

Leader in Innovative Capillary
Electrophoresis Products



Sample
preparation

PCR **amplification**



Fragment analysis
Qsep Series
Bio-Fragment Analyzers



Automatically generate result

Total Solution from Sample to Result

ABOUT US

BiOptic Inc. is a biotechnology instrumentation company that develops innovative scientific products for research and clinical applications to improve lives and help our society become better.

The company was founded in 2004, with a vision of establishing high-quality, value-added and customer-driven OEM/ODM solutions by developing and manufacturing products utilizing Capillary Gel Electrophoresis (CGE) Technology for biotechnology laboratories all over the world. In 2009 BiOptic started to develop an innovative Capillary Gel Electrophoresis instrument utilizing disposable pen-shaped gel-cartridges. The first patented CGE-based Fragment Analyzer *Qsep₁₀₀*[™] was launched in 2011 at the Lab Automation Conference in Palm Springs, CA.

With strong R & D, manufacturing and sales teams in China, Taiwan and the United States, BiOptic supports customers in over 50 Countries. Recently, BiOptic has expanded its portfolio of products by developing and introducing several CGE instruments: the *Qsep₁*[™], *Qsep₁-Lite*, the Gly-Q[™], the *Qsep₄₀₀*[™], and most recently, the mini-PCR machine, *Qamp_{mini}*[™], that incorporates newly launched innovative Direct RT-PCR and PCR reagent kits. BiOptic's *Qsep* Series capillary electrophoresis systems combined with *Qamp_{mini}* and our novel Direct RT-PCR and PCR reagents, are a fast pathogen detection platform which could perfectly applied for the detection of various pathogens (such as the COVID-19). In general, the epidemic prevention centers only need to select specific gene loci to develop specific primers, which then can be directly applied to the BiOptic's detection platform, where they can perform instant and rapid screening.

As BiOptic grows stronger, we have begun to cooperate with colleges to conduct on campus and industrial practice connection/education, hoping to cultivate more talents for biomedical related industries. At the same time, BiOptic also cooperates with academic and official health centers to actively participate in the prevention and control of epidemic diseases by using our products and technical expertise.



CONTENT



New Products _____ 1

- Qsep1-Lite
- Kilo Base Cartridge (S3 and N3) Kit Series
- Quantitative Cartridge Kit



PCR Related Products _____ 7

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- ExpressGO PreMix 2X Master Mix
- AccuGO Pfu Proofreading DNA Polymerase
- Qamp_{mini} Portable PCR Thermal Cycler



Qsep Series Bio-Fragment Analyzers _____ 9

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Applications _____ 17

- Formalin-fixed, Paraffin-embedded (FFPE)
- cell-free DNA Quality Control
- RNA Quality Control
- High Molecular Weight DNA (HMW DNA)
- Third-generation Sequencing Library
- Next Generation Sequence (NGS)
- Quantitative Applications
- Protein
- CRISPR/Cas9



Qexp Test Kits _____ 31

- Qexp-MDx Series
- Qexp-FS Series
- Qexp-Vet Series



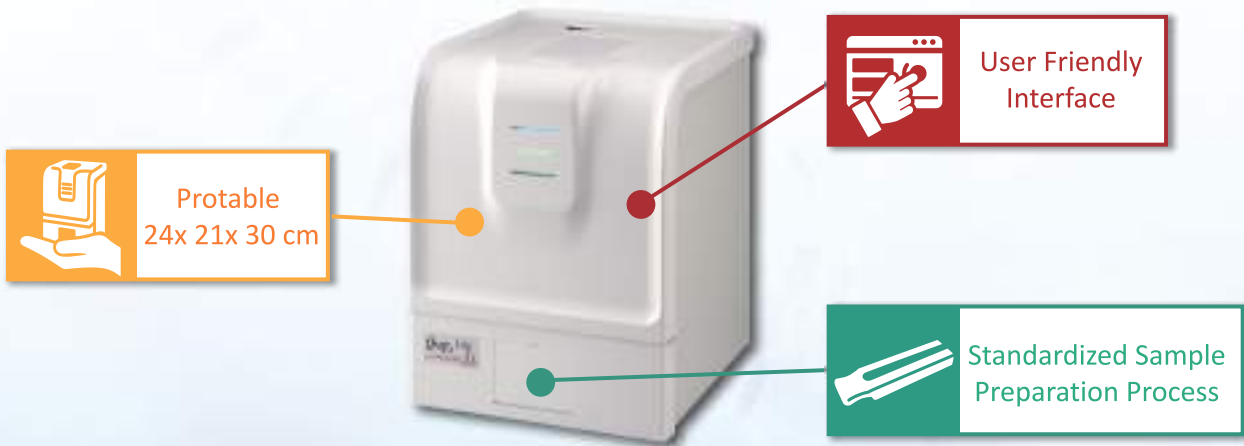
Order information _____ 33





1 Qsep₁ - Lite

Qsep₁-Lite is an affordable, entry-level CGE system for students and all the users. It can become personal gel electrophoresis tool and get more accurate result at sizing and concentration.



