DNA extraction : Exgene™ Clinic kit vs. Competitor's DNA Kit

Introduction

Cell, blood and tissue are among the most common samples in molecular laboratories. Many research studies require proper handling to isolate nucleic acids (DNA or RNA) for the performance of downstream applications by PCR, RT-PCR, NGS, or other techniques. To ensure successful analysis, it is desirable to extract high quality nucleic acids possible.
Here we compare the genomic DNA extraction efficiency of two commercial kits : GeneAll Exgene™ Clinic kit and Competitor's DNA extraction kit.

Materials and methods

Cell, blood and tissue DNA extraction were performed by manual of each kit. Following DNA extraction, DNA yield and purity were determined using NanoDrop™ (Figure1~2).

To assess DNA integrity, DNA eluted was run on a 1% agarose gel (Figure 3).

To evaluate inhibitor free DNA extraction, DNA eluted was amplified by PCR (Figure 4).

Assessment of DNA contamination in the eluate were performed by gel electrophoresis (Figure 5).

Sample used

Starting sample	Input
Human and pig blood	200 µl
Mouse tissues (Stomach, Lung, Liver, Spleen)	200 mg
Cultured bacteria cell (*E.Coli*)	1 x 10^8
Cultured cell (Jurkat cell)	1 x 10^6

Kit used

Kit	Exgene™ Clinic kit	Competitor's DNA Extraction kit
Format	Spin column	
Technology	Silica technology	
Main sample type	Blood, tissue, cell, swab, DBS	Blood, tissue, cell
Target Molecule	Genomic DNA, mitochondrial DNA, bacterial DNA, parasite DNA, viral DNA	
Proteinase K	O	
RNase A	X (Optional RNase A treatment protocol is provided)	X

Results

DNA yield

DNA yields from human blood, pig blood, E.Coli and mouse tissues were analyzed using NanoDrop™ and the results were compared for the Exgene™ Clinic and Competitor's DNA kit used to extract the DNA (Figure 1).

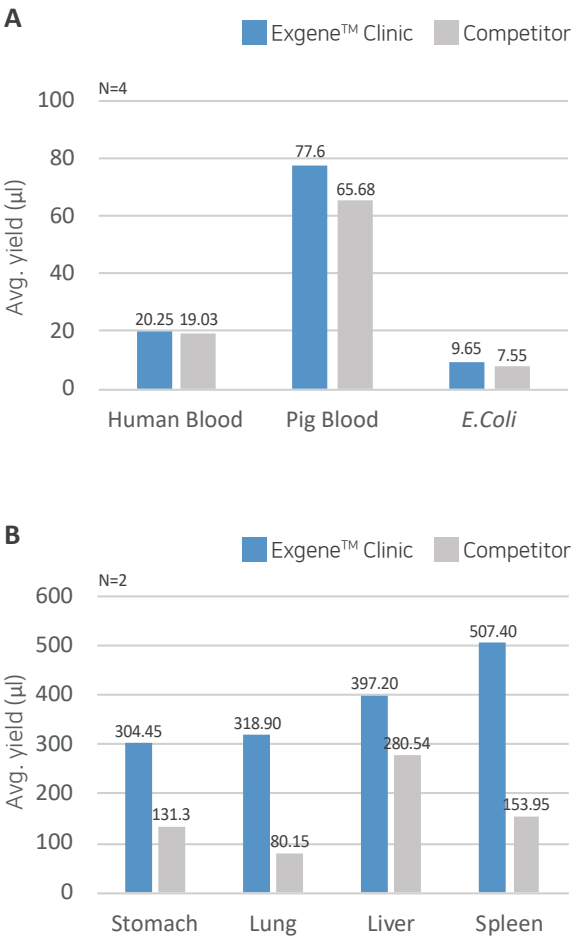


Figure 1. Comparison of DNA yields.
DNA yields from (A) human blood, pig blood, *E.Coli* and (B) mouse tissues were determined by analysis on the NanoDrop™. Exgene™ Clinic kit delivered higher DNA yield than the Competitor's DNA kit, for all sample types analysed.

DNA purity

DNA purity from human blood, pig blood, *E.Coli* and various mouse tissues was assessed using NanoDrop™ (Figure 2), evaluated for integrity by gel electrophoresis (Figure 3).

