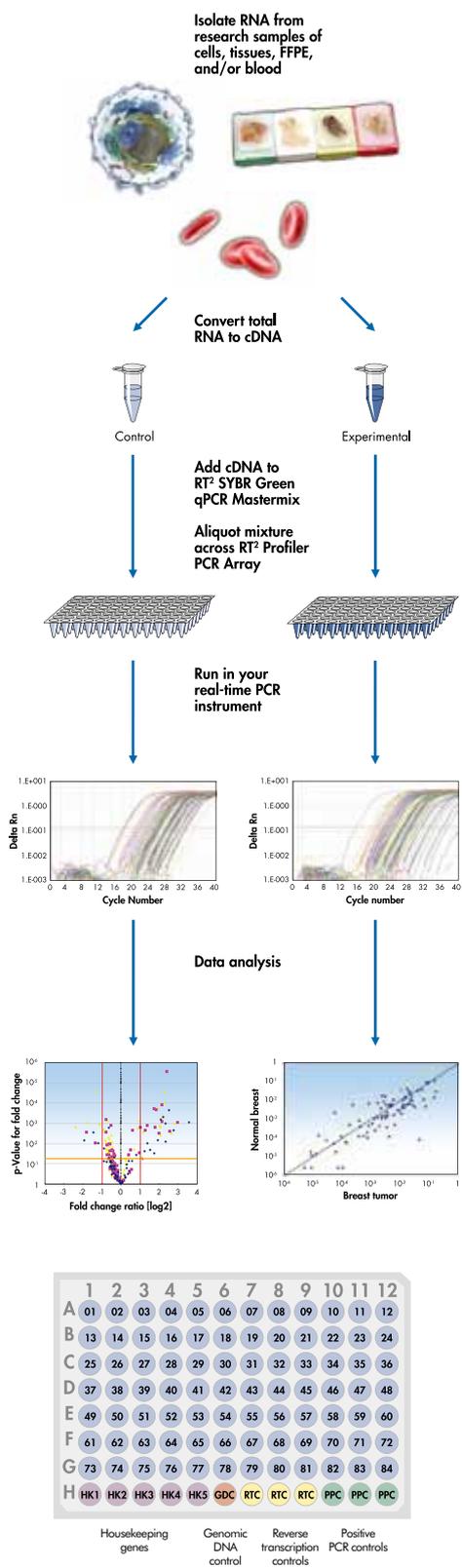
Somatic mutation screening

The qBiomarker Mutation PCR Arrays and Assays are designed to analyze mutations reported in genes associated with disease processes. The mutations are selected from comprehensive curated, literature reviews, frequency of occurrence, and functional relevance.

DNA methylation

The study of epigenetic mechanisms is becoming increasingly prevalent in disciplines ranging from cancer research to genetic imprinting and biomarker development. Pyrosequencing provides accurate and detailed profiles of DNA methylation patterns underlying cell cycle regulation, differential gene expression, and epigenetic effects.

Strengthening our Pyrosequencing solutions, the new PyroMark CpG Assays enable methylation analysis of multiple targets in virtually any human or mouse gene.



RT² Profiler PCR Array plate layout. Each well in an RT² Profiler PCR Array measures the expression of a gene related to a pathway or disease state. A typical 96-well format is shown. This is also available in a 384-well plate, 100-well disc, and 96x96 chip format.

PCR arrays

PCR arrays are the most reliable tools for analyzing the expression of a focused panel of genes. Each 96-well plate, 384-well plate, or 100-well disc PCR arrays includes SYBR Green-optimized primer assays for a thoroughly researched panel of relevant, pathway- or disease-focused genes. PCR arrays can also be customized to contain a panel of genes tailored to your specific research interests. Our high-quality primer design and master mix formulation enable the PCR array to amplify 96 or 384 different gene-specific products simultaneously under uniform cycling conditions. This combination provides the PCR array with the specificity and the high amplification efficiencies required for accurate real-time SYBR Green results. The simplicity of the PCR arrays makes them accessible for routine use in every research laboratory.

How it works

Simple workflow

Simply mix your cDNA template with the appropriate ready-to-use PCR master mix, aliquot equal volumes to each well of the same plate, and then run the real-time PCR cycling program. PCR arrays are compatible with all ABI, Bio-Rad, Eppendorf, QIAGEN, Roche, and Stratagene instrumentation.

