Bead Xtract: Cell-free DNA Extraction Kit

Flexible, scalable and easily automated isolation of high-quality circulating cell-free (ccfDNA) from up to 10 ml plasma or serum samples

Highlights

Flexible and scalable cfDNA purification
A range of input volumes from of 0.5-10 ml and both manual and automated protocols mean Bead Xtract cfDNA is easily scalable to suit your laboratory needs.

Fully automated protocol
From lysis through to separation, fully automated protocols compatible with most open-source liquid handlers save you precious hands-on processing time.

Maximise cfDNA yield
High binding capacity beads maximise cfDNA recovery and an elution volume as low as 30 µl ensures cfDNA is concentrated enough for downstream applications without the need for DNA vacuum concentration.

High quality cfDNA output
gDNA contamination is minimized producing high quality cfDNA for a broad range of applications including qPCR, ddPCR and next generation sequencing (NGS).

Introduction

Cell-free DNA (cfDNA) are usually short ~160 bp DNA fragments circulating in the blood plasma of individuals. In oncology and prenatal studies, they offer tremendous potential for non-invasive variant analysis in disease detection, diagnosis and monitoring.

Extracting cfDNA from plasma or serum can be challenging due to its low concentration and small fragment size. There is, therefore, a need for an isolation method that is highly efficient at recovering the maximum possible yield of smaller fragment sizes.

nonacus
ADVANCING NON-INVASIVE HEALTHCARE

Bead Xtract cfDNA Kit

The Bead Xtract cfDNA kit is designed for the rapid and efficient isolation of circulating cfDNA from up to 10 ml plasma or serum using paramagnetic beads. Samples can be processed manually or using a range of automation platforms. The kit eliminates the need for funnels and vacuum steps, and allows complete automation of the extraction process, with minimal hands-on time.

Simple, scalable extraction

The Bead Xtract cfDNA kit is simple and easy to use and is completely scalable to fit with the sample requirements of different applications and workflows. Users can change input volume freely between 0.5-10 ml serum or plasma and still ensure maximum recovery of cfDNA from samples (Table 1).

Table 1: The Bead Xtract cfDNA protocol enables a range of input volumes within the same kit.

Kit size	No. of extractions with 1 ml input	No. of extractions with 2 ml input	No. of extractions with 4 ml input
Small	20	10	5
Medium	200	100	50
Large	800	400	200

High performance

The high binding capacity of the magnetic particles used in the Bead Xtract cfDNA kit ensures a high DNA yield from plasma samples compared to other leading manufacturers cfDNA extraction kits (Figure 1). It also reduces the amount of particles required to isolate the DNA ensuring that the final elution volume is kept low (30-60 µl) even when starting with 10 ml of plasma. This avoids the need for DNA vacuum concentration steps simplifying the protocol and ensuring the concentration of the final cfDNA sample is high enough for downstream applications.

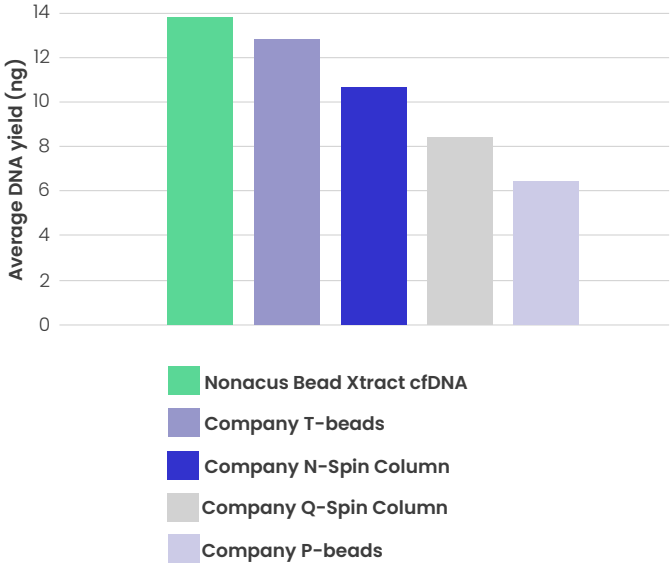

Figure 1: Average DNA yield (ng) extracted from 1 ml plasma replicates using a range of different beadbased and spin-column based extraction kits. cfDNA was extracted following the manufacturer's instructions and eluted into 50 µl of elution buffer. DNA concentration was determined using high sensitivity reagents on the Qubit 3.0 (Invitrogen).

