APOSTLE®

we deliver the message of health

Apostle MiniMax™ Technology

1. **Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Standard Edition)**

2. **Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S)**

At Apostle, we aim to develop technologies to fundamentally improve the efficiency and accuracy of liquid biopsy and NIPT.

Apostle MiniMax™ Technology

The ability to isolate and analyze circulating cell free DNA (cfDNA) at very low concentrations is becoming increasingly important, particularly in non-invasive prenatal test, early cancer detection, and infectious disease diagnosis. Highly efficient isolation of cfDNA from complexed biological medium is a crucial step for subsequent cfDNA analysis.

Apostle MiniMax™ technology ensures precise capture and separation of circulating genetic materials for liquid biopsy analysis. This is achieved through Apostle's novel proprietary MiniMax™ magnetic nanoparticles (Exhibit 1 and 2) with novel material composition and surface chemistry, large surface area and minimized variation.

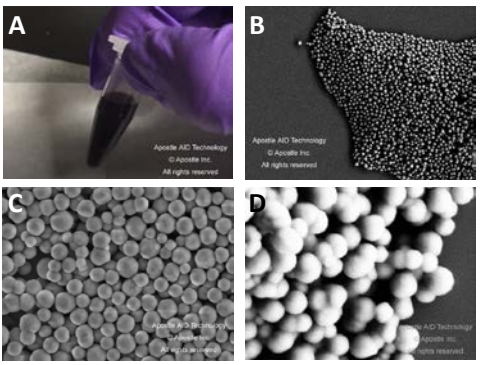


Exhibit 1. Apostle's proprietary MiniMax™ magnetic nanoparticles.

The Apostle MiniMax™ nanoparticles have an increased magnetic strength and a decreased particle size compared to other leading technologies in the market, which ensures excellent suspension in solution and rapid mobility. The optimized surface chemistry allows efficient enrichment of genetic materials from complex biological materials.

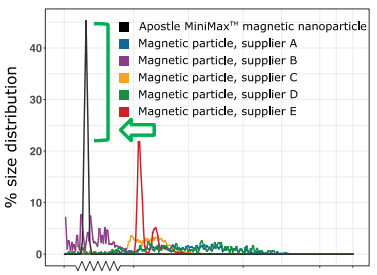


Exhibit 2. Apostle's proprietary MiniMax™ nanoparticles have uniform sizes. Apostle's MiniMax™ magnetic nanoparticles generated from our proprietary technology have uniform size distribution with minimized doublets, distinct from the particles from five current technological providers showing random sizes. Highly consistent size distribution of Apostle's nanoparticles ensure reproducible results.

Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Standard Edition)

– powered by Apostle MiniMax™ technology

Powered by Apostle MiniMax™ technology, Apostle MiniMax™ High Efficiency cfDNA Isolation Kit is an excellent tool for the isolation of ultra-low concentration cell free DNA (cfDNA). Compared to major alternative suppliers, Apostle MiniMax™ High Efficiency cfDNA Isolation Kit offers superior DNA isolation efficiency for DNA ladders spiked in biological medium (Exhibit 3).

