

MagAttract[®] HMW DNA Kit

For isolation of high-molecular-weight genomic DNA

The MagAttract HMW DNA Kit enables purification of high-molecular-weight (100–200 kb) DNA using a simple, magnetic bead-based protocol. The purification procedure gently removes contaminants and inhibitors, while delivering very high yields and purity. The extracted genomic DNA is suitable for numerous applications, including archiving and next-generation sequencing (NGS).

The MagAttract HMW DNA Kit provides:

- Reproducible isolation of high-molecular-weight DNA
- High yields and purity from a range of sample materials
- Fast and convenient protocols
- Complete removal of inhibitors

Advanced technology for efficient isolation of high-molecular-weight DNA

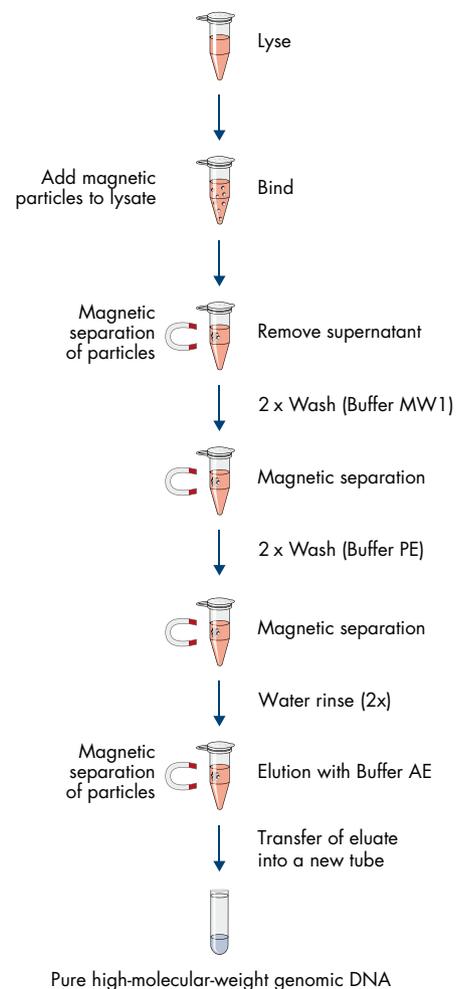
Isolation of genomic DNA is a crucial step for any DNA analysis method. The key parameters are generally yield, purity and integrity of the isolated DNA. While for standard methods such as PCR, sequencing or hybridization techniques, molecular weight in the range of 10–30 kb may be sufficient, some sensitive methods such as the generation of BAC or fosmid libraries or archiving of DNA require higher integrity of genomic DNA.

The MagAttract HMW DNA Kit is specifically designed to deliver high-molecular-weight DNA from a wide range of samples, including human or animal tissue, blood and bacteria. The kit uses an efficient combination of high-performance magnetic beads and innovative silica-based chemistry. High-performance magnetic particles ensure that the isolated DNA is of high yield and purity, while the convenient protocol allows reproducible results in as little as 70 minutes (Table 1).

Table 1. MagAttract HMW DNA Kit specifications

Parameter	Specification
Sample volume/input	200 µl blood; up to 25 mg tissue; 2 x 10 ⁹ bacterial cells
Elution volume	100–200 µl
Processing time	~70 minutes for 12 samples
DNA fragments recovered	>150 kb

MagAttract HMW DNA Kit procedure



Fast and optimized protocol

Optimized buffers and enzymes gently lyse samples, while ensuring minimized fragmentation of genomic DNA. The procedure comprises 4 simple steps: lyse, bind, wash and elute. Following sample lysis, the DNA binds to the surface of magnetic beads. During the wash steps, contaminants and PCR inhibitors are effectively removed and pure, high-molecular-weight DNA is eluted in Buffer AE.

Efficient isolation of high-molecular-weight DNA

The MagAttract HMW DNA Kit ensures reproducible isolation of genomic DNA >150 kb. DNA isolated using the MagAttract HMW DNA Kit and other magnetic bead-based procedures was compared using pulse-field gel electrophoresis. The MagAttract HMW DNA Kit demonstrated superior performance in the isolation of high-molecular-weight DNA (Figure 1).

