

# Apostle MiniMax™ High Efficiency cfDNA Isolation Kit Manual (Type S), 5-10 Preps – designed for small DNA (<100bp) fragments

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## Product description

The Apostle MiniMax™ High Efficiency cfDNA Isolation Kit (Type S) is designed for isolation of DNA from cell free plasma, serum, urine samples. The kit is featured for its efficient recovery of small DNA fragments (<100 bp) from biological samples. The kit uses proprietary Apostle MiniMax™ technology, offers highly efficient, reproducible recovery of high-quality cfDNA with high yield. The isolated DNA samples is suitable for a broad range of subsequent applications, including sequencing, PCR, etc.

## Kit capacity

The kit is capable of cfDNA isolation for 5-10 samples, depend on sample volume.

## Kit contents and storage condition

Contents	Amount	Storage
Magnetic Nanoparticles (S)	0.3 mL	2-8°C
cfDNA Lysis/Binding Solution (S)	25 mL	Room Temperature, in dark
cfDNA Wash Solution (S)	16 mL	
cfDNA 2 <sup>nd</sup> Wash Solution (S)	5 mL	
cfDNA Elution Solution (S)	0.3 mL	

**Note:** Upon receipt of the kit, check component to make sure the components are not frozen due to shipping. If the components are frozen, thaw all component before use. May need to sonicate the nanoparticle solution to resuspend the particle after freeze and thaw.

## Required materials not supplied

Adjustable micropipette (1 mL, 200 uL, 20 uL) and tips  
Magnets (Magnets specifically designed for 15 mL and 2 mL tubes are preferred)  
Table top centrifuge  
Nonstick, DNase/RNase-free tubes (1.5 mL, 15 mL, 50 mL)  
Vortex  
Shaker  
Ethanol, 200 proof  
Heater (for sample lysis)  
Proteinase K, 20mg/ml  
20% SDS solution  
Isopropanol, 100%

## Procedure for manual isolation of cfDNA

### A. Reagent Preparation

1. Add 8 mL Isopropanol to the cfDNA Wash Solution (S) bottle, to a final volume of 24 mL, and mix well.
2. Add 20 mL Ethanol to the cfDNA 2<sup>nd</sup> Wash Solution (S) bottle, to a final volume of 25 mL, and mix well.

**Caution:** Make sure to follow the Reagent Preparation step before experiment. Check the box on the bottle label to reflect the completion of reagent preparation.

### B. Sample lysis

3. Add components to a tube (15 mL tube for sample volume ≤ 4mL, 50 mL tube for sample volume > 4mL) **in the order** indicated below, based on volume of sample.

Reagents	Plasma/serum volume			
	1 mL	2 mL	4 mL	8 mL
Plasma/serum	1 mL	2 mL	4 mL	8 mL
Proteinase K, 20mg/ml	15 uL	30 uL	60 uL	120 uL
20% SDS solution	50 uL	100 uL	200 uL	400 uL

**Caution:** avoid mixing proteinase K with SDS before Plasma/serum.

4. Mix the solution well (invert the tube 10 times, or vortex briefly) and incubate the mixture at 60°C for 20 minutes.
5. At the end of the incubation, cool the tubes containing the plasma to room temperature (e.g. put the tube in ice water for 5 min).

### C. Bind cfDNA to magnetic nanoparticles

6. Prepare the binding/nanoparticle solution according to the table below, and mix well (**Note:** vortex the Apostle MiniMax™ Magnetic Nanoparticles (S) vial (White Cap) to fully resuspend the nanoparticles before use):

Reagents	Plasma/serum volume			
	1 mL	2 mL	4 mL	8 mL
cfDNA Lysis/Binding Solution (S)	1.25 mL	2.5 mL	5 mL	10 mL
Magnetic Nanoparticles (S)	15 uL	30 uL	60 uL	120 uL
Isopropanol (100%)	0.75 mL	1.5 mL	3 mL	6 mL

7. Add the prepared binding/nanoparticle solution to the plasma/serum sample, thoroughly mix by vortexing briefly, or invert the tube 10 times (**Note:** avoid excessive vortexing, which generate excessive bubbles).
8. Shake at moderate-high speed for 10 minutes to bind the cfDNA to the nanoparticles.
9. Place the tube on magnet for 5 min, or until the solution clears and the beads are pelleted against the magnet.
10. Carefully remove the supernatant (e.g. using pipette to remove supernatant, or discard the supernatant with the existence of the magnet to attract nanoparticles).

