



Paternity doubts erased

Our improved non-invasive paternity testing workflow now delivers definitive answers, every time



Sample to Insight



Noninvasive prenatal paternity testing

Paternity testing has evolved to become safe and non-invasive. Now we can test for paternity through purification and analysis of circulating cell-free fetal DNA (ccfDNA) from maternal plasma. Thankfully, invasive amniocentesis and chorionic villus sampling and their attendant risks of miscarriage and infection belong to the past.

A disadvantage of the noninvasive method is that samples of ccfDNA have a relatively low proportion of fetal DNA to maternal DNA, making stable sample collection and efficient purification a challenge. The fragmented nature of purified ccfDNA also presents problems for DNA analysis. Conventional protocols for noninvasive prenatal paternity testing (NIPPT) based on short tandem repeats (STRs) have their own limitations.

Thanks to our new NIPPT workflow, you can overcome many of those limitations. Our approach is specially designed for samples containing low level or degraded DNA, even in a high background of third party DNA, and is therefore ideally suited for fetal DNA analysis. Combine purified ccfDNA with our powerful next-generation sequencing (NGS) kits to confidently identify low-level STR and SNP markers and sequence-level variation.

Find certainty and delete all doubts with accurate information about maternal and paternal contributions.



Confident, accurate and cost-effective NIPPT workflow

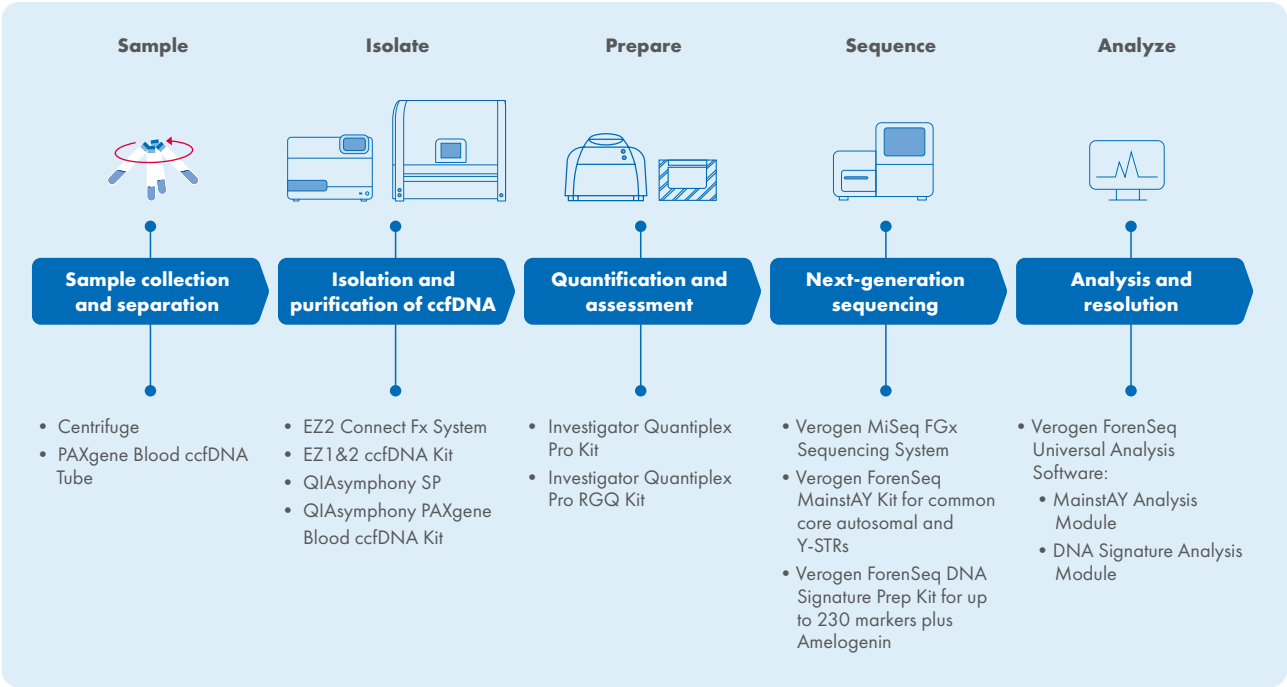
From sample collection to DNA sequencing and analysis

The QIAGEN HID workflow is an efficient and cost-effective option for NIPPT analysis.

