Product Profile

Automatable on QIAcube

QIAamp® genomic DNA kits

For genomic and viral DNA purification from a wide range of sample materials

QIAGEN's extensive range of QIAamp Kits sets the standard for DNA purification. QIAamp genomic DNA kits enable rapid and efficient purification of high-quality genomic DNA from a diverse variety of sample materials for a broad range of downstream applications.

QIAamp genomic DNA kits provide:

- Reliable DNA purification
- Fast procedures and easy handling
- Pure, ready-to-use DNA free of contaminants and enzyme inhibitors
- High DNA recovery from a wide range of sample sources
- No phenol–chloroform extraction or time-consuming alcohol precipitation

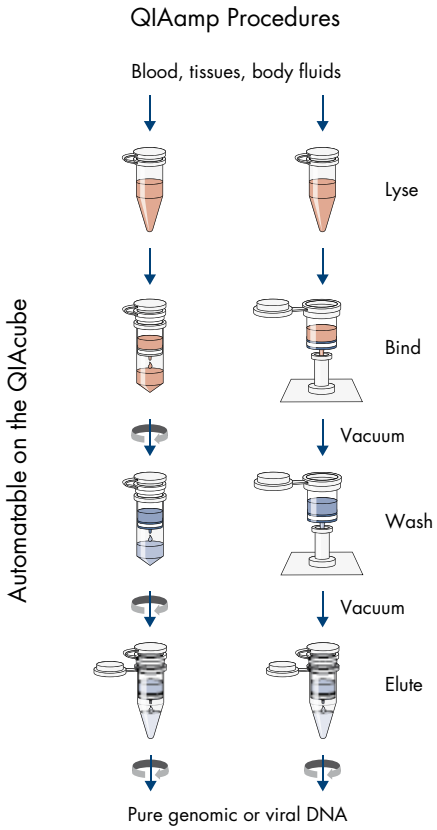
Figure 1. QIAamp genomic DNA kits and components.

Rapid and reliable purification

QIAGEN provides a variety of QIAamp genomic DNA kits for fast, efficient and easy DNA purification (Figures 1 and 2). Protocols can be carried out manually (using either a microcentrifuge or a vacuum manifold*) or fully automated on the QIAcube®.

QIAamp Kits utilize the selective binding properties of the unique QIAamp silica membrane to isolate pure DNA. After lysis in an optimized buffer and adjustment of DNA binding conditions, the sample is loaded directly onto a QIAamp spin column. DNA is bound to the silica membrane, and contaminants are completely removed in 2 wash steps. Pure DNA is eluted in small volumes of a low-salt buffer or water, ready for use in downstream applications.

* Requires use of the QIAvac 24 Plus with VacConnectors (see ordering information).



DNA ready for any application

DNA purified with QIAamp genomic DNA kits has A_{260}/A_{280} ratios of 1.7–1.9, indicating absence of contaminating proteins. Purification provides high-molecular-weight DNA of up to 50 kb.

Optimized protocols

The simple protocols are based on a rapid lyse–bind–wash–elute principle. Manual protocols (using either a microcentrifuge or a vacuum manifold) require minimal user interaction and yield pure DNA in less than 30 minutes after sample lysis. Automated protocols on the QIAcube enable walkaway processing. The manual and automated procedures are designed to ensure that there is no sample-to-sample cross-contamination and to allow safe handling of potentially infectious samples. The simple procedures are highly suited for simultaneous processing of multiple samples.

QIAamp genomic DNA kits can be used with a variety of downstream methods, including:

- Multiplex PCR (page 6)
- DNA methylation analysis (page 5)
- Quantitative, real-time PCR (pages 4, 5, 7, 8 and 9)
- STR analysis (pages 5 and 7)

