

# BIABooster CE-LEDIF System

**Instrumental Platform for DNA Analysis with unrivalled sensitivity**

## BIABooster Platform :

- ▶ **Agilent Technologies 7100**  
Capillary Electrophoresis System
- ▶ **Zetalif™ LED** Induced  
Fluorescence Detector (LEDIF)
- ▶ **Capillary Device**



This note describes how the **μLAS technology** is used with the **Agilent Technologies 7100 Capillary Electrophoresis** system coupled to **Zetalif™ LED** Induced Fluorescence Detector.

The BIABooster System provides high sensitivity and extended range of DNA size analysis.

It is also possible to perform all modes of capillary electrophoresis that are available with the Agilent Technologies CE System.

---

**For more information**

🌐 [www.adelis-tech.com](http://www.adelis-tech.com)

✉ [contact@adelis-tech.com](mailto:contact@adelis-tech.com)

## Instrumental Set-Up

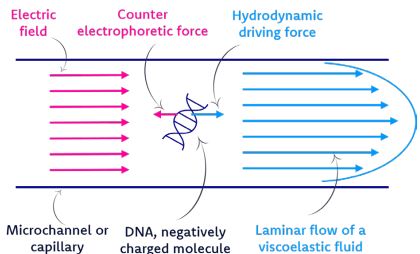
The BIABooster solution consists of the following items:

- ▶ **Agilent Technologies 7100** Capillary Electrophoresis System including all functional hardware for performing CE separation
- ▶ **Zetalif™ LED Detector** including a Detector, Optical Cell, LIF Cassette, LED light source with the corresponding emission filter block, LIF Driver for Agilent Technologies Software.
- ▶ Proprietary **Capillary Device** for  $\mu$ LAS technology
- ▶ **BIABooster Analytics** software to quantify, qualify and size DNA.

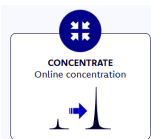
## About $\mu$ LAS Technology

**$\mu$ LAS technology** simultaneously uses electric field and pressure in a viscoelastic fluid to analyse DNA. The capillary device is specially designed to take full benefit of the technology.

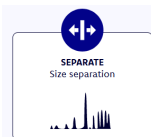
**Basic principle :** DNA is subjected to a pressure-driven viscoelastic flow in combination with a counter-electrophoresis. In these conditions, DNA undergoes a viscoelastic force oriented toward the channel walls, the amplitude of which depends on its size. Because of the parabolic velocity profile of the flow, DNA molecules are transported by the fluid at a rate which depends on their size, like in gel electrophoresis.



**$\mu$ LAS basically covers three functions:**



**To concentrate DNA «inline»:**  $\mu$ 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.



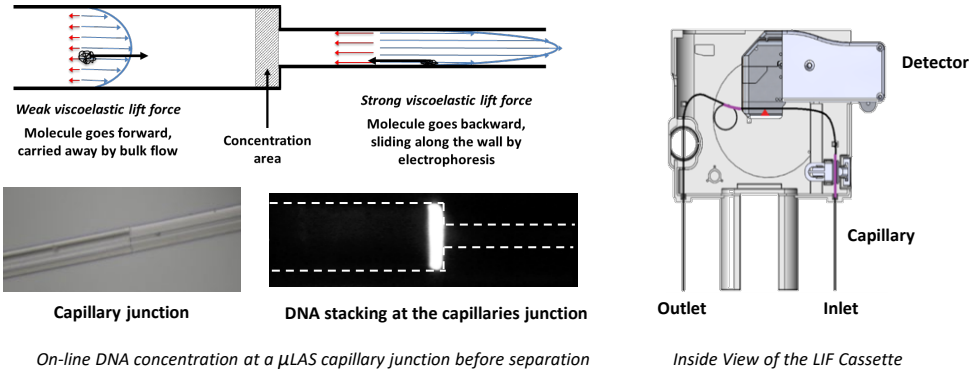
**To separate and quantify DNA fragments of different sizes,** which have equal electrophoretic mobilities. As such, it is a new separation technique, complementary to gel electrophoresis since molecules are separated in solution.



**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.

## Proprietary Capillary Device

A modified cassette accommodates the integration of a LEDIF detection system and any type of  $\mu$ LAS capillary device.



## 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.

Analytical specifications	Kit DNA 1K	Kit DNA 10K	cfDNA Kit
Sizing range	0.1-1.5 kbp	1-10 kbp	0.1-1.5 kbp
Limit of detection ( $S/N = 3$ ) <sup>1</sup>	10 pg/mL at 1 kbp 50 pg/mL at 200 bp	10 pg/mL at 10 kbp 30 pg/mL at 1 kbp	5 pg/mL at 1 kbp 50 pg/mL at 100 bp
Sizing accuracy <sup>2</sup>	+/- 3%	+/- 3% (from 1kb to 6kb) +/- 5% (from 6kb to 10kb)	+/-3%
Sizing reproducibility	3% CV	3% CV	< 3% CV
Dynamic range <sup>3</sup>	1000	300	800
Quantitative precision	20% CV	20% CV	< 20% CV
Quantitative accuracy	20%	20%	+/- 20%
Minimum sample volume	10 $\mu$ l (1 $\mu$ l injected)	10 $\mu$ l (1 $\mu$ l injected)	10 $\mu$ l (1 $\mu$ l injected)
Maximum salt concentration	15 mM	15 mM	Up to 130 mM

1) Excitation wavelength : 480nm LED

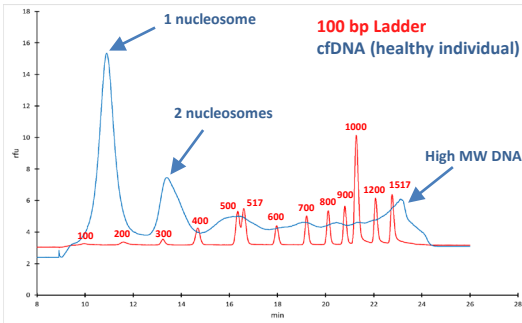
2) Determined using a commercial ladder as a sample, different from the standard used for reference.

