



Efficient purification of high-quality DNA from blood samples with a range of white cell counts using the BioRobot® EZ1 System

This study shows that the BioRobot EZ1 workstation, in combination with EZ1 DNA Blood Kits, efficiently purifies DNA from whole blood samples and that DNA yield correlates strongly to white blood cell count. Purified DNA performs well in downstream PCR analysis, irrespective of the blood preservative used.*

Introduction

Sensitive PCR applications require template DNA of consistent high quality and purity for assays to be effective. The heterogeneous nature of blood samples, and the various blood preservatives used increase the importance of robust and reliable DNA purification methods for clinical research applications. The small footprint and easy operation of the BioRobot EZ1 workstation make it highly suited to low- to medium-throughput laboratories.

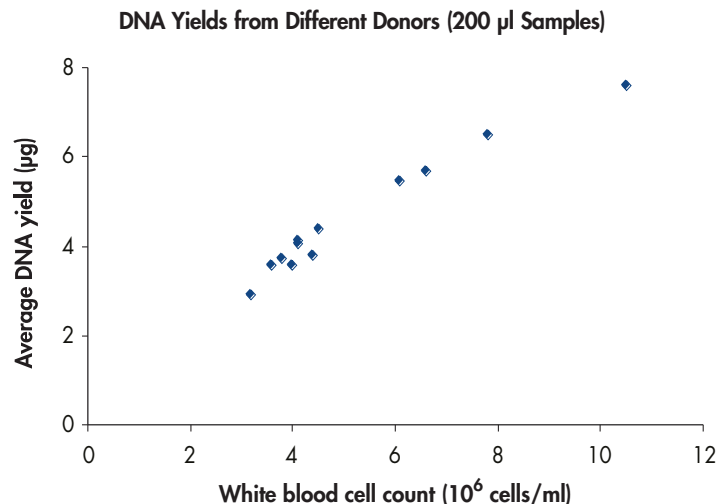
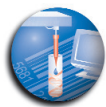


Figure 1. Average DNA yields from 200 µl blood samples. Samples from 12 individuals with various white blood cell counts were used.



Materials and methods

Automated DNA purification was performed on EDTA-preserved blood samples taken from 12 individuals. Blood was isolated from 12 samples using the 200 μl protocol. Seven of the twelve samples were selected and purified using the 350 μl protocol. Blood from two additional individuals was also preserved with EDTA, heparin, and citrate (ACD). Six isolations were performed from each individual using EZ1 Blood DNA Kits on the BioRobot EZ1 workstation. Purified DNA was eluted in 200 μl RNase-free water, and DNA yields were measured by absorbance (A_{260}) corrected for background. The single-copy *MECL-1* gene was amplified by PCR (34 cycles) using between 15 and 0.25 μl purified DNA.

Results

Average yields for all donors are presented in Figures 1 and 2. As much as 2.91–7.58 μg and 5.78–12.91 μg was isolated using the 200 μl and the 350 μl protocols, respectively. The figures show the relationship between DNA yield and white blood cell count. The selected individuals showed various white blood cell counts within the normal clinical range. Strong, clean bands were observed from all PCR reactions using template purified from ACD-, heparin-, and EDTA-preserved blood.

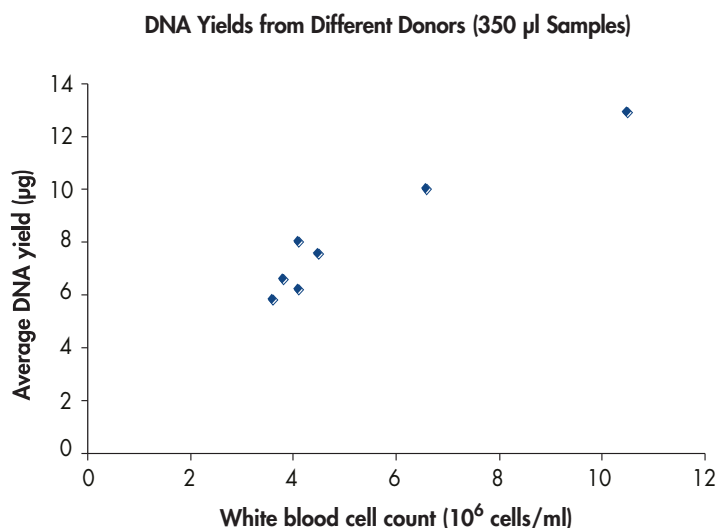
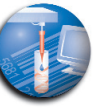


Figure 2. Average DNA yields from 350 μl blood samples. Samples from 7 individuals with various white blood cell counts were used.



Sensitive PCR Using DNA from Preserved Blood

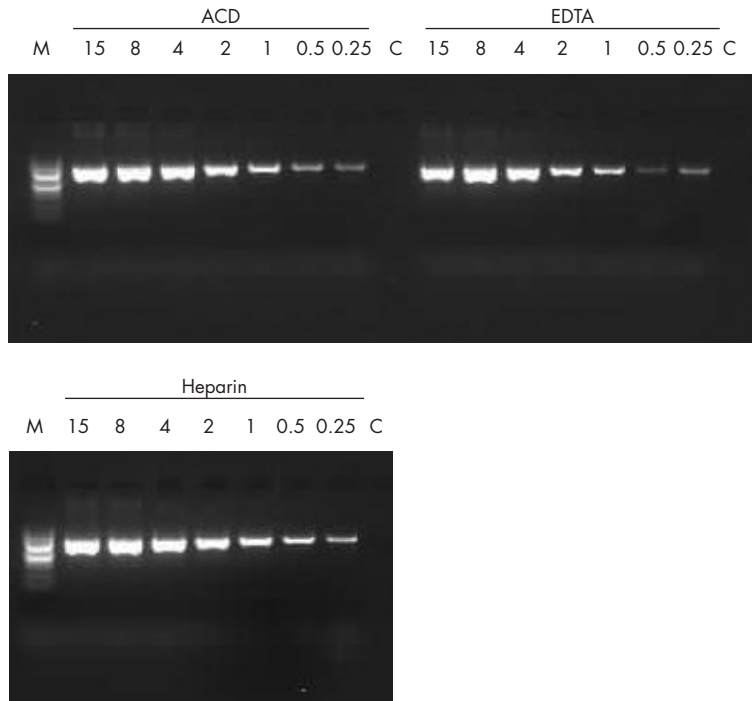


Figure 3. PCR of a 900 bp fragment of the MECL-1 single-copy gene using serial dilutions of template DNA purified from 200 μ l ACD-, heparin-, and EDTA-preserved whole blood. 15–0.25 μ l purified DNA was used in each 50 μ l PCR as indicated. **M:** 100 bp DNA ladder; **C:** negative control.

Conclusions

The BioRobot EZ1 system, efficiently purifies high-quality DNA from whole blood samples:

- n **High-quality DNA** — prepare PCR templates from ACD-, heparin-, or EDTA-preserved blood
- n **Reproducible yields** — count on DNA that represents your starting sample
- n **Successful PCR** — use highly pure DNA for inhibition-free amplification

