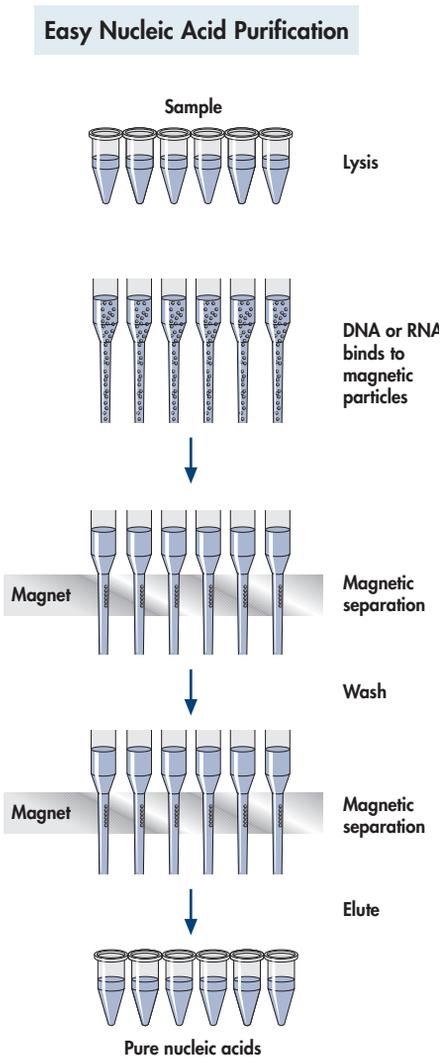
BioRobot® EZ1™ System — Easy Walkaway Purification of DNA and RNA

QIAGEN®

Sample & Assay Technologies

The BioRobot EZ1 workstation — easy, safe, and reliable!

The BioRobot EZ1 workstation in combination with EZ1 kits allows easy purification of nucleic acids from a wide range of sample types relevant for forensics, biomedical research, and gene expression. Specialized user training is not required. In combination with prefilled reagent cartridges, the BioRobot EZ1 is ideally suited for laboratories handling emergency samples, requiring versatile nucleic acid purification for daily testing, or performing long-term research projects. Comprehensive instrument service and application support ensure fast startup and your continued success.



The BioRobot EZ1 workstation delivers:

- Simple, walkaway automation
- Safe, fast operation for processing 1–6 samples
- Convenient handling with prefilled reagent cartridges
- Affordable, slimline automation with no external PC

Walkaway automation for results you can depend on

The self-contained BioRobot EZ1 system ensures optimal ease of use and full automation. All processing steps are performed by the workstation — from piercing reagent cartridges to elution of pure nucleic acids. No separate computer is required to operate the BioRobot EZ1 and EZ1 kits include all reagents and accessories required to process your samples (Figure 1, page 3).

EZ1 kits provide prefilled, foil-sealed reagent cartridges that remain sealed until the instrument door is closed and the protocol run is started, reducing the risk of contamination during setup of the workstation. The BioRobot EZ1 provides high levels of reliability and standardization for low- to medium-throughput laboratories. Using multiple BioRobot EZ1 workstations enables flexible batching of different sample types and scaleable sample throughput.

Three Simple Steps

1. Insert the EZ1 Card containing the desired protocol into the EZ1 Card slot and start the workstation.
2. Place up to 6 samples and the prefilled, sealed reagent cartridges in to the workstation. Samples are processed automatically and purified nucleic acids are transferred to elution tubes.
3. Remove pure nucleic acids in 1.5 ml microcentrifuge tubes at a concentration suited to your downstream application.

Starting a protocol is as easy as using a credit card

EZ1 Cards specify a choice of purification protocols without any manual data entry. As your range of applications expands, new EZ1 Cards may be purchased — increasing your range of purification protocols without any retraining or costly modifications to the workstation. EZ1 kits are available for a broad range of applications including work in forensics, biomedical research and gene expression.

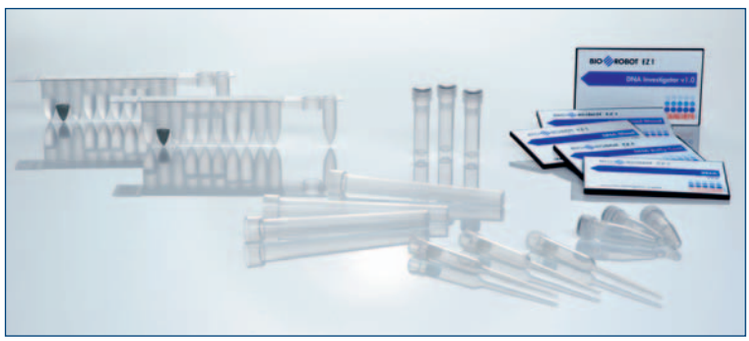


Figure 1. EZ1 kits include all reagents and consumables required to process your samples.

