

# TANBead cfDNA Extraction kits

## I. Introduction

Cancer is a major cause of death worldwide. According to the report from World Health Organization (WHO), nearly 10 million deaths were accounted for in just 2020. To date, examination of cancer still relies on tissue biopsy. However, in the recent year, emergence of new techniques such as liquid biopsy have been developed as an alternative method. Liquid biopsy works as a minimally invasive diagnostic approach involving the isolation of circulating tumor markers such as cell-free DNA (cfDNA) and circulating tumor cells (CTCs) from peripheral blood, which is easier to access. Furthermore, noninvasive prenatal test (NIPT) also analyzes cfDNA from a maternal blood sample for screening of chromosomal disorders in the fetus.

CfDNA is a double-stranded DNA fragment of approximately 150 to 300 bp and mainly originates from apoptosis, necrosis and active secretion. Therefore, the amount of cfDNA is relatively at a low-level from normal cells found in plasma of healthy individuals, and the level can increase under conditions of tissue stress, including inflammation, surgery, or tissue injury. TANBead cfDNA extraction kits are designed to purify cfDNA from serum or plasma which can selectively extract and purify cfDNA with limited contamination of host gDNA. High-quality cfDNA extracted from serum/ plasma is ready for immediate use in downstream applications, such as PCR-based analysis and next-generation sequencing.

## II. Advantages

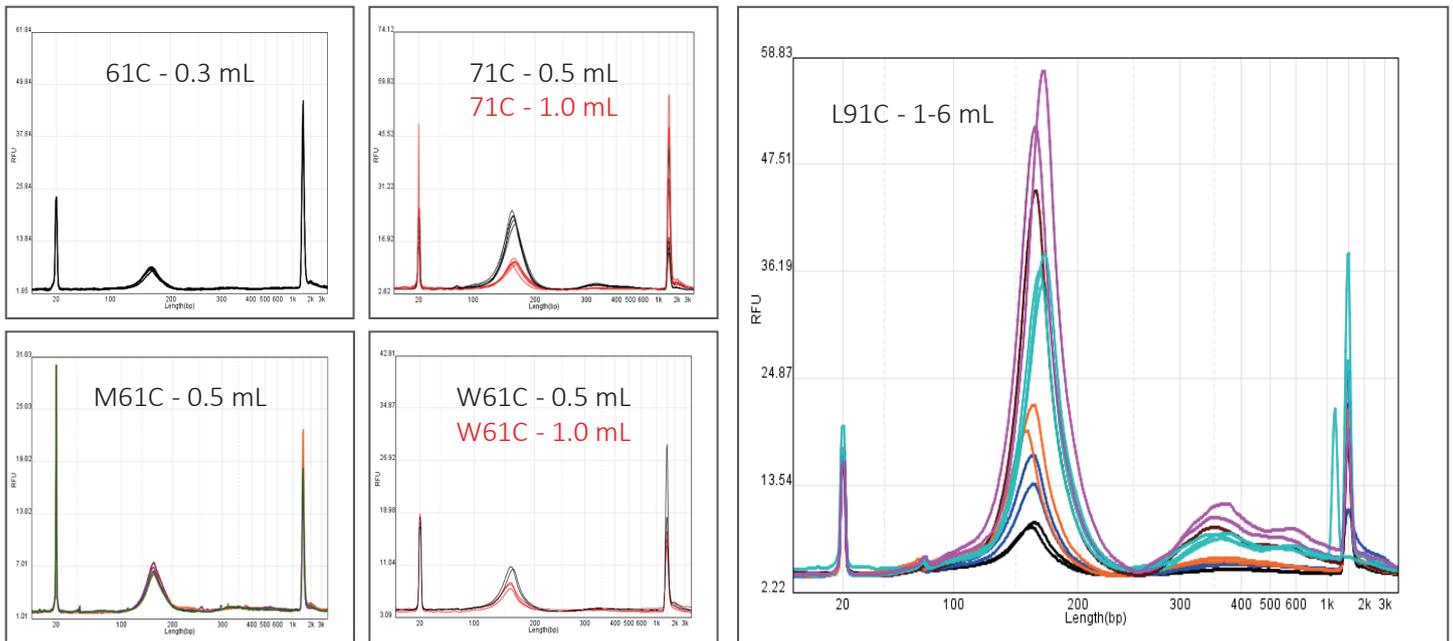
- Provide easy operation from 1 to 96 samples, including high processing volumes in 60-80 minutes.
- Automation-ready, no organic extraction or ethanol precipitation is required.
- Complete removal of large fragments of genomic DNA.
- Purified cfDNA are suitable for multiple downstream applications, such as PCR, qPCR, and next-generation sequencing (NGS) for diagnosis.