Minimal genomic DNA contamination

The lysis and binding buffers of the Bead Xtract kit are optimised to maximise recovery of smaller DNA fragments and minimise gDNA contamination. The high quality cfDNA extracted is suitable for downstream applications such as quantitative PCR (qPCR), droplet digital PCR (ddPCR) and Next Generation Sequencing (NGS) (Figure 2).

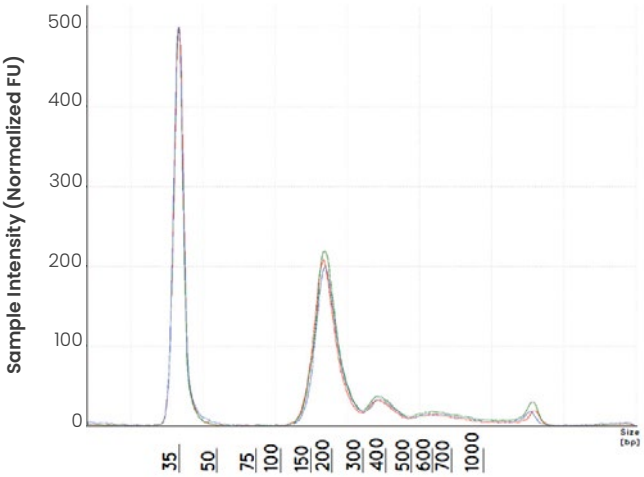

Figure 2: Automated cfDNA extraction using the Bead Xtract cfDNA kit shows expected nucleosomal patterning typical of cfDNA fragment distribution and low gDNA contamina-tion. 4 ml replicates performed on the Hamilton ML STAR and eluted in 50 µl of buffer. Purified DNA was analyzed on the Agilent 4200 Tapestation.

Streamlined workflow

The properties of the magnetic particles in the Bead Xtract cfDNA kit ensure fast magnetic separation even when using large volumes (Figure 3). The manual process takes less than 70 minutes with a hands-on time of under 30 minutes.

Automated protocols

The Bead Xtract cfDNA protocol offers users flexibility to be run manually or as a fully automated process to suit laboratory and sample throughputs. Validation of automated isolation from lysis to extraction has been performed on the Hamilton ML STAR and scripts are available for a range of open-ended liquid handlers. Fully automated cfDNA extraction requires just 30 minutes set-up time, processes 48 samples (4 ml input, 96-head, Hamilton ML STAR) in less than 3 hours and has been shown to generate highly concordant results with manual processing (Figure 4).

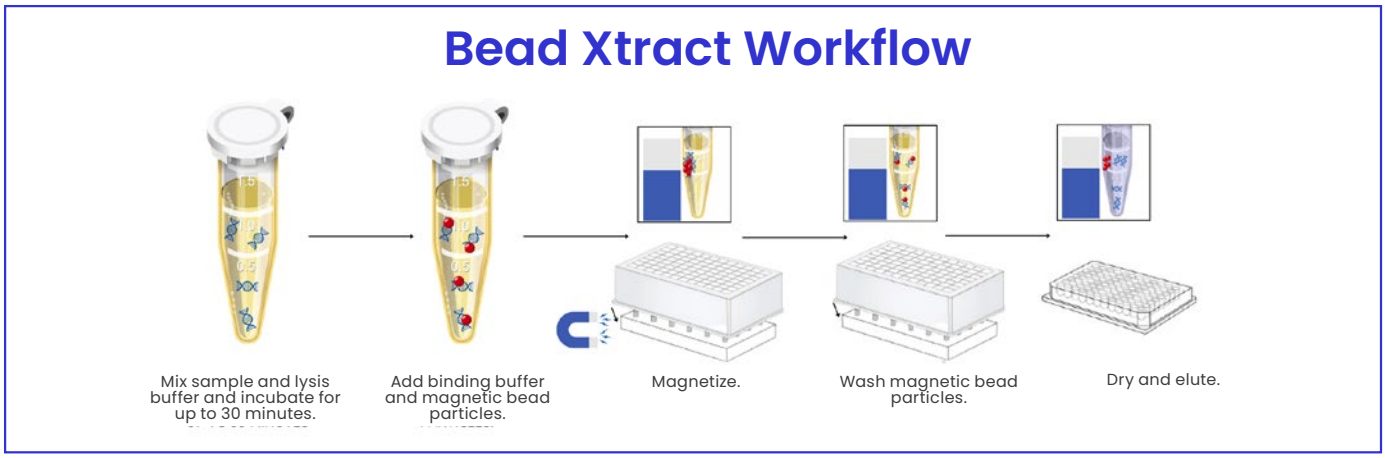

Figure 3: Streamlined workflow, utilising paramagnetic beads to maximize the binding of short cfDNA fragments.