EZ1 DNA Blood and Tissue Kits

By eliminating most sources of variation during processing, the BioRobot EZ1 workstation, in combination with EZ1 kits, provides highly reproducible data from run to run (Figures 2 and 3) — making it highly suited to large research projects with low to medium daily throughput. The high quality of the nucleic acids prepared using the BioRobot EZ1 allows sensitive downstream applications such as quantitative RT-PCR or amplification of single-copy genes (Figure 4).

The EZ1 DNA Blood Kit enables purification of genomic DNA from whole blood and buffy coat samples. The EZ1 DNA Tissue Kit enables purification of genomic DNA from up to 40 mg tissue samples and bacterial DNA from primary samples. The high-quality DNA obtained using EZ1 DNA Blood or Tissue Kits and Cards with the BioRobot EZ1 workstation is suited for use in many applications, such as genotyping analysis, including SNP, STR, VNTR, RAPD, NASBA®, and AFLP technologies.

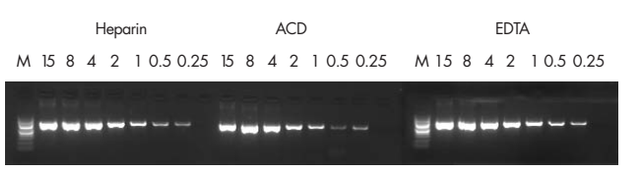


Figure 4. High-quality DNA for sensitive and specific analyses. PCR of the single copy MECL-1 gene using DNA purified from whole blood. Genomic DNA was purified from samples of ACD-, EDTA-, and heparin-preserved human whole blood using the EZ1 DNA Blood 200 µl Kit. Template DNA was serially diluted. A 15, 8, 4, 2, 1, 0.5, or 0.25 µl aliquot of purified DNA was used in each 50 µl PCR as indicated.

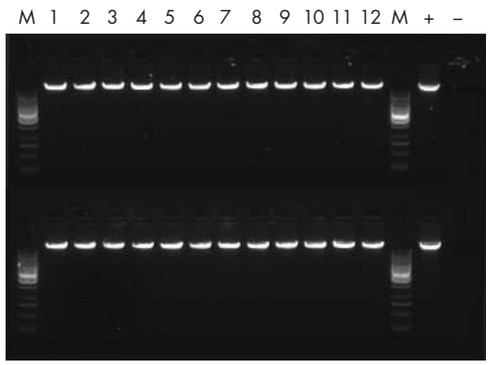


Figure 2. Reproducible high-quality DNA. Genomic DNA purified from whole blood. Upper lanes are from 200 µl blood, lower lanes are from 350 µl blood. Lanes 1–6 and 7–12 are from the first and last of 8 processing runs on the BioRobot EZ1 workstation, respectively. **M**: 1000 bp DNA ladder (100 ng); **+**: positive control; **–**: negative control. A 2 µl aliquot (1%) of each eluate was visualized on the agarose gel.

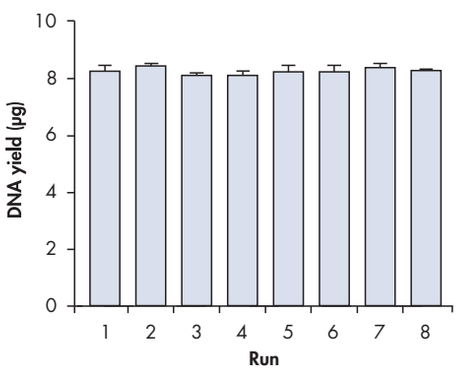


Figure 3. Reproducible yields of high-quality DNA (350 µl blood samples). Genomic DNA was purified from 48 x 350 µl samples (white-cell count 4.9 x10^6/ml) of human whole blood using the EZ1 DNA Blood 350 µl Kit. Average yields from each run of six samples are shown. DNA yield was quantified by absorbance (A_{260}) using background correction. Purified DNA was eluted in 200 µl RNase-free water. Average DNA yield was 8.20 µg (S.D.= 0.23). Average DNA purity (A_{260}/A_{280}) was 1.85 (S.D.= 0.01).

