

# Flexible purification of DNA from variable volume blood samples with the Thermo Scientific KingFisher Blood DNA Kit

SP&A Application Laboratory, Thermo Fisher Scientific, Vantaa, Finland

- *Efficient purification of genomic DNA*
- *Isolation from fresh or frozen blood and buffy coat*
- *Flexible procession from 1-96 samples*
- *Variable sample volume up to 3 ml*
- *Excellent performance, DNA yields up to 130 µg*



## Introduction

The Thermo Scientific KingFisher Blood DNA Kit together with the KingFisher® magnetic particle processor offers an efficient solution for purifying genomic DNA (gDNA) from fresh or frozen blood and buffy coat with minimal hands-on work. The Thermo Scientific KingFisher Flex instrument enables automation of high-throughput or large-volume sample preparation, and a lower throughput instrument, the Thermo Scientific KingFisher Duo, is available for up to 24 samples at a time. Optimized combination of kit reagents, plastic consumables, Thermo Scientific BindIt Software and patented magnetic particle handling constitutes an exceptional purification system for obtaining a high yield and optimal purity of DNA. This technical note describes the excellent quality of the rapid method for gDNA purification from variable volumes of blood samples.

## Material and Methods

### KingFisher Flex 96 and KingFisher Duo 12

The gDNA was isolated from 250 µl of fresh and frozen human blood using the KingFisher Blood DNA Kit (Cat. No. 97010196) according to the instruction manual. The purification protocols were optimized for the KingFisher Duo and KingFisher Flex with the BindIt® Software 3.2. The elution volume for KingFisher Duo was 100 µl and for KingFisher Flex 150 µl.

### KingFisher Flex 24

The gDNA was isolated from 3 ml of fresh and 1.5 ml of frozen human blood using the KingFisher Blood DNA Kit according to the instruction manual. The protocol was run on the KingFisher Flex 24. In the walk-away process for 1 ml blood samples, the KingFisher Magnetic Beads and Binding Buffer are included in the lysis step. The modified protocol was run on the KingFisher Flex 24. The elution volume with KF Flex 24 was 500 µl.

### Competitor comparison

The KingFisher Blood DNA Kit together with the KingFisher Duo and KingFisher Flex were compared to three comparable methods or instruments. The other methods comprised of a spin column method, a magnetic particle purification kit combined to a semi-automated instrument and a purification automate with sealed reagent cartridges. DNA was purified from 200–250 µl of blood and eluted according to the instruction manuals.

## Results

The results of the gDNA purification by using the KingFisher Blood DNA Kit with the KingFisher Flex and KingFisher Duo are listed in Table 1. The shape of the UV absorption curve at 220–340 nm and ratios between the absorbance 260/280 nm and 260/230 nm show an excellent purity of the gDNA (Figure 1).

TABLE 1.  
Typical DNA yields and purities from blood samples\*  
treated with EDTA or citrate

Instrument	Blood sample	Typical DNA yield	Purity by absorbance 260/280 nm
KingFisher Flex 96 and KingFisher Duo 12	250 µl	3–10 µg	1.7–2.0
KingFisher Flex 24 and KingFisher Duo 6	3 ml	90–130 µg	

\* DNA yields obtained from blood samples vary individually due to the number of white blood cells

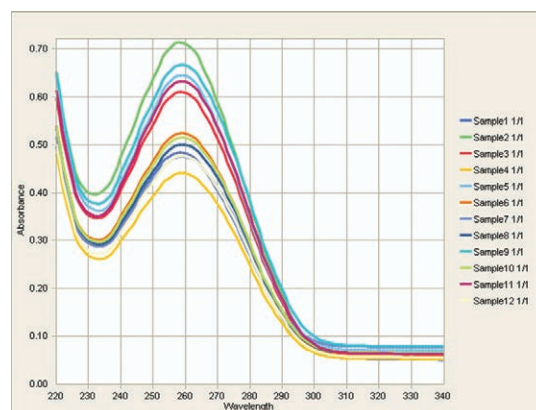


Figure 1. Absorption spectra (220–340 nm) of twelve DNA isolates extracted from 250 µl of fresh blood with the KingFisher Flex.

With the KingFisher Flex 24 and the KingFisher Duo 6 -sample format, it is possible to use 3 ml of blood to reach up to 130 µg of gDNA. Experiments of the walk-away protocol, with even less hands-on work, show that the starting volume of blood should be reduced to 1 ml to achieve sufficient washing of DNA and the best purity. The gDNA quality was excellent for downstream applications but the yields were lower with the walk-away protocol, as was expected (Figure 2).