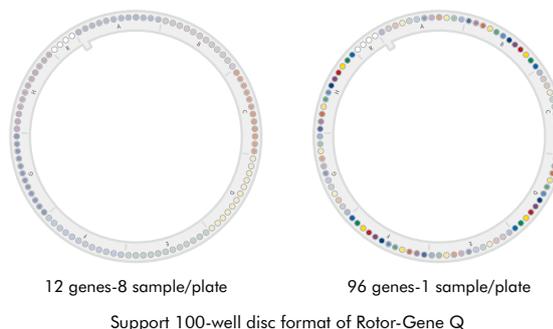
Well-designed layout and controls

RT² Profiler PCR Arrays are available in 96-well plate, 384-well plate, and 100-well disc formats, and are used to monitor the expression of 84 or 370 genes related to a disease state or pathway plus five housekeeping genes. Controls are also included on each array for genomic DNA contamination, RNA quality, and general PCR performance.

Easy-to-use data analysis

Download an easy-to-use Excel-based data analysis template. Data analysis is based on the $\Delta\Delta C_T$ method with normalization of the raw data to either housekeeping genes or an external RNA control.

You can easily perform a PCR array experiment in your own laboratory, or send your samples to us and take advantage of our PCR Array Services.



Complete solutions for microRNA research

microRNA purification

- miRNeasy Mini Kit
- miRNeasy 96 Kit
- miRNeasy FFPE Kit
- miRNeasy Protect Animal Blood System
- PAXgene Tissue miRNA Kit
- PAXgene Blood miRNA Kit
- QIAamp Circulating Nucleic Acid Kit
- GeneRead rRNA Depletion Kit

microRNA quantitation

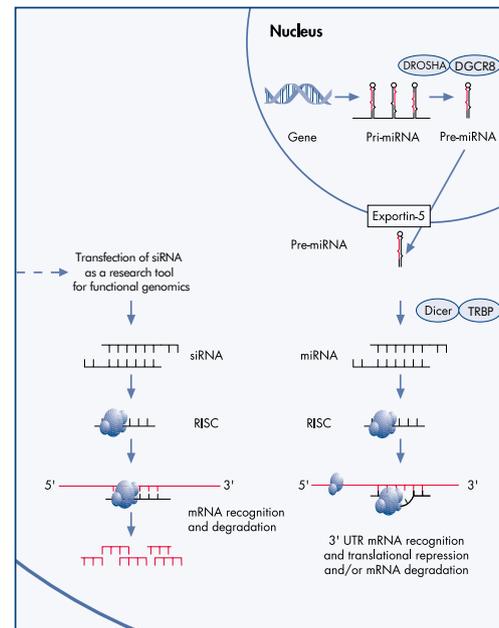
- miScript Reverse Transcription Kit
- miScript SYBR Green PCR Kit
- miScript Primer Assays
- miScript Precursor Assays

microRNA functional analysis

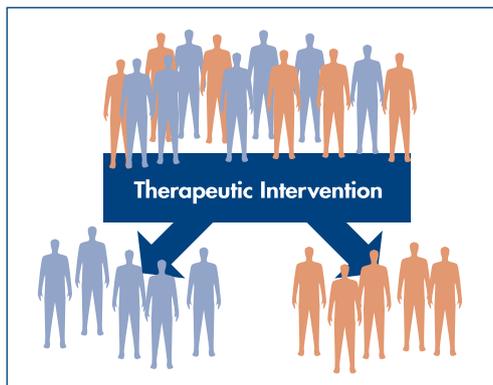
- HiPerFect® Transfection Reagent
- Attractene Transfection Reagent
- miRNA Mimics
- miRNA Inhibitors

For miRNA profiling and quantification, the new, next-generation miScript PCR System offers exciting possibilities for miRNA research. Profile pathway-focused panels of miRNAs or entire miRNomes using miScript miRNA PCR Arrays. Use the miScript II RT Kit, with its unique dual-buffer system, to quantify mature miRNA exclusively or simultaneously quantify miRNA, pre-miRNA, and mRNA from the same cDNA sample. For samples with low RNA amounts, the miScript PreAMP PCR Kit provides breakthrough technology for preamplification, enabling reliable miRNA profiling.