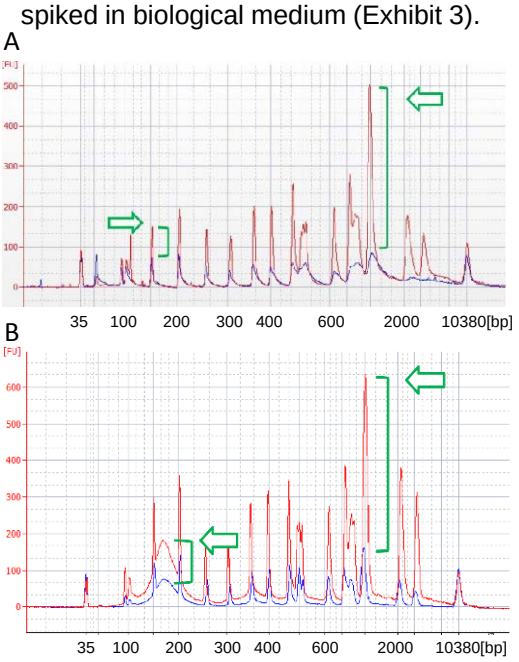


Exhibit 3. Superior DNA isolation efficiency. **A)** DNA ladder (50-3000bp) was spiked in TE buffer, followed by isolation with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (red curve) and major alternative product (blue curve). The isolated DNA was characterized by Bioanalyzer 2100. **B)** DNA ladder was spiked in serum, followed by isolation with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (red curve) and major alternative product (blue curve). The isolated DNA was characterized by Bioanalyzer 2100. Apostle MiniMax™ High Efficiency cfDNA Isolation Kit offers superior DNA enrichment efficiency of 2x – 10x.

Over 95% DNA recovery in range between 80 – 3000bp was achieved using Apostle MiniMax™ High Efficiency cfDNA Isolation Kit, as demonstrated through recovery of DNA ladder spiked in serum (Exhibit 4). This is due to the optimal interaction between DNA and the nanoparticles enabled by the MiniMax™ technology, resulting in efficient binding with cfDNA in complexed biological medium and total elution of cfDNA at later stage.

The Apostle MiniMax™ High Efficiency cfDNA Isolation Kits are manufactured under highly controlled and validated production processes. This will ensure optimal performance with high efficiency and reproducibility in cfDNA isolation (Exhibit 5).

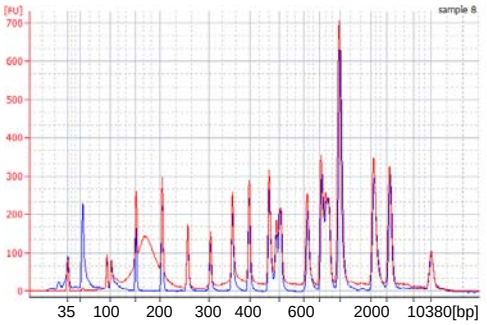


Exhibit 4. Over 95% DNA recovery in range between 80 – 3000bp. DNA ladder was spiked in serum, followed by isolation with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit. The Isolated DNA was characterized by Bioanalyzer 2100 (red curve), and compared with original DNA ladder (blue curve). Apostle MiniMax™ High Efficiency cfDNA Isolation Kit offers superior DNA recovery efficiency of > 95%.

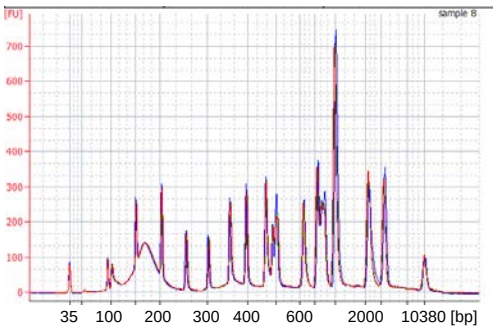
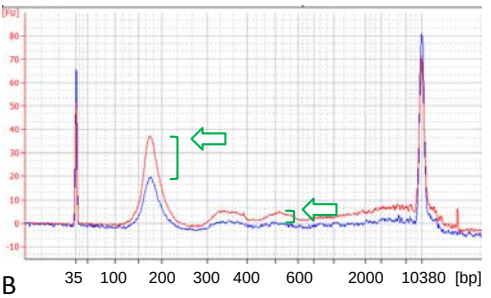


Exhibit 5. Highly reproducible DNA isolation process. DNA ladder was spiked in serum, followed by isolation with three batches of Apostle MiniMax™ High Efficiency cfDNA Isolation Kit. The Isolated DNA was characterized by Bioanalyzer 2100, and compared between batches. Apostle MiniMax™ High Efficiency cfDNA Isolation Kit offers highly consistent DNA isolation result.