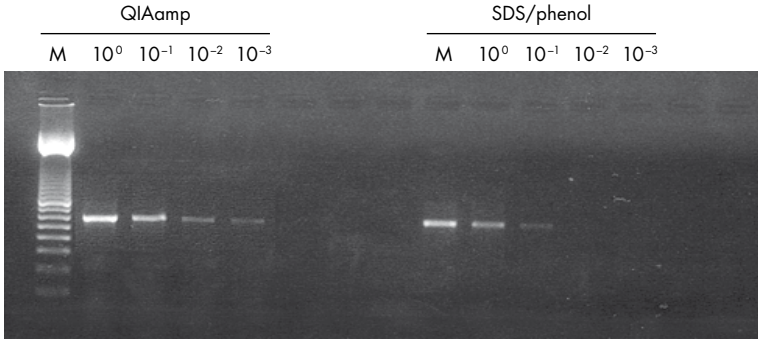


Figure 2. Efficient purification of viral DNA. Viral DNA was purified from tenfold dilutions of HBV-positive serum using the QIAamp DNA Blood Mini Kit (**QIAamp**) or an SDS–phenol method (**SDS/phenol**) and analyzed by agarose gel electrophoresis. **M**: 100 bp ladder.

Selecting the optimal kit for a wide range of sample materials

QIAamp genomic DNA kits enable purification of genomic, mitochondrial, viral, bacterial and parasite DNA from a wide range of fresh or frozen samples. Starting materials include such diverse samples as blood, other body fluids, tissue, cultured cells, stool, formalin-fixed paraffin-embedded (FFPE) tissue, swabs and dried blood spots.

Special protocols are available for yeast and bacteria. Additional protocols for specialized sample types are available as supplementary protocols at **www.qiagen.com/literature**.

Application	Manual					
	QIAamp DNA Blood Kits (page 5)	QIAamp DNA Micro Kit (page 7)	QIAamp DNA Mini Kit (page 6)	QIAamp DNA FFPE Tissue Kit (page 9)	QIAamp DNA Investigator Kit*	QIAamp DNA Stool Mini Kit (page 8)
Whole blood	■	■	■		□	
Plasma and serum (viral DNA)	□ †		□			
Urine		□				
CSF (viral DNA)	□					
Saliva and mouthwash	■					
Buffy coat	■					
Lymphocytes	■					
Bone marrow	■					
Dried blood spot		■	□		■	
Tissue		■	■			
Bone			■		■	
Paraffin-embedded tissue			■	■		
Laser-microdissected tissue		■				
Stool						■
Bacteria			■			
Parasites			■			
Cultured cells	■		■			
Swabs and buccal cells	■		■		■	
Forensic and human identity samples					■	

■: Recommended kit.
□: Compatible kit.

* Please inquire for more information.
† Including free circulating DNA and/or RNA

Fully automated DNA purification on the QIAcube

Automatable on QIAcube

QIAamp genomic DNA kits can be fully automated on the QIAcube (Figure 3). The innovative QIAcube uses advanced technology to process QIAGEN spin columns, enabling seamless integration of automated, low-throughput sample prep into any laboratory workflow. Sample preparation using the QIAcube follows the same steps as the manual procedure (i.e., bind, wash and elute), enabling purification of high-quality DNA (Figure 4).

The standardized, automated purification procedure helps to eliminate human error, providing results that are comparable between experiments and labs. This gives you more time to focus on downstream analysis.

Walkaway spin-column processing

The fully automated QIAcube, equipped with a 12-bucket centrifuge, eliminates manual centrifugation steps, giving you more time for other tasks. Innovative disposable rotor adapters hold spin columns and collection tubes in the centrifuge (Figure 5). Highly pure nucleic acids are eluted into collection tubes, ready to use in sensitive downstream applications.

The QIAcube is preinstalled with protocols for purification of genomic DNA, plasmid DNA, RNA, viral nucleic acids and proteins. The range of protocols available is continually expanding, and additional QIAGEN protocols can be downloaded free of charge at **www.qiagen.com/MyQIAcube**.