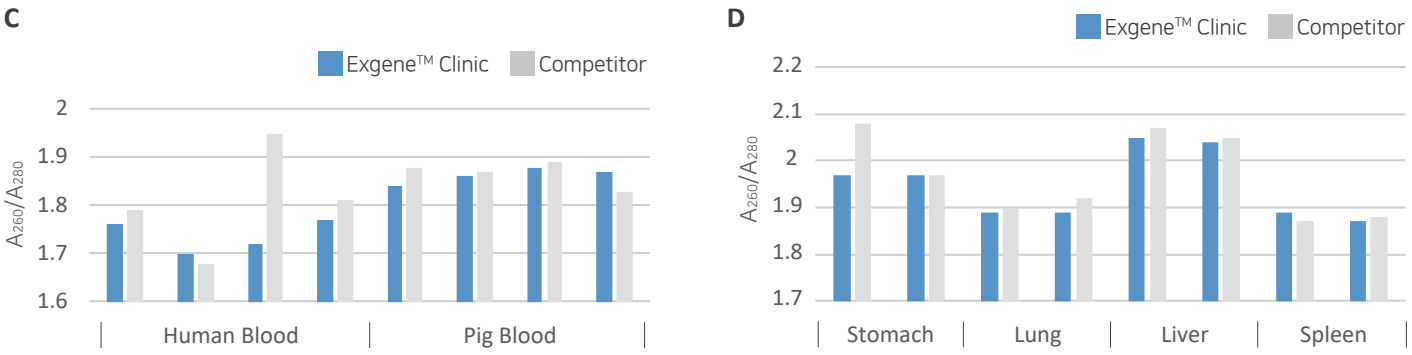


Figure 2. DNA purity, analyzed using NanoDrop™.
DNA purity from (C) human blood, pig blood and (D) mouse tissues was determined by analysis on the NanoDrop™. All had A_{260}/A_{280} ratio of 1.7~2.0, indicating high DNA purity.

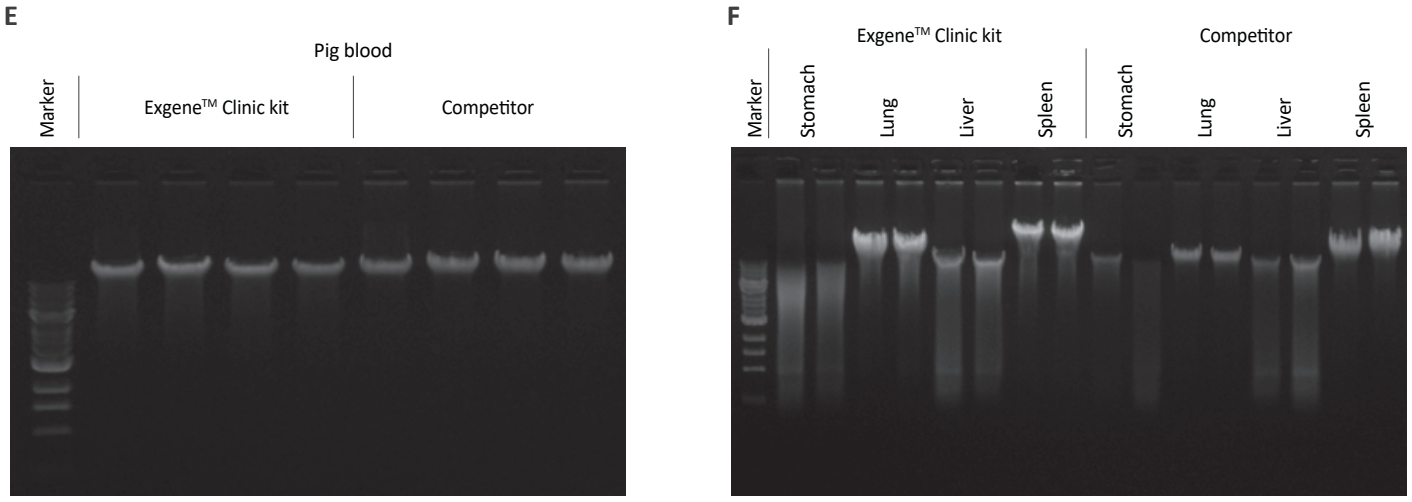
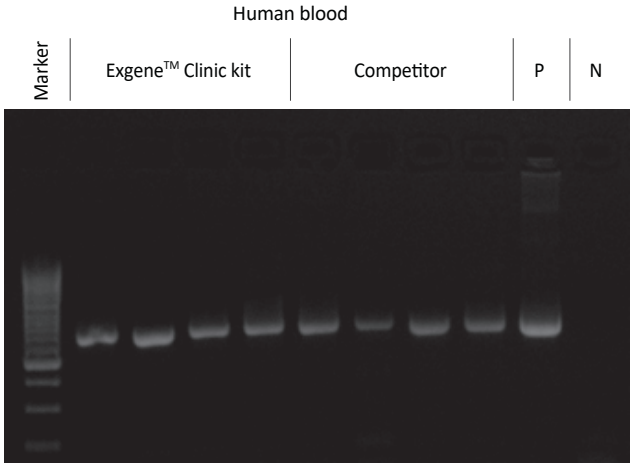


Figure 3. DNA integrity was visualized by agarose gel electrophoresis.
All samples showed a high level of DNA integrity.