Product Features

- Easy to setup, and only requires 2 µl of sample volume
- One cartridge – One method: No confusion
- Best Resolution : 2-4 bp
- High flexibility for sample number : 1~8 samples
- DNA fragment, gDNA quality check, total RNA QC all included.
- Quantitative and Qualitative all in One test.

Specifications

- Detection : Fluorescence
- Separation Voltage : 1~8 kV
- System Weight : 5.5 kgs
- Dimension : 24x 21x 30 cm
- System Type : 1 Channel Portable System
- Automated Sampling : 1~8 samples

4 Standard / cartridge kit applications are available :

High Resolution	Standard	Large Size DNA	Total RNA
------------------------	-----------------	-----------------------	------------------

- | | | | |
|--------------------------|---------------------------|--|--------------------|
| ● Best resolution 2-4 bp | ● Best resolution 4-10 bp | ● Up to 50 kbp | ● Total RNA QC |
| ● Size range 20 bp~1 kb | ● Size range 20 bp~5 kb | ● Genomic DNA, plasmid DNA quality check | ● RQN scoring 1~10 |
| ● Quantitative kit | ● Quantitative kit | | |

2 Kilobase Cartridge (S3 and N3) Kit Series

Both the Kilobase Cartridge (S3,C105206) and High Sensitivity Kilobase Cartridge (N3, C105253) Kits provide the best solution for the large size DNA quality check. The sizing range could be up to 50 kbp and the software can provide the user size distribution and peak ratio information.

Main applications :

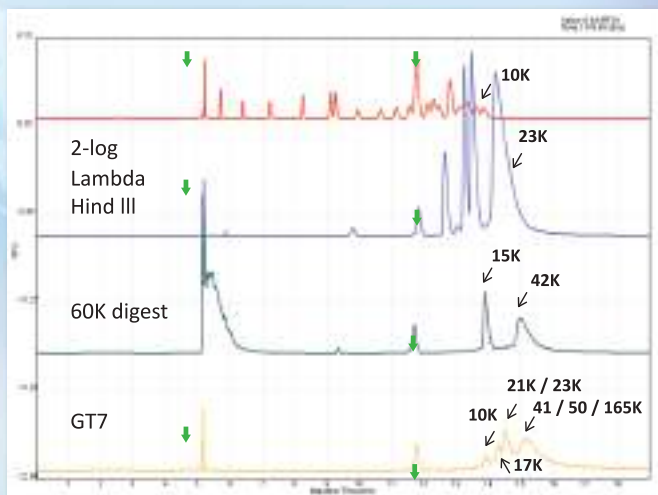
- Genomic DNA QC
- Plasmid DNA conformation check
- Fragmentation and library sample QC for 3rd generation sequencing



The specifications of S3 and N3 Cartridge

	Kilobase Cartridge (S3)	High Sensitivity Kilobase Cartridge (N3)
Specifications		
Cat. No.	C105206 (2 pcs) C105806 (8 pcs) C405106 (4-CH)	C105153 (1 pc) C105253 (2 pcs) C405153 (4-CH)
Sample size range	10-50000 bp	10-50000 bp
L.O.D.	0.1 ng/μl*	20 pg/μl*
Best resolution	10-50 bp	10-50 bp
Sample number (per cartridge)	200 runs	100 runs
Sample consumption (per run)	<0.1 μl	<0.1 μl
Recommended sample volume	0.1mL tube: 10 μl 0.2mL tube: 20 μl Micro vial: 1-μl (C104250)	0.1mL tube: 10 μl 0.2mL tube: 20 μl Micro vial: 1-μl (C104250)
Shelf life	6 months	4 months

*Determined by the DNA ladder (15-622 DNA size marker : C109200) as sample



The left figure shows four different commercial high-molecular-weight DNA ladders. The first red signal pattern is BiOptic Size Marker (500bp-23kb). The blue signal pattern is Lambda DNA digested by Hind III. The green signal pattern is the 60K digested by Nco I. The yellow signal patterns is NipponGene GT7 (10 kb-165 kb). All these signal patterns are detected by *Qsep₁₀₀* using S3 Cartridge (C105206).