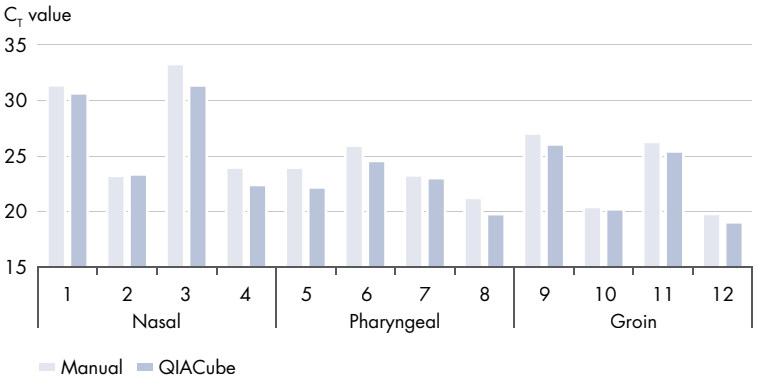


Figure 4. Comparable performance of manual or fully automated isolation of bacterial DNA from dried swabs. Dried cotton swabs (clinical specimens) were incubated in 2 ml PBS for 4 hours at room temperature. Afterwards the liquid was split into 2 parts, and DNA was prepared with the QIAamp DNA Mini Kit using either the manual procedure or the automated QIAcube procedure. Quantification of the eluted DNA with a generic 16S rDNA real-time PCR assay showed that yields from the manual and the automated procedures were comparable and that the purified DNA was free of PCR inhibitors (C_T[10% – 40%] = ~ 2).

Figure 3. Fully automated nucleic acid purification using QIAamp genomic DNA kits. The QIAcube enables walkaway automation of many QIAGEN spin-column procedures. Visit **www.qiagen.com/MyQIAcube** for more information.

Figure 5. Freedom from laborious manual tasks. The QIAcube is equipped with an automated centrifuge and pipetting system. No manual handling steps are required during the QIAcube run.

Automatable on QIAcube

Small- to large-scale DNA purification from blood and body fluids

QIAamp DNA Blood Kits provide rapid and efficient purification of genomic and viral DNA from 200 µl to 10 ml of whole human blood using QIAamp spin-column technology.

The standardized, automated purification procedure helps to eliminate human error, providing results that are comparable between experiments and labs. This gives you more time to focus on downstream analysis.

QIAamp DNA Blood Kits provide:

- Mini-, midi- and maxipreps
- Fast and convenient processing, even with large-volume samples
- Easy procedure with no additional erythrocyte lysis

QIAamp DNA Blood Mini, Midi and Maxi procedures are optimized for purification of genomic and viral DNA from whole blood, plasma, serum, bone marrow, body fluids and cultured cells. These procedures can be used with fresh or frozen blood samples treated with common anticoagulants, such as EDTA, citrate or heparin. Purification of DNA using the QIAamp DNA Blood Mini Kit can be fully automated on the QIAcube.

Purified DNA is of high molecular weight, up to 50 kb, with a predominant fragment size of 30 kb. DNA molecules as small as 200 bp can be isolated as well. The DNA can be successfully amplified even in long-range PCR and is sufficiently concentrated for Southern-blotting applications.

Table 1. Sample size and yields with different QIAamp DNA Blood Kits

QIAamp DNA Blood Kit	Starting material	Sample size	Average yield
Mini	Blood	200 µl	5–8 µg
	Buffy coat	200 µl	15–40 µg
	Dried blood spots	3 x 3 mm	50–150 ng
	Cultured cells	1 x 10^7	40–60 µg
Midi	Blood	1–2 ml	25–80 µg
	Cultured cells	2 x 10^7	70–150 µg
Maxi	Blood	10 ml	150–300 µg
	Cultured cells	1 x 10^8	300–600 µg

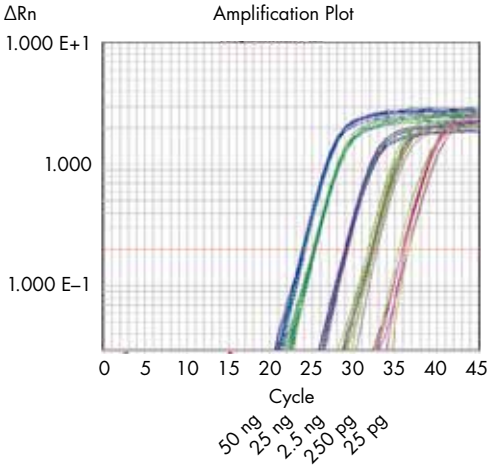


Figure 6. Reproducible and reliable purification and conversion of methylated DNA for MSP. Genomic DNA was isolated from human samples using the QIAamp DNA Blood Mini Kit, and different amounts of DNA were bisulfite converted using the EpiTect® 96 Bisulfite Kit. The converted DNA, corresponding to the amounts indicated, was used for real-time PCR analysis of the glutathione S-transferase gene using the QuantiTect® Probe PCR Kit. Highly reproducible results were obtained for all DNA amounts tested.