EZ1 DNA Investigator Kit

The BioRobot EZ1 and the EZ1 DNA Investigator Kit and Card reproducibly automate purification of genomic DNA from a wide variety of samples encountered in forensic, human-identity, and biosecurity applications (Figure 5). Automated processing of swabs, blood discs, cigarette butts, and other solid samples includes optimized protocols and normalization for uniform yields (Figures 6 to 8). Large-volume protocols are available for processing textiles, bone samples, or dilute samples.

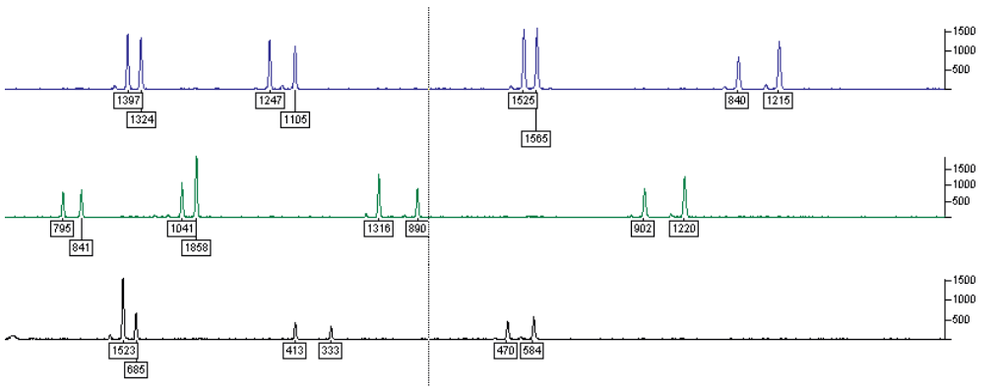


Figure 5. Improved performance in STR analysis. AmpFlSTR® control DNA (1 ng) was diluted in 200 µl Buffer G2 and purified using the EZ1 DNA Investigator Kit and the trace protocol on the BioRobot EZ1 workstation. DNA was eluted in 50 µl water, and 10 µl (corresponding to 200 pg DNA) was used for STR analysis. PCR products were analyzed on an ABI PRISM® 310 Genetic Analyzer with Genotyper® software (data kindly provided by B. Bayer and K. Anslinger, Institute of Legal Medicine, Ludwig Maximilian University, Munich, Germany).

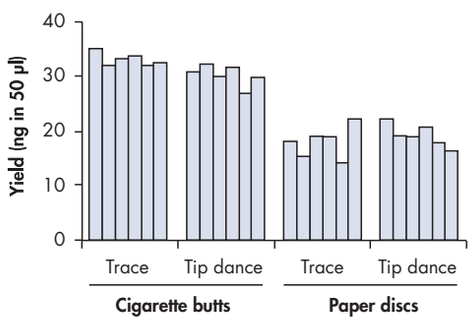


Figure 6. Easy and efficient processing of solid materials with the "Tip Dance" protocol. Papers from cigarette butts or 3 paper discs per sample were spotted with 50 ng DNA per sample. After proteinase K digestion, the samples were incubated at 95°C for 5 minutes. Solid materials were removed from half of the samples, which were then processed using the EZ1 DNA Investigator Kit with the standard trace protocol (**Trace**).The remaining half of the samples were processed using the EZ1 DNA Investigator Kit with the "tip dance" protocol, without removing solid materials from the sample tubes (**Tip dance**). DNA yields were quantified by real-time, quantitative PCR.

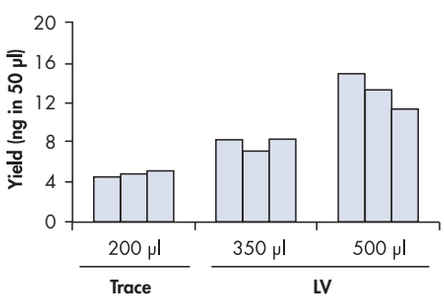


Figure 7. Higher yields of concentrated DNA with the large-volume protocol. DNA was diluted in Buffer G2 to a final concentration of 50 pg/µl, and the indicated volumes were processed using EZ1 DNA Investigator Kit with the standard trace protocol (**Trace**) or the large-volume protocol (**LV**). All samples were eluted in 50 µl water, and 5 µl was quantified using real-time, quantitative PCR.