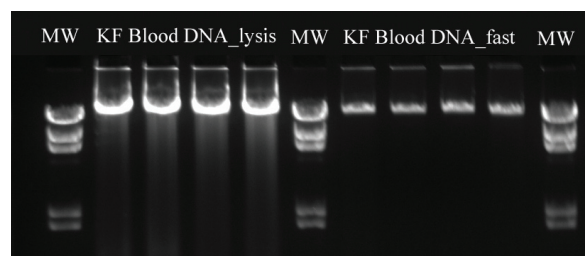


FIGURE 2. DNA purified from 3 ml of blood by lysing samples according to the kit instructions (KF Blood DNA\_lysis) and from 1 ml of blood by using the walk-away protocol including the magnetic beads and the Binding Buffer from the beginning of the process (KF Blood DNA\_fast).

The purification of DNA from different volumes of frozen blood resulted in very good quality and quantity of gDNA for any secondary applications. Figure 3 shows purified gDNA on agarose gel and the PCR performed from these isolates.

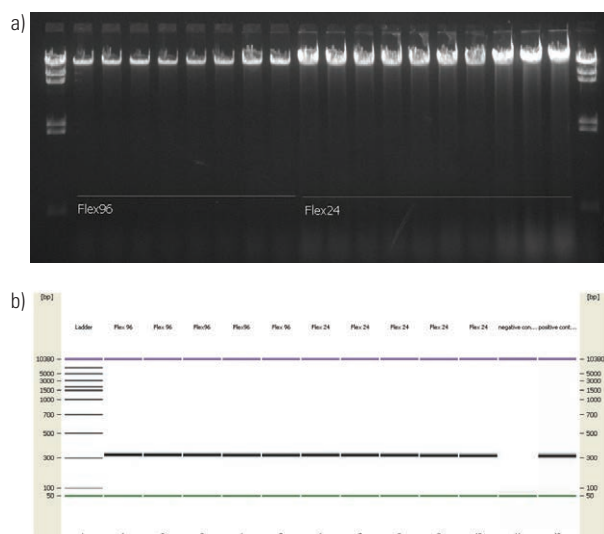


FIGURE 3. DNA purified from frozen blood samples. a) gDNA isolated from 250 µl of blood with the KingFisher Flex 96 and from 1.5 ml of blood with the KingFisher Flex 24. b) PCR performed from 10 frozen blood DNA isolates, negative control and positive control.

Comparing the performance of the KingFisher Blood DNA Kit against three different DNA isolation procedures showed superiority of the KingFisher Blood DNA Kit purification process by using the kit together with the KingFisher Duo or KingFisher Flex instrument. Figure 4 represents the agarose gel image of the DNA elutions from tested purification systems. Competitor comparison results indicate the most efficient DNA isolation by using KingFisher system.

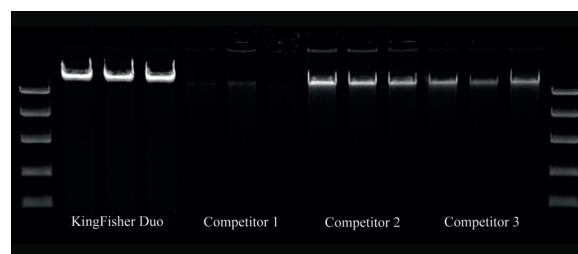


FIGURE 4. In the comparison between different purification processes, the highest yield of gDNA was obtained with the KingFisher Blood DNA Kit together with KingFisher Duo.

## Conclusions

- Excellent DNA yields up to 130 µg from 3 ml of blood
- High-quality DNA free of proteins, salt and other inhibitors
- DNA purification of 96 blood samples in less than an hour
- Optimized process including the purification kit, instrument and software
- Semi-automated process saves time with minimal hands-on work



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**North America:**  
**USA / Canada**  
+1 800 345 0206

**Europe:**  
**Austria**  
+43 1 801 40 0

**Belgium**  
+32 53 73 42 41

**France**  
+33 2 2803 2180

**Germany national toll free**  
08001-536 376

**Germany international**  
+49 6184 90 6940

**Italy**  
+39 02 02 95059 448

**Netherlands**  
+31 76 571 4440

**Nordic countries**  
+358 9 329 100

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+7 (495) 739 76 41

**Spain/Portugal**  
+34 93 223 09 18

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+41 44 454 12 12

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+44 870 609 9203

**Asia:**  
**China**  
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+86 10 8419 3588

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+91 22 6716 2200

**Japan**  
+81 45 453 9220

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+852 2885 4613

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+33 2 2803 2180

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