3

Quantitative Cartridge Kit

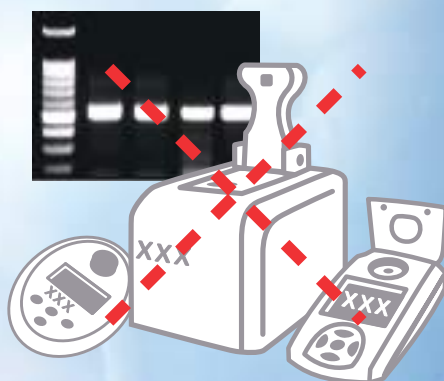
Product Features :

- High Accuracy
- Broad Detection Range : 0.1 ng/μl ~ 100 ng/μl ; High Sensitivity Quantitative Cartridge Kit : 5 ng/μl ~ 500 ng/μl
- Quick Analysis Time : 3 ~ 5 mins per run
- From the Result of peak pattern one can distinguish the main target, contamination and know the ratio and concentration

Quantitative cartridge kit is a powerful kit that uses just one run to provide reliable size and quantification results. Compared to the traditional spectrometers and fluorometers, quantitative cartridge kit provides concentration for each fragment which can avoid overestimation. Accurate and stable concentration results are critical for sample quality control to ensure the success of downstream applications. Now we provide various type of quantitative cartridge kits which are capable to measure sample for different applications.

Available Cartridge Kits and Main Applications :

- Standard Quantitative Cartridge Kit (S2) (C105201-Q) : Fragmentation and library QC
- High Resolution Quantitative Cartridge Kit (S1) (C105202-Q) : PCR, DNA fragment.
- High Sensitivity Quantitative Cartridge Kit (N1) (C105205-Q) : cell free DNA QC. (Launch in 2020 Q3)

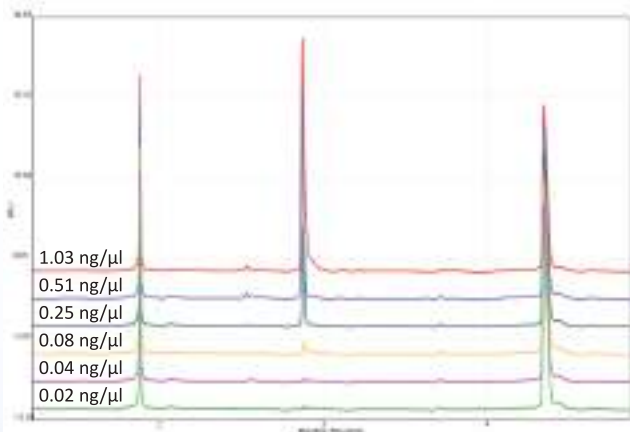


Traditional Spectrometers
&
Fluorometers



Quantitative Cartridge Kit

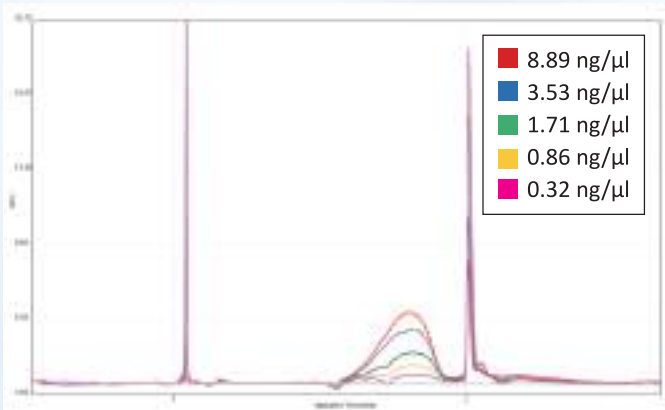
High Sensitivity & Wide Detection Range



Dilution Factor	Spectrophotometry	Fluorphotometer	Fragment Analyzer	<i>Qsep</i> ₁₀₀
1x	7.67	7.48	27.87	6.07
2x	3.52	1.23	14.58	3.04
5x	1.03	0.62	5.5	1.03
10x	-	0.37	2.91	0.51
20x	-	0.2	1.9	0.25
50x	-	0.07	0.098	0.08
100x	-	-	0.049	0.04
200x	-	-	-	0.02