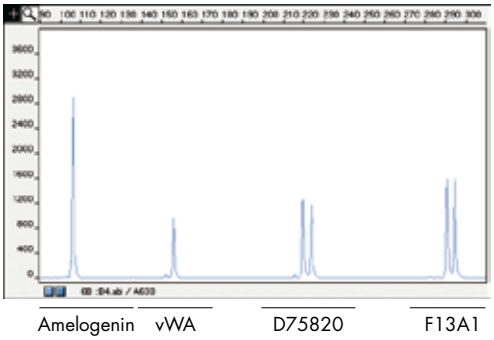


Figure 7. High performance in STR analysis. The amelogenin gene and the indicated STR loci were amplified in 6-plex PCR using FAM™ and HEX™ labeled primers and template DNA purified using QIAamp DNA Blood Kits. STR traces were analyzed using the FAM or HEX (not shown) channel of a DNA sequencer.

QIAamp DNA Mini Kit

Purification of genomic and viral DNA from tissues and other samples

Automatable on QIAcube

QIAamp DNA Mini Kits enable rapid and efficient purification of high-quality genomic, mitochondrial and viral DNA from a variety of tissues and other sample types.

The QIAamp DNA Mini Kit provides:

- Efficient lysis with no mechanical homogenization
- Only 20 minutes of total hands-on preparation time
- Purification of high-quality DNA from a wide range of samples

The QIAamp DNA Mini Kit can be used to isolate DNA from human tissues, swabs, blood or washed cells from urine. Special protocols for yeast and bacteria are included in the kit handbook. Additional supplementary protocols are available online at **www.qiagen.com/literature**.

For greater speed and convenience, DNA can be purified from blood and other body fluids using vacuum pressure instead of centrifugation. Purification of DNA using the QIAamp DNA Mini Kit can also be automated on the QIAcube for increased standardization and ease of use.

Purified DNA is of high quality and ready to use in a wide range of downstream applications, including multiplex PCR analysis (Figure 8).

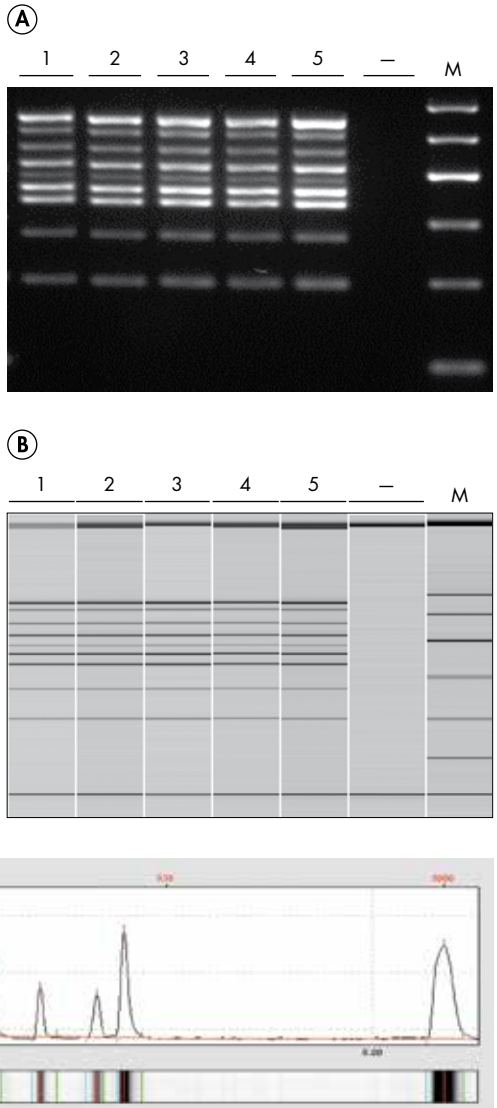


Figure 8. High-quality DNA for multiplex PCR analysis. Genomic DNA was purified from 5 human blood samples (**1–5**) using the QIAamp DNA Mini Kit and amplified in multiplex PCR using the QIAGEN Multiplex PCR Kit and primer pairs for 9 different gene targets. **A** PCR products were analyzed by agarose gel electrophoresis. **B** PCR products were analyzed by capillary electrophoresis on the QIAxcel System using the QIAxcel DNA High Resolution Kit. The QIAxcel generates a gel-like image. **C** Detailed information from each lane can be visualized on the QIAxcel as an electropherogram. Sample 5 is shown.
–: No template control; **M**: GelPilot® 100 bp Ladder.