cfDNA is a group of highly fragmented DNA molecules, with major peak at ~170bp, doublet peak at ~340bp, triplet peak at ~510bp, and so on. Therefore, cfDNA isolation kit capable of highly efficient cfDNA isolation spanning wide cfDNA size distribution is desired. Apostle MiniMax™ High Efficiency cfDNA Isolation Kit meets such need as demonstrated from its > 95% recovery of DNA ladder. This is further validated through isolation of natural cfDNA from human plasma (Exhibit 6A) and urine samples (Exhibit 6B), where Apostle MiniMax™ High Efficiency cfDNA Isolation Kit offers superior cfDNA isolation efficiency over wide range, specifically covering the 170bp, 340bp, and 510bp cfDNA peaks, when compared with major alternative product.

A



B

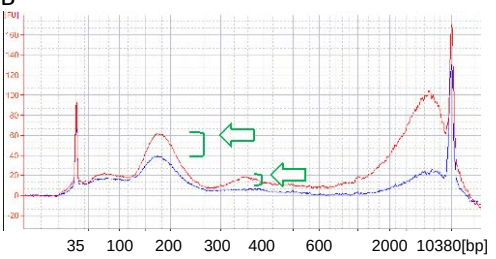


Exhibit 6. Superior natural cfDNA isolation efficiency in human plasma and urine. **A)** Cell-free plasma was separated from blood samples by centrifugation for 10 minutes at 2000g at 4°C, then centrifuged for 10 minutes at 16000g at 4°C. cfDNA was isolated from 4mL plasma with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (red curve) and major alternative product (blue curve). The isolated cfDNA was characterized by Bioanalyzer 2100. **B)** Cell-free urine was prepared by centrifugation for 10 minutes at 16000g at 4°C. cfDNA was isolated from 20mL urine with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (red curve) and major alternative product (blue curve). The isolated cfDNA was characterized by Bioanalyzer 2100. Apostle MiniMax™ High Efficiency cfDNA Isolation Kit offers superior cfDNA isolation efficiency for both plasma and urine samples.

The quality of DNA isolated with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit was validated through qPCR test (Exhibit 7). Different concentrations of DNA fragment containing the EGFR c.2573T>G L858R mutation (synthetic, ~170 bp) were spiked in biological medium, then isolated with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit. Consistent qPCR result was observed between isolated DNA and original DNA fragment before spike in, demonstrating high quality of DNA isolated with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit for down stream applications.

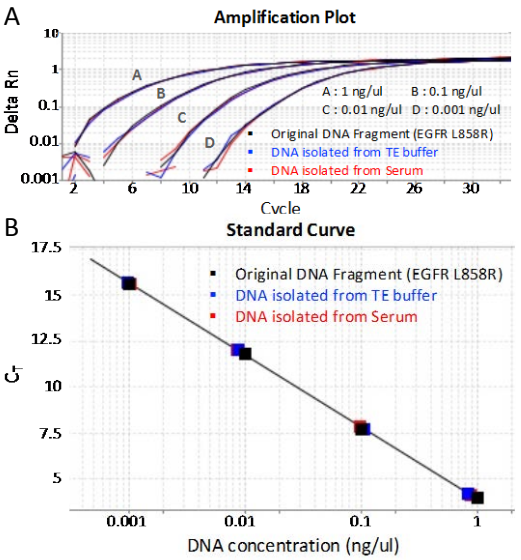


Exhibit 7. Superior performance of DNA mutation detection isolated with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit