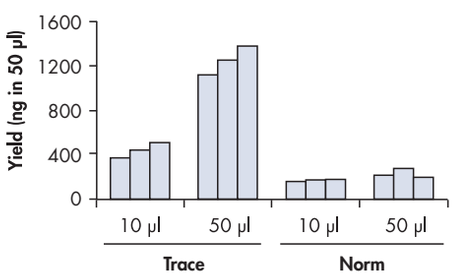


Figure 8. Uniform yields with the normalization protocol. DNA was purified from the indicated volumes of whole blood using the EZ1 DNA Investigator Kit with the standard trace protocol (**Trace**) or the normalization protocol (**Norm**). All samples were eluted in 50 µl water. DNA yields were quantified by real-time, quantitative PCR. DNA yields were uniformly limited to 150–250 ng using the normalization protocol.

EZ1 Virus Mini Kit v2.0

The EZ1 Virus Mini Kit allows simultaneous purification of viral DNA and RNA from serum, plasma, and other cell-free body fluids from up to 400 µl sample volume. Purified nucleic acids can be eluted in as little as 60 µl elution buffer. Efficient purification of viral RNA and DNA results in sensitive analytical detection on a variety of real-time thermal cyclers (data not shown; visit www.qiagen.com/goto/EZ1Virus for more information). The kit provides optimized binding conditions for robust and reproducible capture of nucleic acids and improved wash conditions for high analytical sensitivity in downstream assays (Figures 9 and 10). Efficient yields, even with low viral titers, ensure sensitive analytical detection.

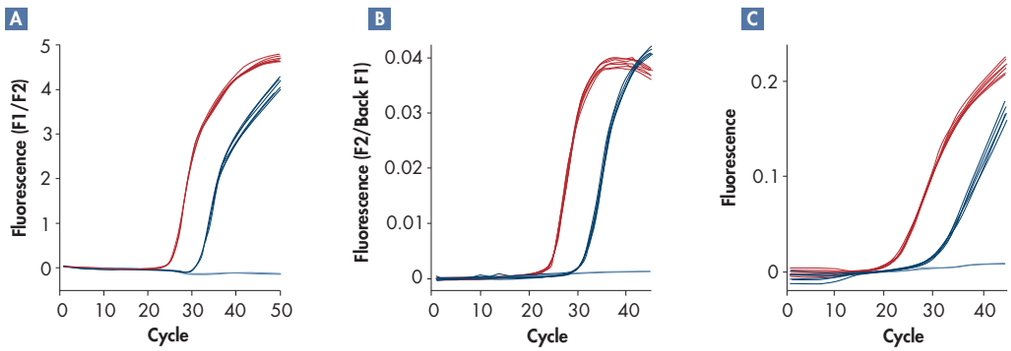


Figure 9. Highly reproducible purification of viral nucleic acids. Viral DNA and RNA was purified from human plasma spiked with 2 dilutions of each virus, in replicates of 12, and from 2 additional negative controls using the EZ1 Virus Mini Kit v2.0 on the BioRobot EZ1, with elution in 100 µl. A HAV RNA was detected using an HAV RT-PCR Research Kit. CVs of crossing-point values were 0.54% and 0.24% for calculated titers of 3.9 x 10^5 IU/ml and 4.2 x 10^3 IU/ml, respectively. B HBV DNA was detected using an HBV PCR Research Kit. CVs of crossing-point values were 0.38% and 0.95% for calculated titers of 1.0 x 10^5 IU/ml and 9.7 x 10^2 IU/ml, respectively. C HIV-1 RNA was detected using an HIV-1 RT-PCR Research Kit. CVs of C_T values were 1.26% and 0.97% for calculated titers of 2.4 x 10^6 IU/ml and 3.5 x 10^4 IU/ml, respectively. The baseline is shown in each amplification plot.