Purification of genomic and mitochondrial DNA from small samples

Automatable on QIAcube

The QIAamp DNA Micro Kit is designed for purification of genomic, mitochondrial and viral DNA from small amounts of fresh or frozen blood, tissue and dried blood spots.

The QIAamp DNA Micro Kit provides:

- Purification from small samples, such as rare or precious samples
- Low elution volume and increased DNA concentration
- Highly pure DNA for high sensitivity in downstream applications

The QIAamp DNA Micro Kit combines the selective binding properties of QIAamp silica-membrane spin columns with flexible elution volumes between 20 and 100 µl. QIAamp MinElute® technology enables a reduction of elution volume for more highly concentrated eluates. This enables downstream applications such as PCR to be performed in very low volumes. For downstream applications that require a larger eluate starting volume, the elution volume can be increased up to 100 µl.

The procedure is suitable for a wide range of sample materials, such as small volumes of blood, blood cards, fine needle aspirates and small tissue samples (including laser-microdissected samples). Purification of DNA using the QIAamp DNA Micro Kit can be automated on the QIAcube.

Samples can be either fresh or frozen. DNA purified using the QIAamp DNA Micro Kit is immediately ready for use in sensitive downstream applications, such as real-time PCR (Figure 9), laser microdissection (LMD) PCR and STR analysis (Figure 10). Samples can be stored frozen at –15 to –30°C or conveniently stored for years and transported at room temperature in QIAsafe® DNA Tubes and 96-Well Plates.

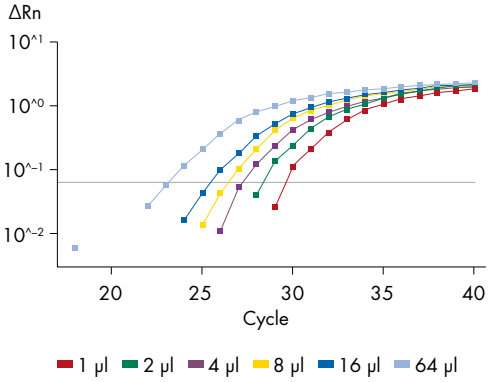


Figure 9. Efficient purification of DNA from small samples for real-time PCR. DNA was purified from 1–64 µl blood samples using the QIAamp DNA Micro Kit and amplified by real-time PCR. Efficient amplification was achieved with all sample amounts.

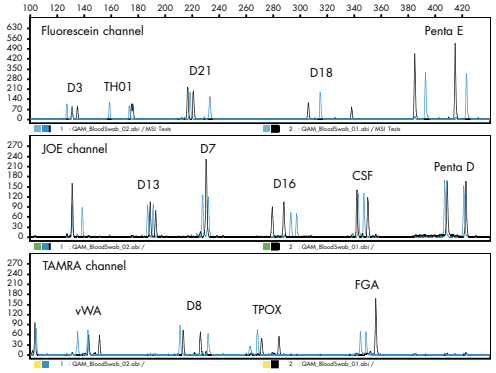


Figure 10. High performance in STR analysis. The QIAamp DNA Micro Kit was used to purify DNA from swabs with 2 µl blood from individual donors. PowerPlex® 16 multiplex STR data generated using GeneScan® 3.0 software are displayed.

Purification of bacterial, viral, parasite and genomic DNA from stool

Automatable on QIAcube

The QIAamp DNA Stool Mini Kit provide rapid DNA purification from fresh or frozen stool. Supplemental protocols for other samples rich in enzyme inhibitors, such as soil or food, are available online at **www.qiagen.com/literature**.