200 bp DNA fragments are analyzed by High Resolution Quantitative Cartridge Kit (S1, C105202-Q) providing wide range of detection

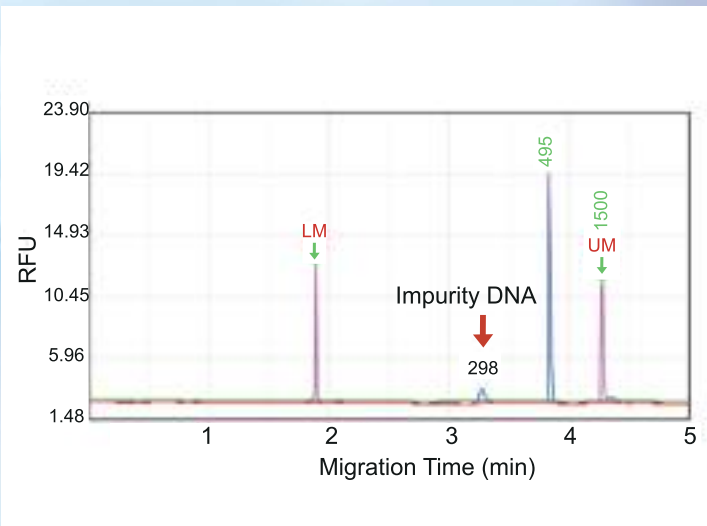
Library QC Result



Library samples (300-500 bp) are analyzed by S2-Standard Quantitative Cartridge Kit (C105201-Q).

The serially diluted results display high linear regression on *Qsep*₁₀₀.

Contamination Result



No.	Time (sec.)	RFU	PeakArea	bp	Concn. (ng/μl)	PeakStart (sec.)	PeakEnd (sec.)
1	113.68	10.04	136.600	20	N/A	111.76	115.20
2	196.56	1.04	88.769	298	0.21	193.88	201.72
3	230.00	16.77	540.077	495	1.13	229.12	233.08
4	256.40	8.82	306.082	1,500	N/A	255.24	259.16

No Limits 500 bp DNA fragment (Thermo Fisher, SM1641) is serially diluted and analyzed by *Qsep*₁₀₀ and fluorphotometer. Fluorphotometer can only provide the total DNA concentration but *Qsep*₁₀₀ identify the product quality and provide accurate concentration information including in 500 bp fragment and impurity DNA.

BiOptic's Products



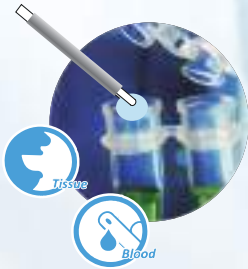
Sample Preparation



PCR Amplification



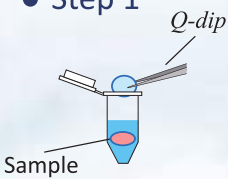
Qsep Series



Q-Dip

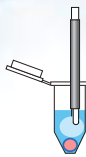
Quick Extraction
From 60 minutes to 1 minute

• Step 1



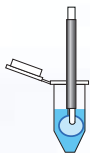
Digestion

• Step 2



Extraction

• Step 3



Washing



DirectGO™ PreMix

No need to do
DNA extraction
and purification,
just PCR directly



ExpressGO™ PreMix

Design for variety
of standard PCR
applications



AccuGO™ DNA Polymerase

Pfu enzyme provide
high fidelity products



Qamp_{mini}

PCR Thermal cycler

- Portable design
- One button to Go
- Programmable chip



Qsep_{1-Lite}

- Entry-level CE system
- 1~8 sample capacity



Qsep₁₀₀

- 1~96 sample capacity
- High sensitivity in DNA and RNA detection

Improve Your Workflow

Bio-Fragment Analyzer



Automatic Report Generation



Qsep₁

- WiFi and cable connect
- Widely application for portable CE system



Qsep₁₀₀ Advance

- 1~96 sample capacity
- Cover DNA, RNA and **protein** applications



Qsep₄₀₀

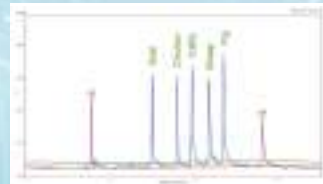
- 4-channel system
- Integrated PC and touch screen
- High sensitivity in DNA and RNA detection