20 uL of DNA fragment containing the EGFR c.2573T>G L858R mutation (synthetic, ~170 bp), with concentration of 1ng/uL, 0.1ng/uL, 0.01ng/uL, 0.001ng/uL, was spiked into 1mL TE buffer (blue) or Serum (red) respectively. The mutated DNA fragment was isolated with Apostle MiniMax™ High Efficiency Cell-Free DNA Isolation Kit (Standard Edition), with a final elution volume of 20uL. qPCR was performed using 1 uL of the isolated DNA, and compared with 1uL of the corresponding original mutated DNA solution at 1ng/uL, 0.1ng/uL, 0.01ng/uL, 0.001ng/uL. **A)** Amplification plot showing highly overlapping curves for mutated DNA fragment isolated with Apostle MiniMax™ High Efficiency Cell-Free DNA Isolation Kit and original DNA solution at different concentrations. **B)** qPCR standard curve generated using original mutated DNA solution, in order to quantify the recovery of DNA isolated with Apostle MiniMax™ High Efficiency Cell-Free DNA Isolation Kit. DNA isolation recovery rate was calculated to be >90%.

Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S)

– designed for small DNA fragments (<100bp)

Powered by Apostle MiniMax™ technology, Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S) is an excellent tool for the isolation of ultra-low concentration cell free DNA (cfDNA). Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S) is featured for its efficient recovery of small DNA fragments (<100 bp) from biological samples (Exhibit 8 & 9). This feature is quite useful when small DNA molecules have significant presence in the biological sample and need to be isolated (Exhibit 8).

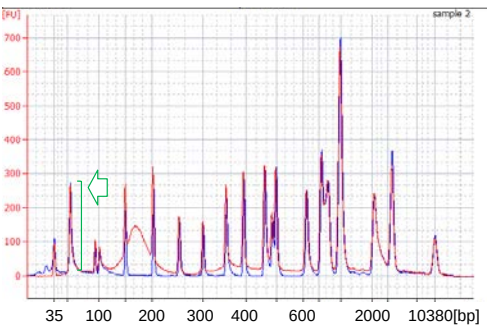


Exhibit 8. Over 95% DNA recovery in range between 50 – 3000bp. DNA ladder was spiked in serum, followed by isolation with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S). The Isolated DNA was characterized by Bioanalyzer 2100 (red curve), and compared with original DNA ladder (blue curve). Apostle MiniMax™ High Efficiency cfDNA Isolation Kit offers superior DNA recovery efficiency of >95%, including small DNA fragments at ~ 50bp as highlighted.

Compared to major alternative suppliers with magnetic bead technology, Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S) offers superior DNA isolation efficiency for cfDNA reference spiked in biological medium, especially for cfDNA with size < 80bp (Exhibit 9).

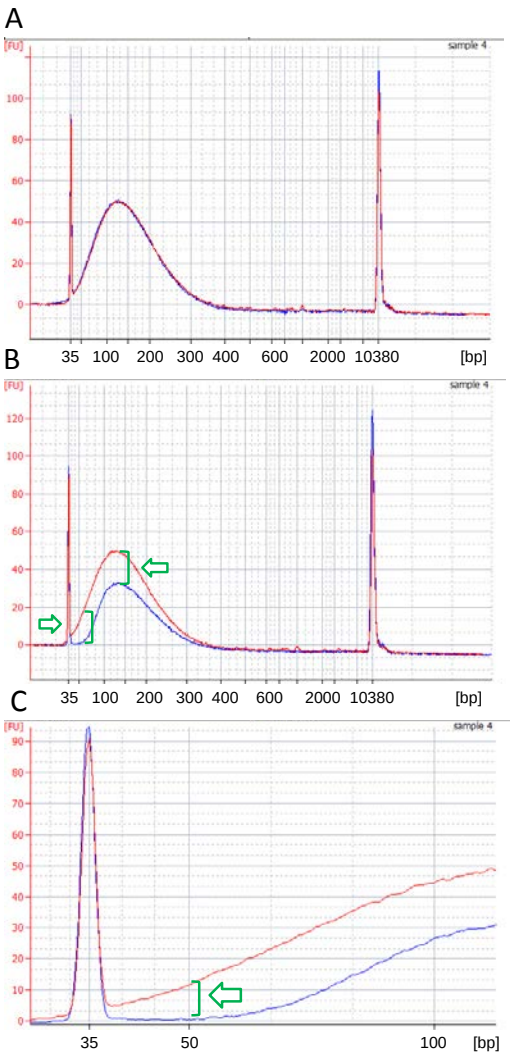


Exhibit 9. Superior small DNA isolation efficiency.