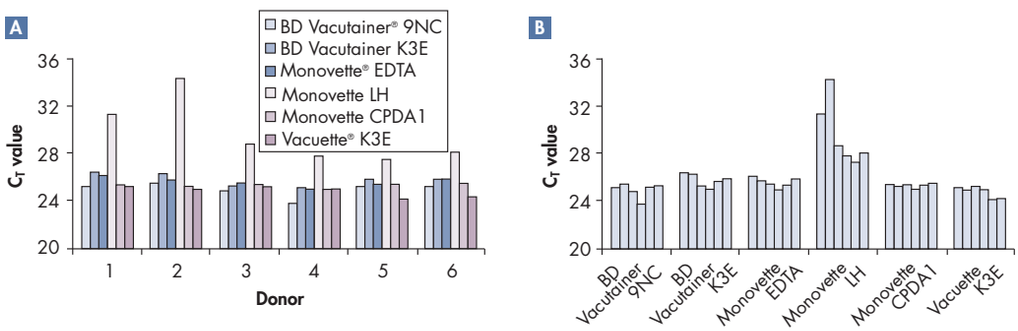
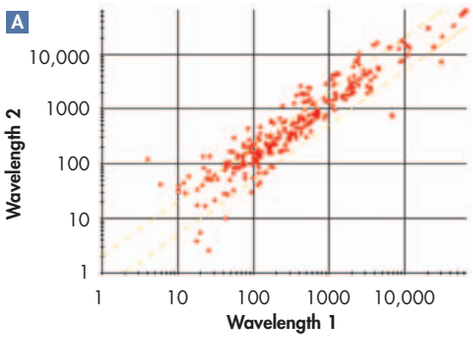


Figure 10. System robustness using different tubes. Blood was collected from 6 different donors into the indicated collection tubes. Plasma was prepared and spiked with a HBV standard (Teragenix) at 1 x 10^4 IU/ml. Viral DNA was purified using the EZ1 Virus Mini Kit v2.0, and eluates were analyzed using custom-designed primers and probe with the QuantiTect® Probe PCR Kit. A Tube-to-tube variability for each donor. B Donor-to-donor variability for each tube type.



EZ1 RNA Cell and Tissue Kits

The high purity and integrity of RNA purified using the BioRobot EZ1 system ensures high performance in gene expression analyses. The high-quality RNA allows sensitive and precise downstream analysis using methods such as microarray analysis (Figure 10) and real-time RT-PCR (Figure 11). Up to 1 x 10^6 cultured cells, 2 x 10^6 blood cells, or 10 mg easy-to-lyse tissue can be processed per sample.

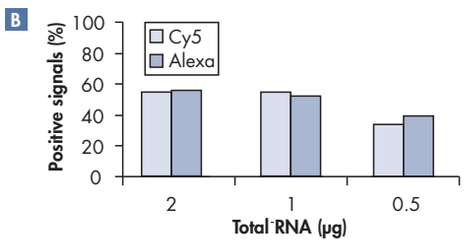


Figure 10. Efficient labeling of target for microrray analysis. Total RNA was purified from HeLa cells using the BioRobot EZ1 system. cDNA was synthesized from total RNA and simultaneously labeled with both Alexa Fluor® 532 and Cy®5 fluorophores using the QIAGEN LabelStar® Array Kit. Labeled cDNA was hybridized to a SensiChip™ DNA Array Bar containing stress- and aging-specific capture probes. A Plot showing that intensities of signal correlate well following hybridization with 1 µg cDNA, independent B of the fluorophore type. B Comparison of numbers of positive (signal:noise ratio >3) signals detected (5-second exposure) following hybridization with the indicated amounts of total RNA.

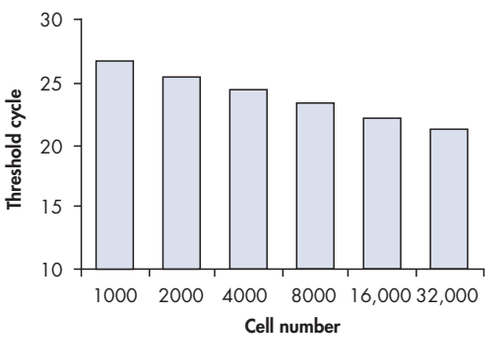


Figure 11. Consistent accuracy provides high-resolution. Dilution series were performed on lysates of 3.2 x 10^4 HeLa cells to produce aliquots equivalent to 1000–32,000 cells. RNA was purified from lysates using the BioRobot EZ1 system. Purified RNA was eluted in 200 µl and 5 µl aliquots were used in 25 µl real-time RT-PCR of human p53 mRNA using the QIAGEN QuantiTect Probe RT-PCR Kit. Three reactions were performed using each dilution. Plot of C_T values and cell number equivalents shows high linearity over a wide range of starting template amounts.

Visit www.qiagen.com/goto/BioRobotEZ1 to discover just how easy and affordable walkaway automation can be!