Q-Analyzer

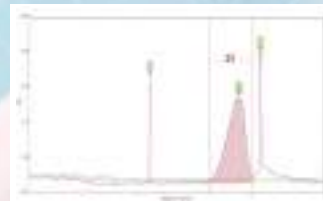
- User-friendly interface : operate without complication
- Report generation : support different report formats (PDF/Excel/Word)
- Quality number (DQN/RQN/DV200)

Peak-calling function : identification automatic by software

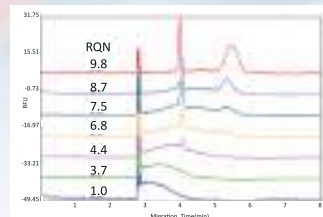


Identify the origin of the meat (Goat 159 bp, Chicken 228 bp, Cow 273 bp, Sheep 334 bp and Pig 396 bp).

Smear function : provide clear distribution information and Zone1 and Zone2 to do comparison



Comparison : compare data to identify differences



The *Q-Analyzer* Software will provide the RNA quality number (RQN) automatically.



PCR Reagents

BiOptic has launched series of novel and high-quality PCR reagents for the use of research centers and laboratories, where they are able to get highly reproducible and satisfied results.

Features of BiOptic PCR Reagents

- Optimized for CGE platform
- 2X Premix --- Easy for preparation
- High Specification --- Hot start design enzyme



DirectGO™ PreMix 2X Master Mix No DNA extraction! Just PCR!



- No need to do DNA extraction and purification for raw material. Blood / Tissue / Cell / some kinds of leaves
- High speed extension rate : 15~30s / kb
- High sensitivity : 10pg human genomic DNA or 1mm diameter plant leaf
- High inhibitor resistance : no need for DNA extraction, and allows for direct PCR amplification in presence of 10% whole blood

ExpressGO™ PreMix 2X Master Mix

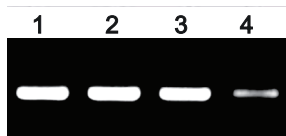


- Design for variety of standard PCR applications, and easy to PCR amplification over 5 kb DNA
- Best for high throughput screening of colony PCR. Desired DNA fragments : with "A" overhang at 3'- end for TA cloning use directly

AccuGO™ Pfu Proofreading DNA Polymerase



- Specialized engineered Pfu enzyme for high fidelity products
- Short extension time : 15-30s / kb
- High yield for long fragment PCR product : up to 10 kb
- Good performance in GC rich template



1 - Human genomic DNA
 2 - Heparin Blood 1%
 3 - Heparin Blood 5%
 4 - Heparin Blood 10%

DirectGO shows high inhibitor resistance for direct PCR amplification in presence of 10% whole blood sample.



ExpressGO activity remains extremely stable after 37°C incubation for 30 days.




PCR extension time 30 sec

AccuGO shows highest specificity and yield than other competitors.

Qamp_{mini} Portable PCR Thermal Cycler


Qamp_{mini} is a portable PCR thermal cycler. It contains centrally positioned Peltier heating & cooling module for 1-8 samples. This design leads to accuracy in analysis and cost efficiency without sacrificing performance and quality. Compact in size and One-Click to Go design, Qamp_{mini} is the ideal instrument for laboratories or classrooms and in the fields of epidemiology, veterinary, food testing, pathogen detection, ecology, archaeology research, and others.

1. Palm size & only 1 kg
Portable & good for high school lab course




2. Pre-program chip

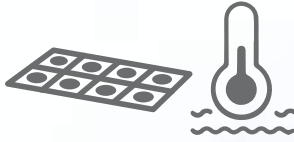
- For research use : personal setting protocol
- For clinical use : can bundle with reagent kit. (everyone can operate without any error)



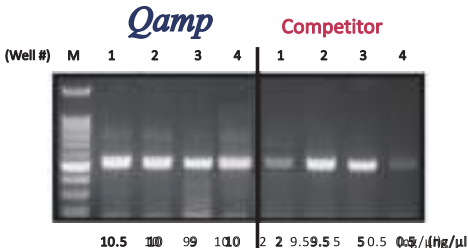
3. One button to Go
So easy to use



4. Better temperature uniformity
One peltier only



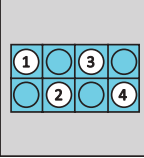
PELTIER CENTER-MODULE FOR BETTER TEMPERATURE UNIFORMITY



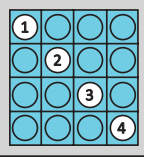
Qamp
Competitor

(Well #) M 1 2 3 4 | 1 2 3 4

10.5 10 99 10.0 | 2 2 9.5 9.5 50.5 0.5/(ng/μl)