#### D. Wash with Apostle MiniMax™ cfDNA Wash Solution

11. Remove the tube (referred to as lysis/binding tube below) from the magnet, add 1 mL of prepared Apostle MiniMax™ cfDNA Wash Solution (S), vortex to resuspend the nanoparticles.
12. Transfer the magnetic nanoparticle suspension to a new non-stick 1.5 mL microcentrifuge tube, and save the lysis/binding tube.
13. Place the 1.5 mL tube on magnet to pellet the nanoparticles for 1 min.
14. Use the supernatant in the 1.5 mL tube to rinse the saved lysis/binding tube, and transfer any residual nanoparticles to the 1.5 mL tube, discard the lysis/binding tube.
15. Place the 1.5 mL tube on magnet for 2 min, or until the solution clears and the nanoparticles are pelleted against the magnets.
16. Remove the supernatant carefully using pipette.
17. Remove the 1.5 mL tube from the magnet, add 1 mL of Apostle MiniMax™ cfDNA Wash Solution (S), then vortex for 30 seconds.
18. Centrifuge the 1.5 mL tube using tabletop centrifuge briefly to bring solution to the bottom, place the 1.5 mL tube on magnet for 2 min, or until the solution clears and the nanoparticles are pelleted against the magnets.

19. Remove the supernatant carefully using pipette.

#### E. Wash with Apostle MiniMax™ cfDNA 2<sup>nd</sup> Wash Solution

20. Remove the 1.5 mL tube from the magnet, add 1 mL of the prepared Apostle MiniMax™ cfDNA 2<sup>nd</sup> Wash Solution (S), then vortex for 30 seconds.
21. Centrifuge the 1.5 mL tube using tabletop centrifuge briefly to bring solution to the bottom, place the 1.5 mL tube on magnet for 2 min, or until the solution clears and the nanoparticles are pelleted against the magnets.
22. Remove the supernatant carefully using pipette.
23. Repeat step 20-22 for a second wash.
24. Keep the 1.5 mL tube on the magnet, air dry the nanoparticles for 3 minutes. (When environment humidity is high, time can be longer to minimize the residual amount of ethanol, which will affect elution efficiency.)
25. Carefully remove the residual supernatant using pipette.

#### F. Elute cfDNA from magnetic nanoparticles

26. Remove the 1.5 mL tube from the magnet, add Apostle MiniMax™ cfDNA Elution Solution (S) (**Blue Cap**) to the 1.5 mL tube according to the following table, based on initial sample volume.

Plasma/serum volume	1 mL	2 mL	4 mL	8 mL
Suggested cfDNA Elution Solution Volume	20 uL	30 uL	50 uL	80 uL

27. Vortex the 1.5 mL tube to resuspend the magnetic nanoparticles in the solution, then vortex for another 5 minutes to elute the cfDNA from the nanoparticle.
28. Centrifuge the 1.5 mL tube using tabletop centrifuge briefly to bring solution to the bottom, place the 1.5 mL tube on a magnet, until the solution clears and the nanoparticles are pelleted against the magnets.
29. Collect the supernatant that contains cfDNA in a non-stick, DNase and RNase free microcentrifuge tube.
30. Store the cfDNA sample at 4<sup>o</sup>C for short term storage, and -20<sup>o</sup> C for long term storage.
31. If isolated cfDNA sample characterization and quantification is needed, it is recommended to use Bioanalyzer 2100 + High Sensitivity DNA Analysis Kit, due to its low detection limit (5pg/ul).