The miScript miRNA PCR Arrays accurately analyze the expression of multiple microRNA (miRNA) sequences at the same time on any real-time PCR instrument. The available 96- or 384-well plates or Rotor Disc 100 arrays contain SYBR Green-optimized and experimentally validated assays for either entire human, mouse, rat, and dog miRNA genomes (miRNomes) or pathway-focused sets of miRNA assays. Our technologies provide the miScript miRNA PCR Array with high sensitivity, specificity, and accuracy. miScript miRNA PCR Arrays are currently available for the human, mouse, rat, and dog species, and individual miRNAs can be analyzed independently with miScript Primer Assays.



microRNA.



Companion diagnostics

Translational research is becoming a key feature of healthcare infrastructures. One of the main applications of translational research is personalized medicine. The foundation of personalized healthcare is pharmacogenomics — the study of how a person’s genetic makeup affects the body’s response to drugs. Pharmacogenomics enables the development of new therapeutics for particular populations and helps healthcare professionals customize their treatments to achieve the best possible results.

Instead of adopting a trial-and-error approach, physicians can immediately choose the most effective medication with the fewest side effects. DNA tests can also be used to predict whether patients are likely to suffer from a given illness during their lifetime, as well as for the identification of many diseases. For example, molecular diagnostics enables the rapid and accurate identification of the exact type of breast cancer in a particular woman – and, thus, the most effective treatment. Similarly, molecular companion diagnostics can help to assess the potential benefits of so-called EGFR therapies in colon cancer patients.



The key to personalized healthcare is the close connection between therapeutics and diagnostics, or so called “theranostics.” Personalized healthcare is beneficial for both the individual patient and society, as it results in more effective treatments and significantly reduced healthcare costs.



QIAGEN is the world’s leading provider in molecular assays related to personalized healthcare – the company offers the largest companion diagnostics and biomarker assay portfolio in the industry. QIAGEN has formed research partnerships with numerous pharmaceutical companies to co-develop drug-specific companion diagnostic assays with numerous pharmaceutical companies including 7 of the top 10 players in oncology.

QIAGEN currently offers about 30 different assays for personalized healthcare, including CE-marked tests for the biomarkers EGFR, KRAS, and BRAF. With our KRAS assays, QIAGEN is leading the way to having the first blockbuster in the companion diagnostics segment. Further information about QIAGEN’s contribution to personalized healthcare is available at www.qiagen.com.

Sample
purification

Assay setup

Detection and analysis



QIASymphony SP and QIASymphony AS



Rotor-Gene Q



PyroMark Q24

Personalized medicine — automated solutions

QIAGEN provides complete automated solutions for personalized medicine and companion diagnostics, accelerating the process of drug discovery and clinical research diagnostics

Realtime PCR-based genetic analysis: QIASymphony SP and QIASymphony AS automate the sample purification and assay setup. Rotor-Gene Q real-time PCR realizes the mutation detection by real-time PCR-based genetic analysis.

Pyrosequencing-based genetic analysis: QIASymphony SP and QIASymphony AS automate the sample purification and assay setup. PyroMark realizes the mutation detection by Pyrosequencing-based genetic analysis.

Real-time PCR-based genetic analysis	
Profile up to 85 pathway- or disease-focused mutations	qBiomarker Mutation PCR Arrays
PIK3CA gene	PI3K Mutation Test Kit
KRAS gene (Rotor-Gene Q)	KRAS RGQ PCR Kit
EGFR gene (Rotor-Gene Q)	EGFR RGQ PCR Kit
BRAF gene (Rotor-Gene Q)	BRAF RGQ PCR Kit
Pyrosequencing-based genetic analysis	
Mutation detection in the BRAF or KRAS gene	PyroMark Q24 Tests
Analysis of APOE, MTHFR, and HFE genes	PyroMark Q96 Tests
Mutation detection in the BRAF gene	BRAF Pyro Kit
Mutation detection in the EGFR gene	EGFR Pyro Kit
Mutation detection in the KRAS gene	KRAS Pyro Kit
Mutation detection in the NRAS gene	NRAS Pyro Kit
Measurement of methylation in the MGMT gene	MGMT Pyro Kit
Genotyping of the allele variant *28 and allele variant* 6 of the UGT1A1 gene	UGT1A1 Pyro Kit

Selected QIAGEN automated genetic analysis kits. These kits are for research use only.

For up-to-date licensing information and product-specific disclaimers, see the respective QIAGEN kit handbook or user manual. QIAGEN kit handbooks and user manuals are available at www.qiagen.com or can be requested from QIAGEN Technical Services or your local distributor.

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