Ordering Information

Product	Contents	Cat. no.
BioRobot EZ1	Robotic workstation for automated purification of nucleic acids using EZ1 kits, 1-year warranty on parts and labor*	9000705
BioRobot EZ1 DSP†	Robotic workstation for automated purification of nucleic acids using EZ1 DSP kits, 1-year warranty on parts and labor	9001360
EZ1 Kits		
EZ1 DNA Investigator Kit (48)	For 48 preps: Reagent Cartridges, Disposable Tip Holders, Disposable Filter-Tips, Sample Tubes, Elution Tubes, Buffers and Reagents; includes carrier RNA	952034
EZ1 Virus Mini Kit v2.0 (48)	48 Reagent Cartridges (Virus Mini v2.0), Disposable Tip Holders, Disposable Filter-Tips, Sample Tubes (2 ml), Elution Tubes (1.5 ml), Carrier RNA, Buffer AVE	955134

* Warranty PLUS 2 (cat. no. 9237720) recommended: 3-year warranty, 1 preventive maintenance visit per year, 48-hour priority response, all labor, travel, and repair parts. † Not available in all countries, please inquire. For information about CE-IVD marked purification kits, visit www.qiagen.com .

Ordering Information

Product	Contents	Cat. no.
EZ1 DNA Blood 200 µl Kit (48)	Reagent Cartridges (Blood 200 µl), Disposable Tip Holders, Disposable Filter-Tips, Sample Tubes, Elution Tubes	951034
EZ1 DNA Blood 350 µl Kit (48)	Reagent Cartridges (Blood 350 µl), Disposable Tip Holders, Disposable Filter-Tips, Sample Tubes, Elution Tubes	951054
EZ1 DNA Tissue Kit (48)	Reagent Cartridges (Tissue), Disposable Tip Holders, Disposable Filter-Tips, Sample Tubes, Elution Tubes, Buffer G2, Proteinase K	953034
EZ1 RNA Cell Mini Kit (48)	Reagent Cartridges (RNA Cell), Disposable Tip Holders, Disposable Filter-Tips, Sample Tubes, Elution Tubes, Buffer RLT, RNase-Free DNase I	958034
EZ1 RNA Tissue Mini Kit (48)	Reagent Cartridges (RNA Tissue), Disposable Tip Holders, Disposable Filter-Tips, Sample Tubes, Elution Tubes, Buffer RLT, RNase-Free DNase I	959034
EZ1 RNA Universal Tissue Kit (48)	Reagent Cartridges (RNA Universal Tissue), Disposable Tip Holders, Disposable Filter-Tips, Sample Tubes, Elution Tubes, QIAzol Lysis Reagent, Buffer RLT	956034
EZ1 Cards		
EZ1 DNA Investigator Card	Preprogrammed card for BioRobot EZ1 DNA Investigator protocols	9016387
EZ1 Virus Card v2.0	Preprogrammed card for EZ1 Virus purification protocols	9017330
EZ1 DNA Blood Card	Preprogrammed card for BioRobot EZ1 DNA blood protocols	9015585
EZ1 DNA Buffy Coat Card	Preprogrammed card for BioRobot EZ1 DNA protocols for buffy coat samples	9015587
EZ1 DNA Tissue Card	Preprogrammed card for BioRobot EZ1 DNA tissue protocols	9015588
EZ1 DNA Buccal Swab Card	Preprogrammed card for BioRobot EZ1 DNA protocols for buccal swab samples	9015589
EZ1 DNA Paraffin Section Card	Preprogrammed card for BioRobot EZ1 paraffin section protocols	9015862
EZ1 DNA Dried Blood Card	Preprogrammed card for BioRobot EZ1 protocols for dried blood samples	9015863
EZ1 RNA Card	Preprogrammed card for EZ1 RNA purification protocols	9015590
EZ1 Test Card	Preprogrammed card for the BioRobot EZ1 test protocol	9016187

The BioRobot EZ1 Workstation and EZ1 Cards are intended for research applications. No claim or representation is intended for their use to provide information for the diagnosis, prevention, or treatment of a disease.

The EZ1 DNA Blood 200 µl Kit, EZ1 DNA Blood 350 µl Kit, EZ1 DNA Investigator Kit, EZ1 Virus Mini Kit v2.0, EZ1 RNA Universal Tissue Kit, EZ1 RNA Cell Mini Kit, and EZ1 RNA Tissue Mini Kit are intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

The BioRobot EZ1 DSP System is intended for in-vitro diagnostic use in Europe.

QuantiTect Probe Kits are for research use only. Not for use in diagnostic procedures.

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China ▪ Orders 021-51345678 ▪ Fax 021-51342500 ▪ Technical 021-51345678

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