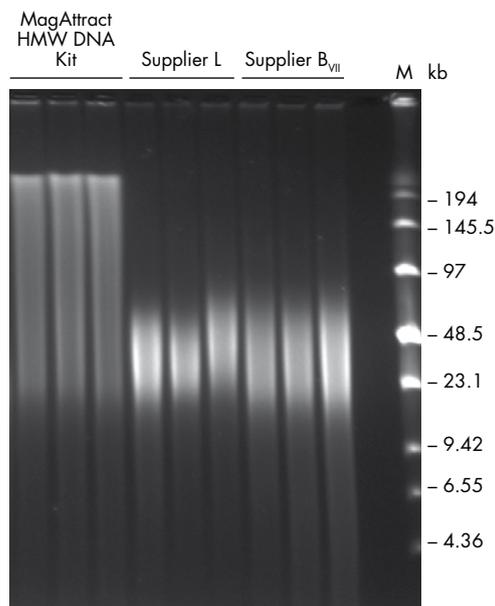


Figure 1. Successful isolation of high-molecular-weight DNA. DNA was isolated from 200 μ l of blood stabilized with EDTA, citrate and heparin respectively, using the standard method recommended for each procedure. The MagAttract HMW DNA Kit outperformed products from other suppliers and enabled successful isolation of 200 kb high-molecular-weight DNA. **M:** Marker.

Consistent high yields and purity

The MagAttract HMW DNA Kit uses a convenient, straightforward procedure to deliver high yields of pure, high-molecular-weight DNA. Gentle lysis conditions minimize DNA fragmentation, while contaminants and PCR inhibitors are efficiently removed, resulting in pure, high-molecular-weight DNA. The optimized chemistry and procedure of the MagAttract HMW DNA Kit greatly enhance DNA yield and purity, compared to classic spin-column or magnetic bead-based methods from other suppliers (Figures 2–3).

Effective removal of PCR inhibitors

Highly sensitive applications such as real-time PCR or NGS require the removal of anticoagulants, enzymes, divalent cations and other such inhibitors. Figure 4 shows real-time PCR amplification of DNA isolated from blood samples stabilized with EDTA, heparin and citrate stabilized using the MagAttract HMW DNA Kit. No inhibition is seen in any of the samples, which demonstrate highly linear correlation of C_T values with sample volume input.

Genomic DNA ready for next-generation sequencing

Since massively parallel sequencing (MPS) technologies utilize short read lengths, sequencing can be performed using intact genomic DNA >10 kb. De novo genome assembly and the discovery of inherited and acquired structural variants are, however, still challenging with standard DNA purification products. Mate-pair libraries with larger inserts may have significant impact on sequencing success, especially for complex repeat-rich genomes. The high-molecular-weight genomic DNA obtained with the MagAttract HMW DNA Kit is ready for use in NGS experiments (Table 2). It can be used for the generation of libraries with both small and large inserts and is therefore suitable for all sequencing applications. \blacktriangleright

