

Multi-Channel BIABooster System

Instrumental Platform for
DNA Analysis
with unrivalled sensitivity



This note describes how the **μ LAS technology is used with the multi-channel capillary electrophoresis system**. The advanced BIABooster solution provides researchers with a unique high sensitivity platform for DNA and RNA analysis, covering a large sizing range.

It is also possible to perform all modes of capillary electrophoresis (CE) that are available with the conventional CE system.

Applications for the BIABooster System include :

- Free Circulating DNA
- HMW DNA
- Single genomic DNA
- RNA
- Single or multiple DNA fragments

For more information
www.adelis-tech.com
contact@adelis-tech.com

Instrumental set-up



The BIABooster system offers
4 analysis channels in parallel using proprietary capillary devices
integrated in individual easy to handle cassettes



Simple sample loading & unloading



Select your method & run
Queue up to 96 samples
fully automated process



Analyse results with our BIABooster Analytics software

SPECIFICATIONS FOR cfDNA ANALYSIS

cfDNA is a promising biomarker for non-invasive monitoring of cancer disease. Getting a DNA profile of plasmatic free DNA is difficult with existing electrophoresis systems. But it is an easy thing with the **BIABooster system for Quality Control of circulating DNA** previously purified or directly from plasma.

	DNA 1K	DNA 10K	DNA 100K	cfDNA
Sample type	DNA	DNA	DNA	Plasma
Size range	0.1 – 1.5 kbp	1 – 10 kbp	1 – 100 kbp	0.1 – 1.5 kbp
LOD (1)	10pg/mL at 1 kbp 50 pg/mL at 200 bp	10pg/mL at 10 kbp 30 pg/mL at 1 kbp	50pg/mL at 100 kbp 20 pg/mL at 20 kbp	5pg/mL at 1 kb 50 pg/mL at 100 bp
Analytical Platform	BB pack for CE Multi channel BB	BB pack for CE	Multi channel BB	BB pack for CE Multi channel BB
Dynamic range (2)	1000	300	300	800
Multiple injection available (3)	Yes	Soon	Soon	no
High salt available (4)	yes			Always included

(1) Limit of Detection: the concentration for a single fragment which gives a signal-to-noise ratio of 3 (peak height). For smears, the LOD is usually 20-50 times higher

(2) Dynamic Range: ratio between the highest and the lowest concentrations giving a quantifiable result

(3) Multiple Injection: method enabling to lower the LOD up to 10 times by injecting and concentrating the same sample up to 10 times before DNA separation

(4) High Salt: method enabling to analyse salty samples, up to 130 mM NaCl. Otherwise, the maximum salt concentration is generally 15 mM

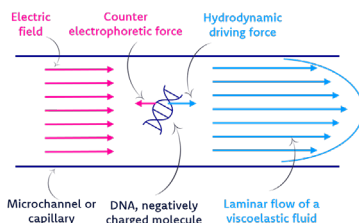
About μ LASTM Technology

μ LAS technology simultaneously uses
**electric field & pressure in a
viscoelastic fluid**
to analyse DNA

The capillary device is specially designed
to take full benefit of the technology

DNA is subjected to a pressure-driven viscoelastic flow in combination with a counter-electrophoresis.

In these conditions, DNA undergoes a viscoelastic force oriented toward the channel walls, the amplitude of which depends on its size. Because of the parabolic velocity profile of the flow, DNA molecules are transported by the fluid at a rate which depends on their size, like in gel electrophoresis



THREE FUNCTIONS OF μ LAS TECHNOLOGY



CONCENTRATE

Online concentration



To concentrate DNA «inline»: μ LAS enables the design of «DNA traps» within a flow, by joining two capillaries of different diameters. In these traps, molecules are confined precisely at capillary junction, allowing to stack them and/or remove them from the flow. DNA can therefore be concentrated before being separated, for unmatched analytical sensitivity.



SEPARATE

Size separation



To separate and quantify DNA fragments of different sizes, which have equal electrophoretic mobilities.

As such, it is a new separation technique, complementary to gel electrophoresis since molecules are separated in solution.



PURIFY

Online purification



To isolate and purify DNA fragments of interest: this functionality is obtained by combining the two functions of concentration and separation, and by adding a collecting function available with the multi-channel CE.

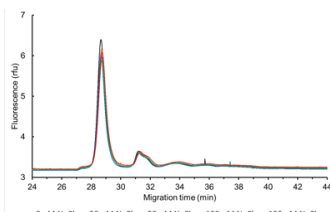
DNAs of the desired size can be selected, excluding other DNAs present in the sample.