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

# Some BIABooster Applications

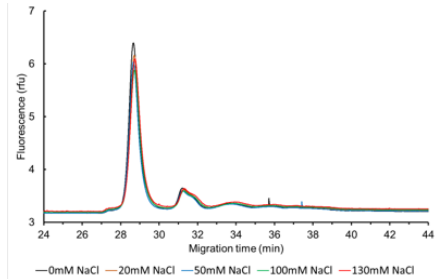
## cfDNA Analysis in Plasma

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

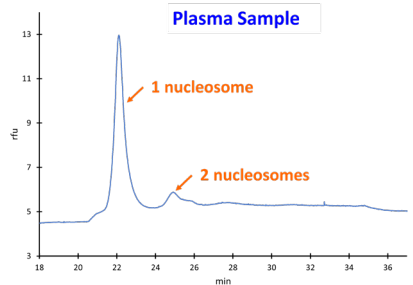


Analysis of purified cfDNA (blue) and 100 bp ladder (red)

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



Concentration and separation of cfDNA sample with 0mM NaCl (black), 20mM NaCl (brown), 50mM NaCl (blue), 100mM NaCl (green), 130mM NaCl (red)

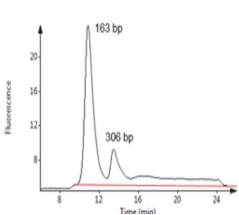


Analysis of endogenous DNA of plasma (with Proteinase K + SDS treatment)

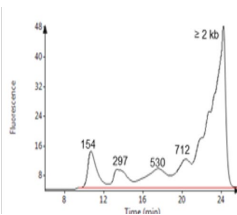
## cfDNA Sample Quality Control

Qualify your samples before PCR and sequencing analysis:

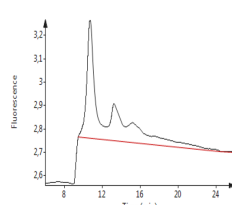
- **Concentration**
- **Integrity**
- **Genomic DNA contamination**



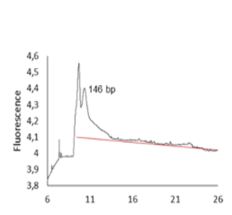
cfDNA of 210ng/ml  
Typical profile



cfDNA of 270ng/ml  
HMW contamination



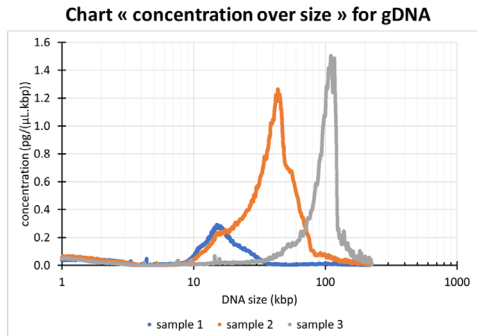
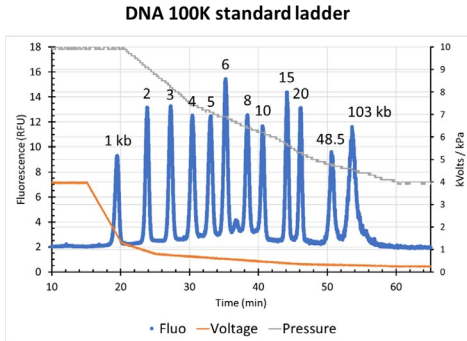
cfDNA of 4 ng/ml  
Low concentration of cfDNA  
with good integrity



cfDNA of 7 ng/ml Low  
concentration of  
degraded cfDNA

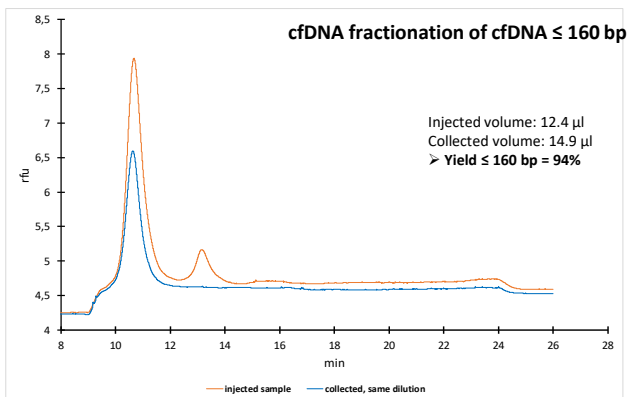
## High Molecular Weight DNA Separation

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



## 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.



**Reference:** cfDNA Biomarker research applications, see [article in Anal. Chem., 2018, 90 \(6\), pp 3766–3774](#)



---

**For more information**

🌐 [www.adelis-tech.com](http://www.adelis-tech.com)

✉ [contact@adelis-tech.com](mailto:contact@adelis-tech.com)

---



*For Research Use Only*

*Specifications subject to change without notice as part of our ongoing quality improvement programme.*

01-2025