## III. Application data

**Table 1.** The quantification results of human peripheral blood cfDNA extracted by various TANBead OptiPure cfDNA extraction kits and Extractor series. Yields of cfDNA were determined by Qubit dsDNA HS assay. (Three replicates with each kit)

Sample Volume	Extraction Kit / Nucleic Acid Extractor	Amount (ng)
0.3 mL	61C / SLA-32, E13200 series	7.50 ± 0.24
0.5 mL	71C / SLA-D14800 series	10.13 ± 0.12
1.0 mL		19.26 ± 0.29
0.5 mL	M61C / Maelstrom 4800 series	16.20 ± 0.90
0.5 mL	W61C / Maelstrom 9600 series	11.90 ± 0.95
1.0 mL		25.90 ± 1.40

Sample Volume	Extraction Kit / Nucleic Acid Extractor	Amount (ng)
1.0 mL	L91C / Maelstrom 2400 series	18.52 ± 0.33
2.0 mL		41.85 ± 0.36
3.0 mL		59.44 ± 2.39
4.0 mL		88.88 ± 1.68
5.0 mL		116.82 ± 0.14
6.0 mL		120.05 ± 6.52



**Figure 1.** Fragment size distribution of human peripheral blood cfDNA extracted by various TANBead OptiPure cfDNA extraction kits and Extractor series. The size distributions of cfDNA were determined by Qsep 100 capillary electrophoresis. (Three replicates with each kit)

**Table 2.** The integrity results of human peripheral blood cfDNA extracted by various TANBead cfDNA extraction kits and Extractor series. To assess cfDNA quantity and integrity, a qPCR assay was performed using two ALU repeat assays: 115 bp and 247 bp. CfDNA has an average length of ~170 bp. The 115 bp assay determines concentration while the 247/115 ratio of products is used to rate the quality of the cfDNA and detect contamination of high molecular weight cellular DNA. A ratio of 0.2-0.5 is considered ideal for cfDNA, where cellular DNA has a ratio of 1. (Three replicates with each kit).

Sample Volume	Extraction Kit / Nucleic Acid Extractor	Alu115 (pg)	Alu247/Alu115 ratio
0.3 mL	61C / SLA-32, E13200 series	94.1 ± 15.5	0.20
0.5 mL	71C / SLA-D14800 series	255.5 ± 34.0	0.19
1.0 mL		615.1 ± 84.9	0.17



Sample Volume	Extraction Kit / Nucleic Acid Extractor	Alu115 (pg)	Alu247/Alu115 ratio
0.5 mL	M61C / Maelstrom 4800 series	210.8 ± 22.3	0.21
0.5 mL	W61C / Maelstrom 9600 series	288.3 ± 8.80	0.33
1.0 mL		646.2 ± 49.3	0.37
1.0 mL	L91C / Maelstrom 2400 series	520.1 ± 16.0	0.26
2.0 mL		1172.4 ± 47.9	0.24
3.0 mL		1661.3 ± 131.9	0.23
4.0 mL		2555.7 ± 114.7	0.31
5.0 mL		6260.5 ± 410.2	0.34
6.0 mL		5502.5 ± 410.7	0.39

#### IV. Specifications

Instrument model	M8 series	M4800 series	M9600 series	SLA-32/ E13200 series	SLA-D14800	M2400 series
Input sample	Serum/plasma					
Elution volume	80-100 µL					
Preparation time	60 mins / 8 samples	60 mins / 48 samples	70 mins / 96 samples	60 mins / 32 samples	70 mins / 48 samples	80 mins / 24 samples
Application	PCR-based analysis					PCR-based analysis, NGS

#### V. Conclusion

The optimized magnetic beads and reagents make TANBead OptiPure cfDNA extraction kits the ideal tool to isolate cfDNA from serum and plasma with high-yield, high-quality and high-suitable for many downstream applications.