BIABooster Applications 1/2

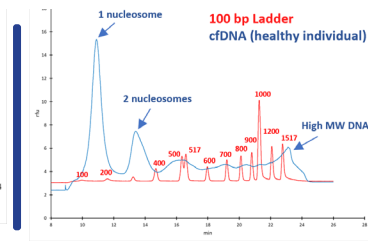
cfDNA Analysis in Plasma

Unrivalled Sensitivity
Unrivalled Robustness
Purification + Concentration + Separation in 30 minutes

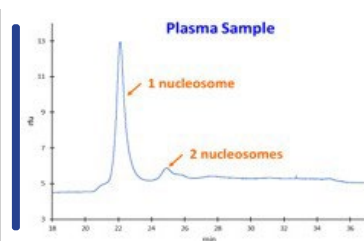
The BIABooster system is able to provide a profile of circulating DNA directly from plasma, without priori DNA extraction



Concentration and separation of cfDNA sample with 0mM NaCl (black), 20mM NaCl (brown), 50mM NaCl (blue), 100mM NaCl (green)



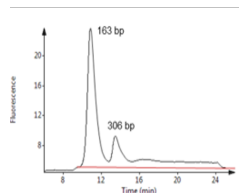
Analysis of purified cfDNA (blue) and 100 bp ladder (red)



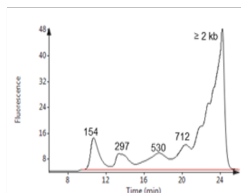
Analysis of endogenous DNA of plasma (with Proteinase K + SDS treatment)

cfDNA Sample Quality Control

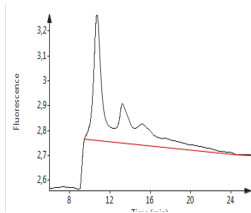
Qualify your samples before PCR and sequencing analysis:
Concentration
Integrity
Genomic DNA contamination



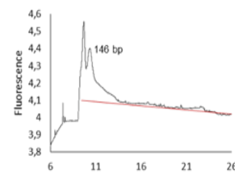
cfDNA of 210ng/ml
Typical profile



cfDNA of 270ng/ml
HMW contamination



cfDNA of 4 ng/ml
Low concentration of cfDNA with good integrity



cfDNA of 7 ng/ml Low concentration of degraded cfDNA

cfDNA Biomarker research applications, see article in *Anal. Chem.*, 2018, 90 (6), pp 3766–3774

BI/4Booster Applications 2/2

High Molecular Weight DNA Separation

Next generation long read sequencing has increased interest in large DNA fragment analysis. BI/4Booster platform enables to quantify and qualify DNA fragments up to 150 kb.

DNA 100K standard ladder

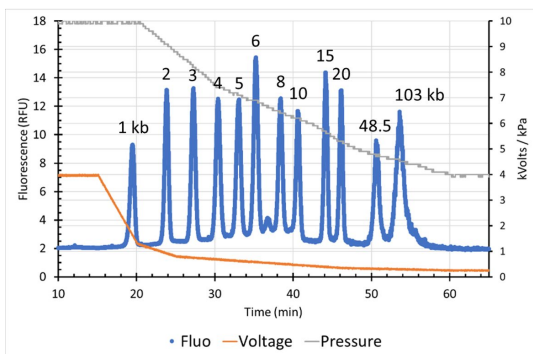
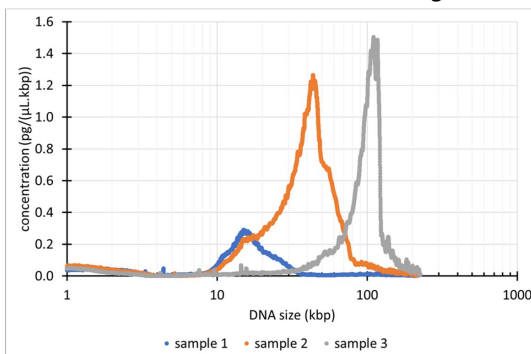


Chart « concentration over size » for gDNA

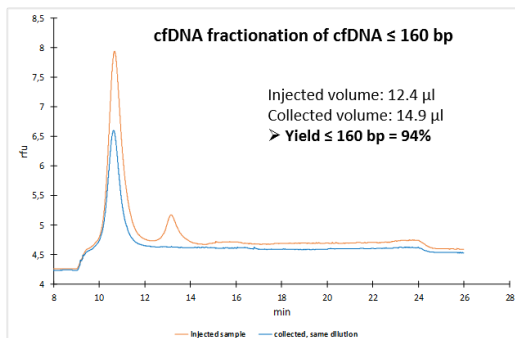


cfDNA Fractionation

μLAS technology can be used to select a DNA size range of interest.

This has been used for cell free circulating DNA in which tumoral cfDNA has been reported to have a smaller size compared to constitutional cfDNA.

The isolation of tumoral cfDNA is expected to provide a better sensitivity for mutation detection.



cfDNA Biomarker research applications, see article in *Anal. Chem.*, 2018, 90 (6), pp 3766–3774



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10-2024*