Peltier cooler
in-center arrangement



wells covered whole
Peltier cooler

Sample number	8 (2x4 well)
Temperature range	4°C ~ 99°C
Max. heating rate (°C/sec.)	4.6°C
Max. cooling rate (°C/sec.)	3.4°C
Temperature accuracy	± 0.4°C
Temperature uniformity across block	± 0.4°C
Max No. of cycle	unlimited
Max No. of step	8
User Interface	LCD
Heated lid	105°C Fixed (pre-heat to 60°C)
Dimension (L x W x H)	10 x 13 x 10 cm
Weight	1 kg
Power	VAC 100-240, 50/60 Hz, 120 W

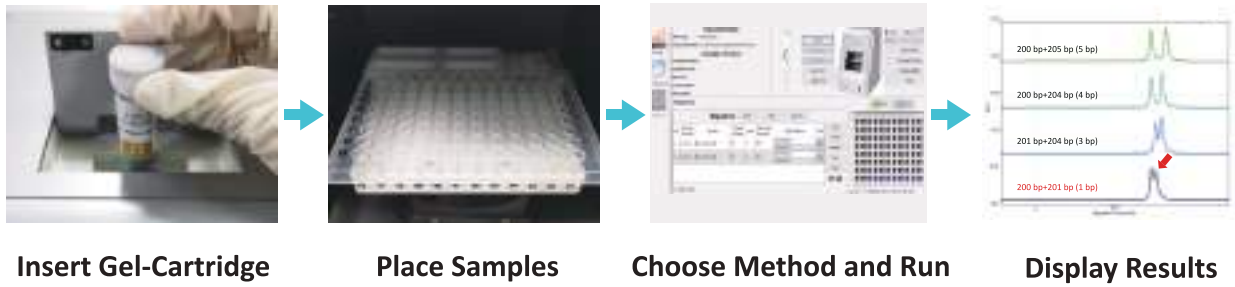


Qsep Series Bio-Fragment Analyzers

Qsep Series Bio-Fragment Analyzers are based on capillary electrophoresis, using a unique composition of gel matrix instead of gel molecules to form a special "sieve" in the capillary for achieving the separation and analysis of biomolecule fragments. The Qsep Series Bio-Fragment Analyzers can analyze DNA, RNA, Protein and Glycans separately through various disposable pen-shaped capillary gel cartridge with different formulas via *Q-Analyzer* operation and database software.

☑ Few Simple Steps to Run Your Tests

Qsep Series Bio-Fragment Analyzers provide accurate results in three simple steps. Step 1, insert the disposable pen-shaped gel cartridge into the instrument. Step 2, place the samples in the sample tray. Step 3, choose the appropriate method and run. In just a few minutes, users can get reliable results in diverse formats (PDF, word and excel), including peak and gel charts.



Specification	Qsep ₁ -Lite	Qsep ₁	Qsep ₁₀₀	Qsep ₁₀₀ Advance	Qsep ₄₀₀
Separation Voltage	1~8 kV	1~8 kV	1~15 kV	1~15 kV	1~15 kV
Connection	Cable	Wi-Fi & Cable	USB	USB	USB
Power Source	AC 100-240V	AC 100-240V	AC 100-240V	AC 100-240V	AC 100-240V
Maximum Power	30W	30W	30W	30W	60W
System Weight	5.5 kgs	5.5 kgs	15 kgs	15 kgs	26 kgs
Dimension	24x 21x 30 cm	24x 21x 30 cm	38x 30x 40 cm	38x 30x 40 cm	54x 40x 36 cm
System Type	1 Channel Portable System	1 Channel Portable System	1 Channel Standard System	1 Channel Standard System	4 Channel System
Automated Sampling	1~8 samples	1~16* samples	1~96 samples	1~96 samples	4~96 samples
Minimum Sample Volume	2 µl Sample (0.1 mL Tube: C104252)	1 µl (Micro-Vial) 10 µl (0.1 mL Tube) 20 µl (0.2 mL Tube)	1 µl (Micro-Vial) 10 µl (0.1 mL Tube) 20 µl (0.2 mL Tube)	1 µl (Micro-Vial) 10 µl (0.1 mL Tube) 20 µl (0.2 mL Tube)	1 µl (Micro-Vial) 10 µl (0.1 mL Tube) 20 µl (0.2 mL Tube)