The QIAamp DNA Stool Mini Kit provides:

- Efficient removal of enzyme inhibitors common in stool
- High performance of purified DNA in downstream assays
- Efficient isolation of DNA from low-titer pathogens

The QIAamp DNA Stool Mini Kit is specially designed for isolation of high-quality bacterial, viral, parasite and genomic DNA from 200 mg fresh or frozen stool. The simple procedure uses InhibitEX® Tablets, a proprietary reagent for removal of enzyme inhibitors and other impurities often present in high concentrations in stool, followed by proven QIAamp silica-membrane technology for convenient spin-column purification of DNA. Purification of DNA using the QIAamp DNA Stool Mini Kit can be automated on the QIAcube.

Successful purification enables reliable PCR amplification with no inhibition (Figure 12). The high-quality DNA can be used in sensitive downstream applications, such as quantitative, real-time PCR (Figure 11).

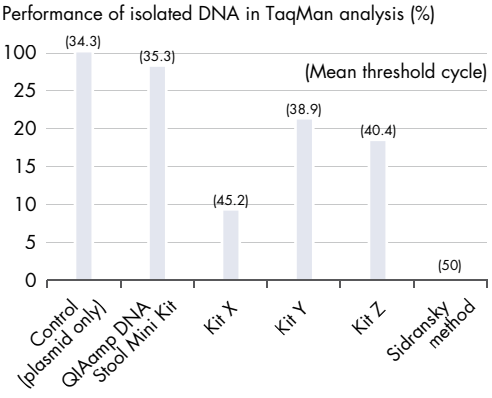


Figure 11. High performance in real-time PCR analysis. Five different methods were used to isolate DNA from each of 5 stool samples. Isolated DNA (5 µl each) was added to 25 µl TaqMan® real-time PCR assays containing 2.5 µg BSA and 1000 copies of Semliki forest virus plasmid as template. Assays were performed in triplicate. Mean performances relative to reactions without stool eluate are shown. The mean threshold cycle for each is shown in parentheses. The QIAamp procedure enabled the most sensitive detection.

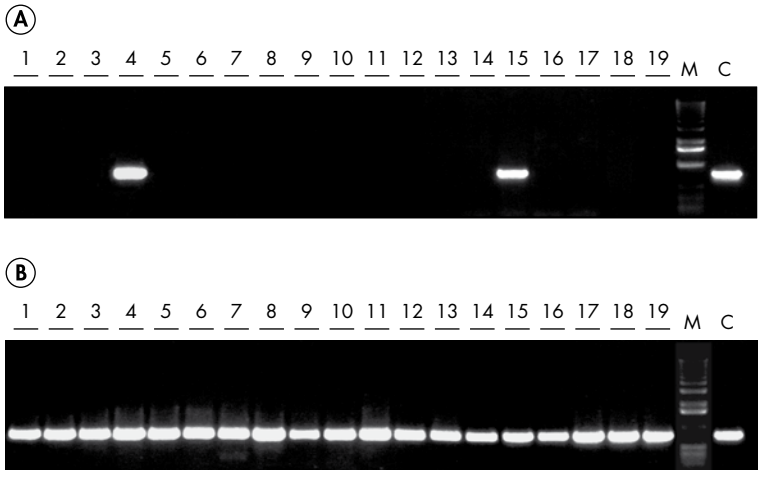


Figure 12. Complete inhibitor removal for efficient PCR. DNA was purified from 19 stool samples (**1–19**) using **A** a conventional silica-based purification technique and **B** the QIAamp DNA Stool Mini Kit. To show whether inhibitors were present in the purified eluates, 5 µl of each eluate was added to PCR mixes with a template of 10 pg plasmid containing the green fluorescent protein (GFP) gene. Amplification of the GFP gene was successful in the presence of all QIAamp eluates whereas only 2 amplification reactions were successful in the presence of eluates prepared using the conventional technique. **M**: Markers; **C**: positive PCR control.

Purification of DNA from formalin-fixed, paraffin-embedded tissues

Automatable on QIAcube

The QIAamp DNA FFPE Tissue Kit is specially designed for purifying DNA from formalin-fixed, paraffin-embedded (FFPE) tissue sections.

The QIAamp DNA FFPE Tissue Kit provides:

- Optimized lysis conditions to release DNA from fixed tissue sections
- Removal of inhibition caused by formalin crosslinking of nucleic acids
- Purification of high-quality DNA in small elution volumes

The QIAamp DNA FFPE Tissue Kit uses well-established QIAamp MinElute technology for purification of genomic and mitochondrial DNA from FFPE tissue samples.