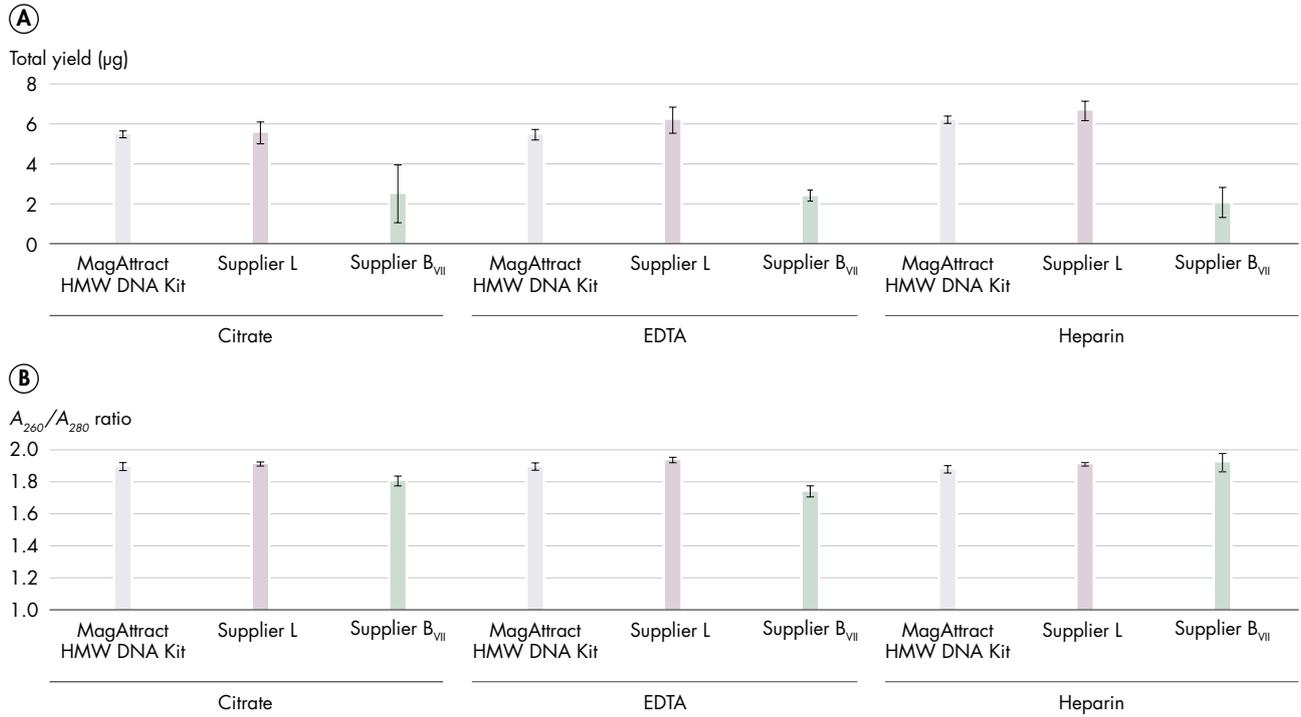


Figure 2. Highest yields and purity. A and B Genomic DNA was isolated from 200 µl of blood stabilized with EDTA, heparin, or citrate using the MagAttract HMW DNA Kit and using products from other suppliers. Yields and purities were determined by SpectraMax®. The MagAttract HMW DNA Kit delivered superior yields of pure DNA.