A) cfDNA reference standard (Horizon Discovery Ltd, Cat# HD780) was spiked in TE buffer, followed by isolation with Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S). The isolated DNA was characterized by Bioanalyzer 2100 (red curve), and compared with original cfDNA reference standard (blue curve). Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S) offers >95% recovery of the cfDNA reference standard, which has significant portion of DNA fragments with size < 100bp. **B)** cfDNA reference standard was spiked in TE buffer, followed by isolation with MiniMax™ Type S and a major alternative product. Bioanalyzer 2100 analysis demonstrated significantly higher cfDNA recovery rate of MiniMax™ Type S (red curve) compared to a major alternative product (blue curve). **C)** Zoom in of B in the region between 35bp – 100 bp. MiniMax™ Type S (red curve) is compared to a major alternative product (blue curve). Bioanalyzer 2100 analysis demonstrated the efficient recovery at ~ 50bp of MiniMax™ Type S (red curve), while a major alternative product (blue curve) failed.

Order Information
contact: info@apostlebio.com

Product	Cat #
Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Standard Edition)	A17622
Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S)	A17830
Apostle MiniMax™ Magnetic Nanoparticles	A320

Apostle Biotechnology

Enabling the new landscape of liquid biopsy and NIPT

David Ge, MD. PhD.
CEO & President

- 18+ years of research and industry experience in genomic sciences
- U.S. Citizen through federal "Outstanding Professors and Researchers"
- President of BioSciKin Co. & Simcere Diagnostics Co (2016-2017)
- Director of Bioinformatics at Gilead Sciences, Inc (2011-2016)
- Assistant Professor of Biostatistics & Bioinformatics, Duke University School of Medicine (2008-2011)
- Ph.D. in Biostatistics & Genetic Epidemiology, CAMS & PUMC (2004)
- Co-authored 70+ peer-reviewed papers, 5 in Nature & 1 in Science, 16,000+ citations.

Bo Zhang, PhD.
VP of Chemistry

- 10+ years of experience in chemistry
- Sr. Director, Simcere Diagnostics, Inc (2016-2017)
- Director, Nirmidas Inc (2015-2016)
- Forbes China Top Innovators, Entrepreneurs And Leaders Under Age 30 "30 Under 30" (2017)
- Recipient, Materials Research Society Graduate Student Awards; Mona M. Burgess SIGF Fellow; William S. Johnson Fellowship
- Ph.D. in Chemistry, Stanford University (2015)
- Co-authored 30+ peer-reviewed papers. Led two in Nature Medicine on diagnostics (2014, 2017)

Xin Guo, PhD.
VP of Bioinformatics

- 10+ years of research and industry experience in bioinformatics, artificial intelligence (AI), and HPC
- VP of Bioinformatics, Simcere Diagnostics, Inc (2016-2017)
- Group leader, research scientist of Bioinformatics at Gilead Sciences, Inc. (2012-2016)
- Led the clinical phylogenomic project for Sovaldi®, a world-leading anti-HCV drug.
- Ph.D. in Computer Science, Duke University (2012)
- M.S. in Informatics from Max Planck Institute, Germany (2006)
- Led multiple publications in AI, including in PNAS.

Apostle, Inc. is a biotechnology company in Sunnyvale, CA – the heart of the Silicon Valley. We are in the business of the research, development, licensing, and sales of novel MiniMax™ high efficiency cell-free genetic material enrichment technology, Triton™ cancer genome deep learning technology, AI-enabled nanoDiagnostics (AID™) technology, and the related intellectual properties, products, and services to fundamentally improve the efficiency and accuracy of liquid biopsy and NIPT for diagnosis and treatment of human diseases.

For more information:
please send inquiries to: info@apostlebio.com
or visit our website: http://apostlebio.com