Specially optimized lysis conditions allow genomic DNA to be efficiently purified from FFPE tissue sections without the need for overnight incubation (Figure 13). Incubation at an elevated temperature after proteinase K digestion partially removes formalin crosslinking of the released DNA, improving yield as well as DNA performance in downstream assays. Note that DNA isolated from FFPE samples is usually of lower molecular weight than DNA from fresh or frozen samples. The degree of fragmentation depends on the type and age of the sample and the conditions used for fixation.

After sample lysis, the simple QIAamp DNA FFPE Tissue procedure, which is highly suited for simultaneous processing of multiple samples, yields pure DNA in less than 30 minutes. Purification of DNA using the QIAamp DNA FFPE Tissue Kit can be automated on the QIAcube.

The kit combines the selective binding properties of a silica-based membrane with flexible elution volumes between 20 and 100 µl. DNA is eluted in Buffer ATE or water. Purified DNA is free of proteins, nucleases and other impurities and is immediately ready for use in amplification reactions (Figure 14) or for storage at –15 to –30°C. Genomic DNA can be conveniently stored for years and transported at room temperature in QIAsafe DNA Tubes and 96-Well Plates.

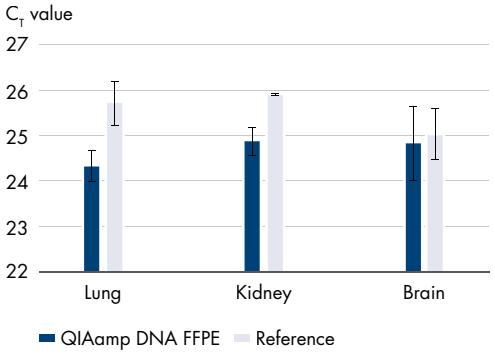


Figure 13. Improved lysis procedure. Genomic DNA was purified from different FFPE rat tissue samples using the QIAamp DNA FFPE Tissue Kit or a standard overnight proteinase K digest as reference followed by DNA purification using the QIAamp DNA Mini Kit. DNA was quantified photometrically, and 20 ng was used as a template in a real-time PCR analysis.

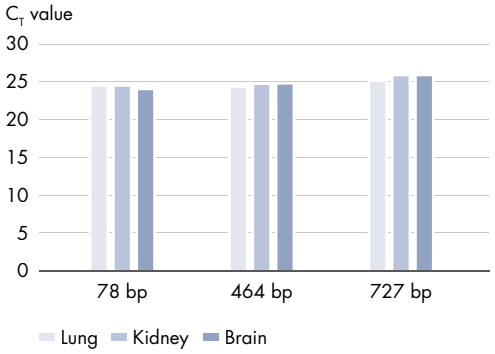


Figure 14. Successful PCR of DNA purified from FFPE tissue samples. Genomic DNA was purified from different FFPE tissue samples using the QIAamp DNA FFPE Tissue Kit. 78 bp, 464 bp and 727 bp products of the prnp gene were amplified by quantitative, real-time PCR.