This improved NIPPT workflow combines dedicated ccfDNA sample collection and isolation protocols with quantitative analysis and assessment. Add dedicated ForenSeq NGS kits for NGS power to

efficiently and cost-effectively sequence the most common autosomal and Y-STRs or SNPs based on the level of discrimination needed.

Sequence-level variation provides higher resolution capabilities to distinguish between maternal and paternal contributions.



Maternal blood sampling, stabilization and separation

The PAXgene® Blood ccfDNA Tube is designed for the collection of human whole blood and the stabilization of ccfDNA.

- A non-crosslinking stabilization solution prevents the release of intracellular DNA
- The environment maintains constant ccfDNA levels during plasma storage

Maternal whole blood is separated via centrifugation. Plasma with ccfDNA is transferred for ccfDNA isolation.



Automated isolation and purification of ccfDNA

Automate processing of up to 24 ccfDNA samples at a time in 35 to 70 minutes with the EZ2® Connect Fx benchtop instrument and the EZ1&2® ccfDNA Kit.

Fetal DNA in maternal blood plasma is usually present as fragments of <1000 bp. The EZ1&2 ccfDNA Kit uses proven magnetic bead technology to efficiently purify these short circulating DNAs.

- Access dedicated human ID protocols easily
- Program flexible sample input (1–8 ml plasma)
- Reduce human error with prefilled cartridges
- Isolate high-quality DNA for downstream analysis
- Connect remotely to monitor and manage your runs from outside the lab

You can also generate good ccfDNA yields with a fully automated QIAasymphony® procedure and the QIAasymphony PAXgene Blood ccfDNA Kit. Select the STA protocol line to isolate predominantly small ccfDNA fragments.

Quantification and assessment of ccfDNA

Assessment of a sample's degradation status together with its quantification data can be critical to successful analysis of degraded or fragmented templates like ccfDNA.

Investigator® Quantiplex® Pro Kits use quantitative real-time PCR to detect and quantify human and male DNA with a parallel assessment of DNA degradation.

- Sensitivity down to <1 pg/μl DNA
- High sensitivity for male DNA in a female background (up to 400,000:1)
- An Internal Control actively flags the presence of potential PCR inhibitors

In addition, the Investigator Quantiplex Pro RGQ assay can distinguish between human and male DNA degradation. If the fetus is male, you can determine the degradation factor of fetal DNA.



Next-generation sequencing and analysis

Verogen® MiSeq® FGx Sequencing System

The MiSeq FGx Sequencing System allows you to prepare and sequence libraries and analyze data in a single workflow. Dedicated reagent kits and matched analysis software combine for answers in all human identification investigations, including questions of paternity.

The ForenSeq® Universal Analysis Software (UAS) simplifies complex bioinformatics and data management.

The UAS includes analysis modules for all Verogen ForenSeq kits, including:

- The ForenSeq MainstAY workflow
- The ForenSeq DNA Signature Prep workflow

A secure interface with the MiSeq FGx System automates post-sequencing data analysis and minimizes hands-on time. Results are viewable through a web browser.

Verogen ForenSeq DNA Signature Prep Kit

The ForenSeq DNA Signature Prep Kit combines more than 200 markers, including autosomal, X- and Y-STRs, identity-informative, phenotype-informative and biogeographical ancestry-informative SNPs into a single workflow.

The combination of this number of STRs, plus the variation from sequencing data, plus the SNPs, make the ForenSeq DNA Signature Prep Kit much more discriminating than CE-based STR kits.