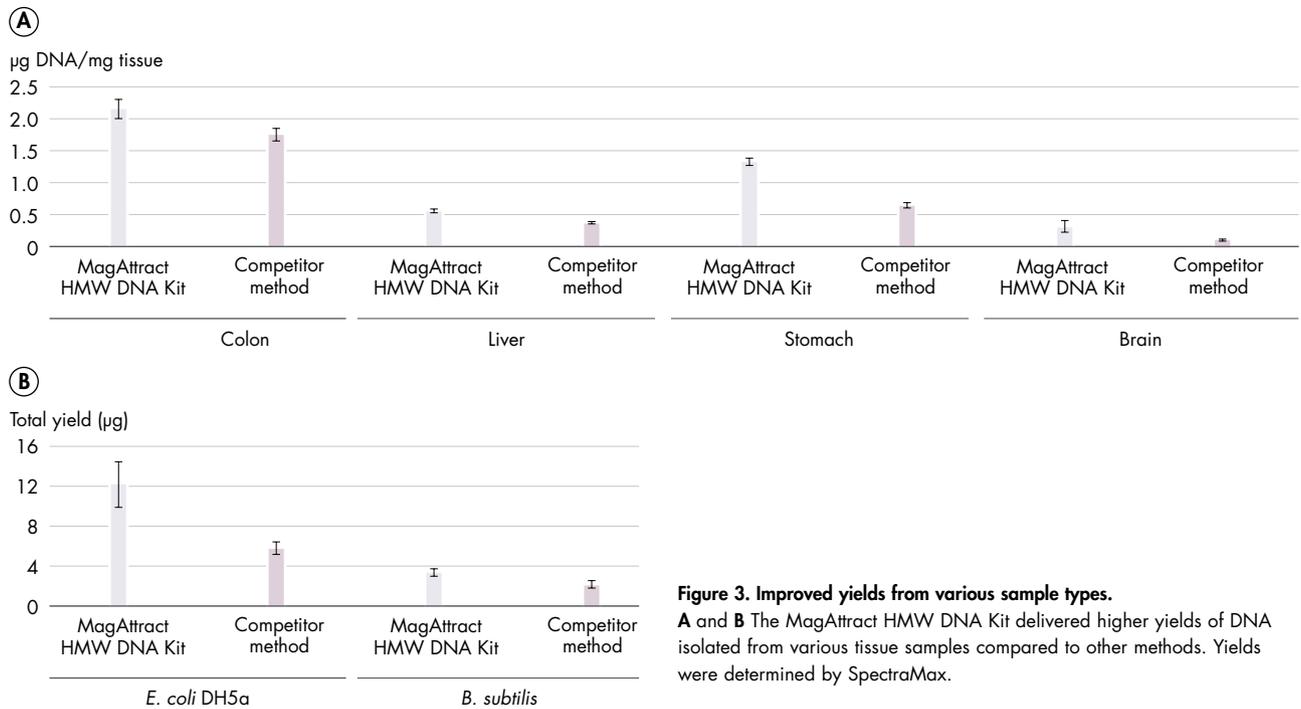


Figure 3. Improved yields from various sample types.

A and B The MagAttract HMW DNA Kit delivered higher yields of DNA isolated from various tissue samples compared to other methods. Yields were determined by SpectraMax.

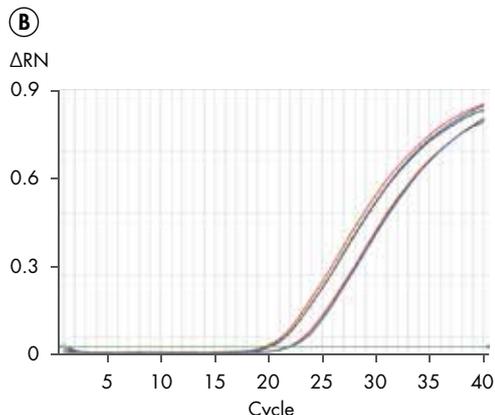
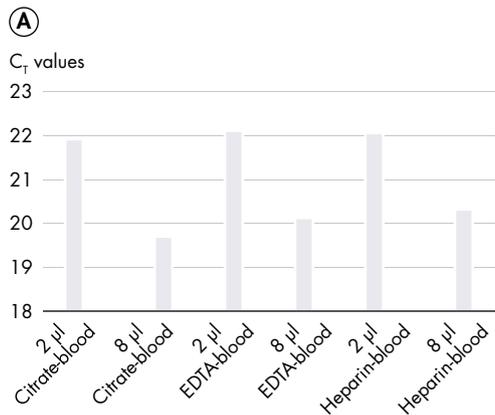


Figure 4. No inhibition in samples derived from anti-coagulated blood.
A and **B** Samples were processed with the MagAttract HMW DNA Kit. Different volumes of eluate were used as indicated. Variable C_T values from sample to sample are a result of WBC content variations.

Table 2. Representative results of a next-generation sequencing experiment (mate-pair)

Parameter	Specification
Total (long) mapped reads	6521106
Error rate	0.36%
Indel rate	0.01%
Chimeras	0.14%
Percent duplication	1.15%

Ordering Information

Product	Contents	Cat. no.
MagAttract HMW DNA Kit (48)	For 48 DNA preps: MagAttract Suspension G, Buffer ATL, Buffer AL, Buffer MB, Buffer MW1, Buffer PE, Proteinase K, RNase A, Buffer AE, Nuclease-Free Water	67563
MagAttract Magnetic Rack	Magnetic rack for convenient processing of up to 12 samples	19606

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