Assessment of inhibitor-free DNA

Inhibitor compounds which may not be completely removed during the DNA extraction protocol can interfere with PCR. The DNA extracted from human blood and mouse tissues was assessed using PCR (Figure 4).

G



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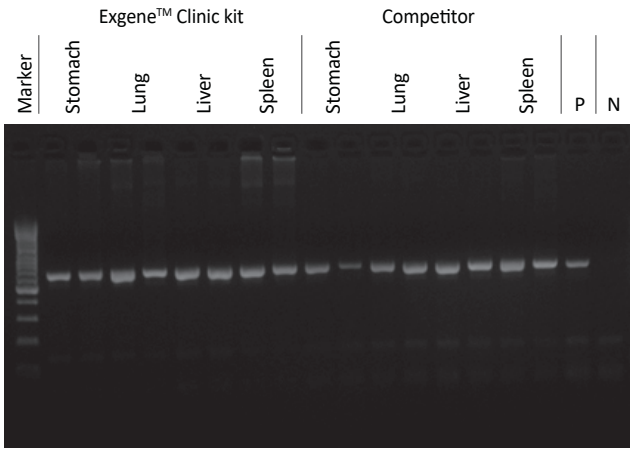

Figure 4. PCR amplification to evaluate inhibitor-free DNA extraction.
All DNA isolated from human blood (G) and mouse tissues (H) using Exgene™ Clinic and Competitor's DNA kit has good quality with PCR amplification of human b-globin gene (G) and bacterial 16s rRNA gene (G).

Assessment of RNA contamination

To determine the residual RNA present in eluate after DNA extraction, visual inspection of DNA by agarose gel electrophoresis carried out (Figure 5). RNase A treatment was not performed.

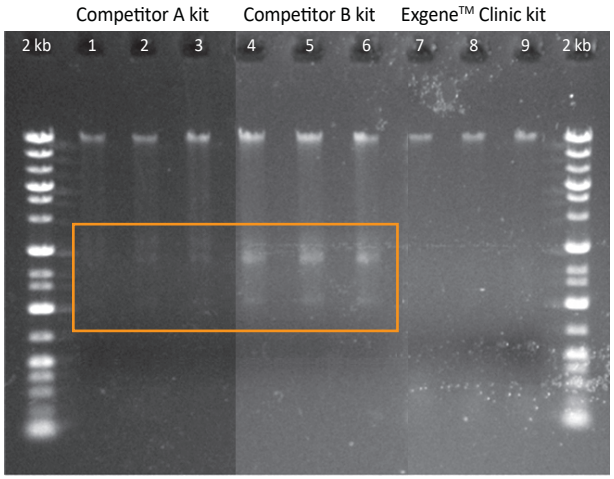

Figure 5. Visualization of DNA in agarose gel performed to evaluate RNA contamination.
Total DNA extracted from Jurkat cell using Competitor A's DNA extraction kit, Competitor B's DNA extraction kit and Exgene™ Clinic extraction kit.
Lane 1~6 contain the genomic DNA of interest as well as contaminating RNA which migrates as a lower molecular weight smear while Lane 7~8 contain just genomic DNA of interest with no RNA contaminants, indicating that Exgene™ Clinic kit has higher efficiency in intact and high molecular weight DNA extraction than Competitor A's DNA kit and Competitor B's DNA kit.

Conclusions

Exgene™ Clinic kit provides an easy and rapid method for high quality genomic DNA extraction from a variety of samples.
In this study, Exgene™ Clinic kit was successfully utilized to extract high molecular weight DNA with high yield, purity and integrity.

- Exgene™ Clinic kit yielded more DNA across the various samples.
- Exgene™ Clinic kit consistently delivered high purity DNA for all samples used.
- The eluted DNA obtained using Exgene™ Clinic kit had no residual RNA without RNase A treatment, indicating that Exgene™ Clinic kit is more optimized to binding of gDNA alone.