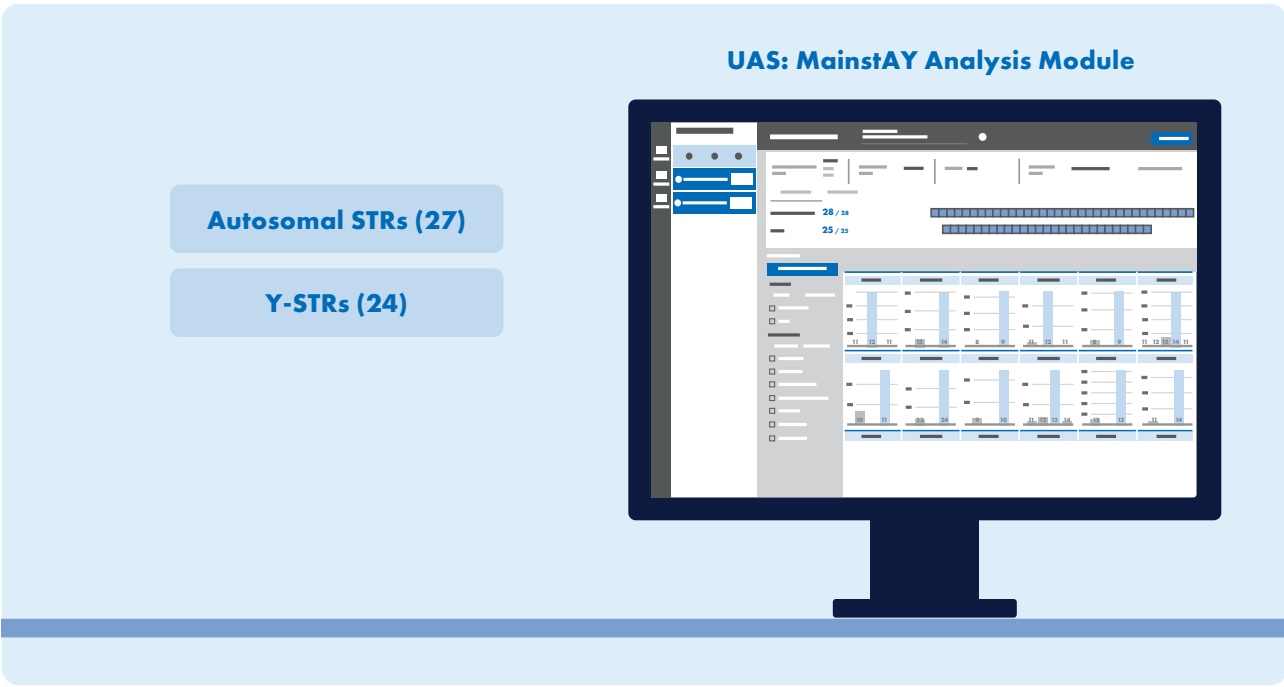
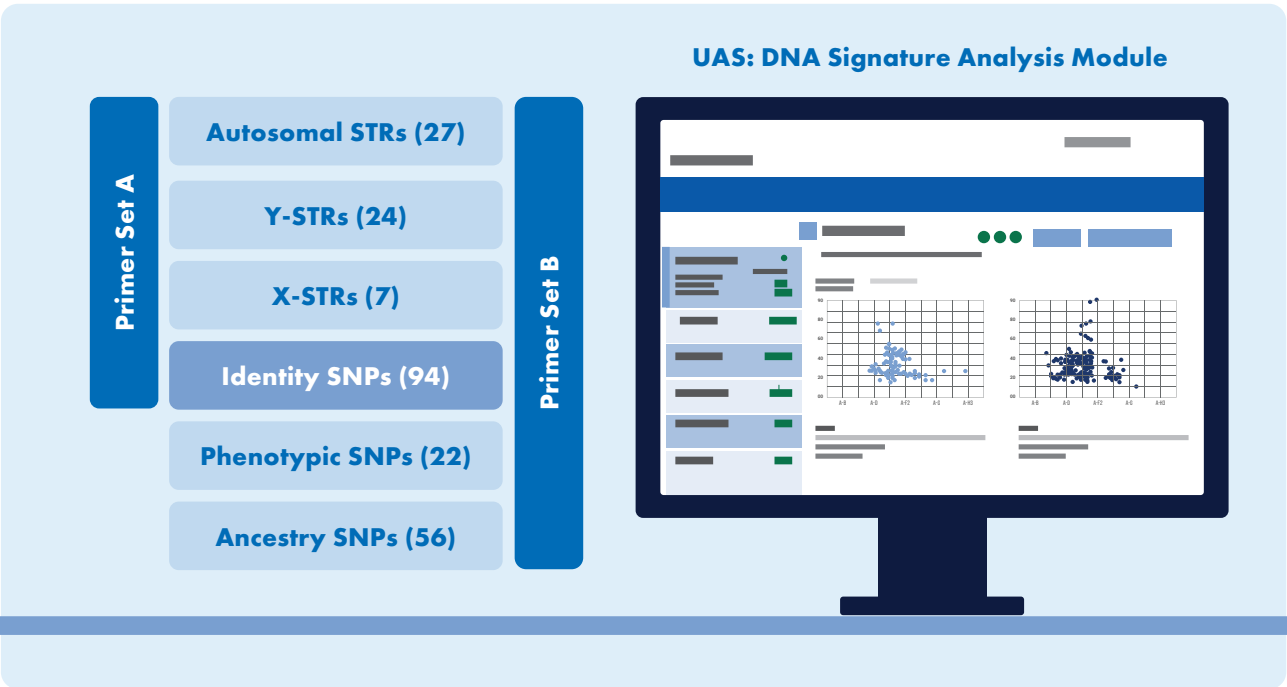
Eliminate the need to run multiple STR tests.