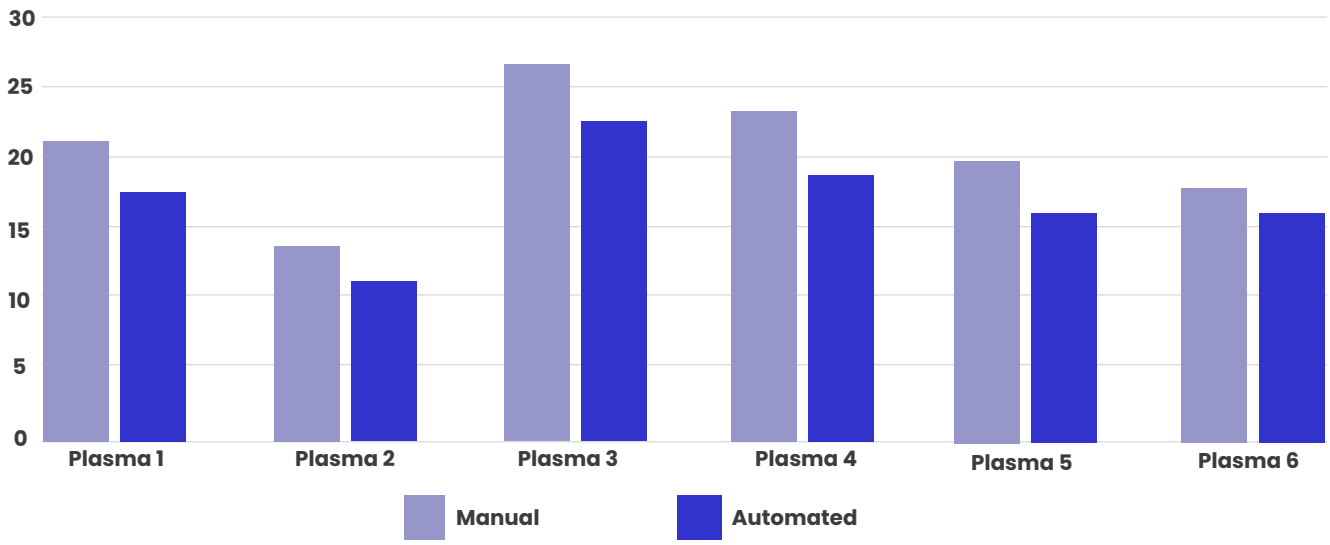

Figure 4: CfDNA yield (ng) using Bead Xtract cfDNA manual and automated protocols is highly concordant. cfDNA was extracted from 4 ml plasma. The automated protocol was performed using the Hamilton ML STAR and cfDNA quantification was determined using high sensitivity reagents on the Qubit 3.0 (Invitrogen). DNA was eluted into 50 µl.

Summary

The Nonacus Bead Xtract cfDNA kit offers efficient isolation of circulating cell-free DNA with little or no genomic DNA contamination from up to 10 ml plasma or serum samples. Samples can be processed manually or automated using a wide range of open source liquid handling platforms.

The kit:

- Enables complete automation from lysis through to cfDNA extraction
- Delivers flexible and scalable protocols allowing users to change input volume freely between 0.5-10 ml serum or plasma
- Extracts high quality cfDNA in low elution volumes with a higher total DNA yield compared to other cfDNA extraction kits currently on the market

Learn more

To learn more about our Bead Xtract cfDNA kit and to download the protocols, application notes and white papers please visit: www.nonacus.com.

Ordering information

Product	Catalog No.
Bead Xtract cfDNA, 20 (1 ml) extractions	PRE_EXT_BXC_20
Bead Xtract, cfDNA 200 (1 ml) extractions	PRE_EXT_BXC_200
Bead Xtract, cfDNA 800 (1 ml) extractions	PRE_EXT_BXC_800

Nonacus Limited
Quinton Business Park
11 Ridgeway
Birmingham
B32 1AF

info@nonacus.com