Ordering Information

Product	Contents	Cat. no.
QIAamp DNA Blood Kits – for small- to large-scale DNA purification from blood and body fluids		
QIAamp DNA Blood Mini Kit (50)*	For 50 DNA minipreps: 50 QIAamp Mini Spin Columns, QIAGEN Protease, Reagents, Buffers, Collection Tubes (2 ml)	51104
QIAamp DNA Blood Mini Kit (250)*	For 250 DNA minipreps: 250 QIAamp Mini Spin Columns, QIAGEN Protease, Reagents, Buffers, Collection Tubes (2 ml)	51106
QIAamp DNA Blood Midi Kit (20)	For 20 DNA midipreps: 20 QIAamp Midi Spin Columns, QIAGEN Protease, Buffers, Collection Tubes (15 ml)	51183
QIAamp DNA Blood Midi Kit (100)	For 100 DNA midipreps: 100 QIAamp Midi Spin Columns, QIAGEN Protease, Buffers, Collection Tubes (15 ml)	51185
QIAamp DNA Blood Maxi Kit (10)	For 10 DNA maxipreps: 10 QIAamp Maxi Spin Columns, QIAGEN Protease, Buffers, Collection Tubes (50 ml)	51192
QIAamp DNA Blood Maxi Kit (50)	For 50 DNA maxipreps: 50 QIAamp Maxi Spin Columns, QIAGEN Protease, Buffers, Collection Tubes (50 ml)	51194
QIAamp DNA Mini Kit – for purification of genomic and viral DNA from tissues and other samples		
QIAamp DNA Mini Kit (50)*	For 50 DNA preps: 50 QIAamp Mini Spin Columns, QIAGEN Proteinase K, Reagents, Buffers, Collection Tubes (2 ml)	51304
QIAamp DNA Mini Kit (250)*	For 250 DNA preps: 250 QIAamp Mini Spin Columns, QIAGEN Proteinase K, Reagents, Buffers, Collection Tubes (2 ml)	51306
QIAamp DNA Micro Kit – for purification of DNA from small samples		
QIAamp DNA Micro Kit (50)*	For 50 DNA preps: 50 QIAamp MinElute Columns, Proteinase K, Carrier RNA, Buffers, Collection Tubes (2 ml)	56304
QIAamp DNA Stool Mini Kit – for purification of bacterial, viral, parasite and genomic DNA from stool		
QIAamp DNA Stool Mini Kit (50)*	For 50 DNA preps: 50 QIAamp Mini Spin Columns, QIAGEN Proteinase K, InhibitEX tablets, Buffers, Collection Tubes (2 ml)	51504
Buffer ASL (560 ml)	560 ml Stool Lysis Buffer	19082
InhibitEX Tablets (100)	PCR inhibitor adsorption matrix†	19590
QIAamp DNA FFPE Tissue Kit – for purification of DNA from formalin-fixed, paraffin-embedded tissues		
QIAamp DNA FFPE Tissue Kit (50)	For 50 DNA preps: 50 QIAamp MinElute Columns, Proteinase K, Buffers, Collection Tubes (2 ml)	56404
QIAvac 24 Plus – for fast vacuum-driven processing of up to 24 spin columns		
QIAvac 24 Plus	Vacuum manifold for processing 1–24 spin columns: includes QIAvac 24 Plus Vacuum Manifold, Luer Plugs, Quick Couplings	19413
VacConnectors (500)	500 disposable connectors for use with QIAamp spin columns on luer connectors	19407

* Fully automatable on the QIAcube. See **www.qiagen.com/MyQIAcube** for protocols.

† To be used with Buffer ASL during DNA purification.

Product	Contents	Cat. no.
Vacuum Pump (115 V, 60 Hz)* (110 V, 60 Hz)† (230 V, 50 Hz)‡ (230V/50Hz)§	Universal vacuum pump (capacity 34 L/min, 8 mbar vacuum abs.)	 84010 84000 84020 84025
QIAvac Connecting System	System to connect vacuum manifold with vacuum pump: includes Tray, Waste Bottles, Tubing, Couplings, Valve, Gauge, 24 VacValves	19419
Vacuum Regulator	For use with QIAvac manifolds	19530
VacValves (24)	24 valves to regulate sample flow rate; for use with the QIAvac 24 Plus	19408
Extension Tubes (3 ml)	For processing large sample volumes with QIAGEN spin columns on vacuum manifolds: 100 per pack	19587
QIAcube – for fully automated sample prep using spin-column kits		
QIAcube (110 V)¶ (230 V)‡	Robotic workstation for automated purification of DNA, RNA or proteins using QIAGEN spin-column kits, 1-year warranty on parts and labor	 9001292 9001293
Starter Pack, QIAcube	Pack includes: reagent bottle racks (3); rack labeling strips (8); 200 µl filter-tips (1024); 1000 µl filter-tips (1024); 1000 µl filter-tips, wide-bore (1024); 30 ml reagent bottles (18); rotor adapters (240); rotor adapter holder; 1.5 ml elution tubes (240)	990395

* Brazil, Canada, India, Mexico, Taiwan, US

† Japan, India, Taiwan

‡ Rest of world

§ UK and Ireland

¶ US, Canada and Japan

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.