- Access valuable data with a dense set of SNPs
- Superior analysis of challenging or degraded samples
- Multiplexing capability

Verogen ForenSeq MainstAY Kit

The Verogen ForenSeq MainstAY Kit targets 27 core autosomal and 24 Y-STRs and generates highly discriminating and cost-effective data.

- Cost is comparable to traditional CE assays
- Largest combination of established STRs in one amplification
- Full profiles from low input (100 pg) of DNA
- Simultaneously sequence 96 samples per run



Ordering Information

Product	Contents	Cat. no.
PAXgene Blood ccfDNA Tube (100)	100 blood collection tubes (10 ml). To be used in conjunction with the QIAamp® MinElute® ccfDNA Kit, the QIAamp Circulating Nucleic Acid Kit (50) or the QIAAsymphony PAXgene Blood ccfDNA Kit (192)	768115
EZ1&2 ccfDNA Kit (48)	For 48 preps (2, 4 or 8 ml sample input volume each): 48 reagent cartridges (EZ1&2 ccfDNA), Magnetic Bead Suspension, Elution Buffer, Large-Volume Tubes (7 ml), Disposable Tip Holders, Disposable Filter-Tips, Elution Tubes (1.5 ml)	954854
QIAAsymphony PAXgene Blood ccfDNA Kit (192)	Reagent cartridges, accessories and proteinase K vials for 192 preps	768536
EZ2 Connect Fx System	Benchtop instrument for automated isolation of nucleic acids from up to 24 samples in parallel, using sealed prefilled cartridges; includes 2x EZ2 Connect racks (EZ2 Connect Fx Tip Rack and the EZ2 Connect Fx Tip Rack – Flip Cap Tubes), EZ2 Connect Fx Cartridge Rack and 1-year warranty on parts and labor	9003220
QIAAsymphony SP	QIAAsymphony sample prep module: includes 1-year warranty on parts and labor	9001297
Investigator Quantiplex Pro Kit (200)	For use on Applied Biosystems® Real-Time Systems: Quantiplex Pro Reaction Mix, Quantiplex Pro Primer Mix, Control DNA M1, QuantiTect® Nucleic Acid Dilution Buffer	387216
Investigator Quantiplex Pro RGQ Kit (200)	For use on QIAGEN Rotor-Gene® Q Real-Time Systems: Quantiplex Pro RGQ Reaction Mix, Quantiplex Pro RGQ Primer Mix, Male Control DNA M1, QuantiTect Nucleic Acid Dilution Buffer	387316
Verogen MiSeq FGx Sequencing System	Desktop instrument with two run modes for a range of forensic genomics applications within a validated NGS workflow	15048975
Verogen Universal Analysis Software	Software pre-installed as a dedicated server specific for forensic genomics for run setup, sample management, analysis and report generation	V16000084
Verogen ForenSeq MainstAY Kit (96)	Includes all the required reagents for 96 reactions to prepare sequencing libraries generating data for mainstream casework and forensic genetic genealogy confirmatory testing	V16000142
Verogen ForenSeq DNA Signature Prep Kit (96)	Includes all the required reagents to prepare sequencing libraries from forensic DNA samples; part of the Verogen MiSeq FGx Forensic Genomics Solution	V16000023

→ Learn more about applying NGS HID to NIPPT. Visit [qiagen.com/HIDandNGS](https://www.qiagen.com/HIDandNGS)

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