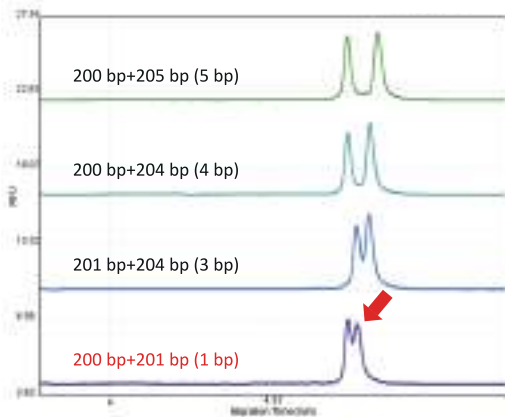
* Launch in Q3 2020

** Micro-Vial: C104250

Features

- Easy to Use
- High Sensitivity
- High Resolution
- Lower Cost
- Sample Flexibility
- Best Partner for NGS QC

High Resolution



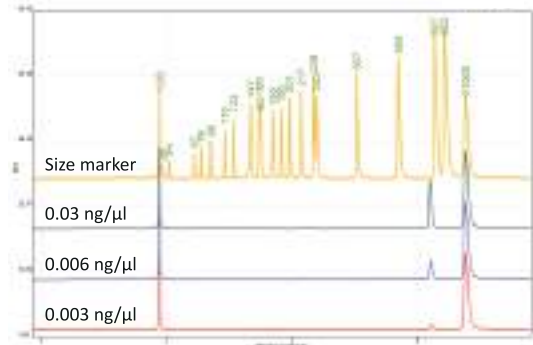
DNA sample with 1 bp difference can be resolved on *Qsep* Series platforms

Fragment mixes separated on *Qsep* Series with C1 customized cartridge; known sizes are resolved: 200/205 bp, 200/204 bp, 201/204 bp, 200/201 bp (with 5 bp, 4 bp, 3 bp, 1 bp differences respectively)

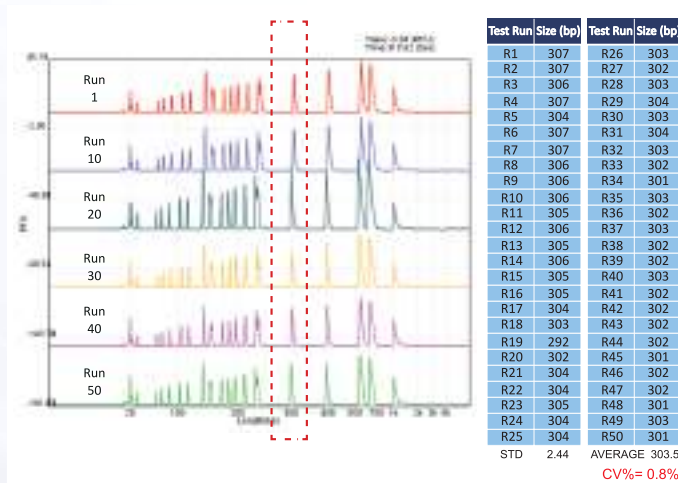
High Sensitivity

Qsep Series Systems are capable of analyzing low concentration samples in picogram level

The detection range is from nanogram level to picogram level. By using High Sensitivity cartridge, the detection limit can be below 5 pg/μl. Samples with low concentration, like cell-free DNA are analyzed easily.



High reproducibility



Provide reliable and consistent sizing results

Repeat testing size marker on *Qsep* Series Systems shows high reproducibility. The 307 bp fragment in size marker has precision value 0.8% CV (repeat test 50 runs).



Qsep Series Bio-Fragment Analyzers

Qsep₁-Lite & *Qsep₁* are portable capillary electrophoresis systems, that could be applied to any research laboratories, clinical laboratories, food farms in the fields instead of transferring the sample to the central lab and provide the precise analysis results. *Qsep₁-Lite* and *Qsep₁* instruments are both like boarding luggage size (24x 21x 30 cm). Both of these products have a high flexibility in sample number. These compact and lightweight instruments can help researchers to turn molecular biology into "mobile molecular biology".



Qsep₁-Lite

- Entry-level, portable capillary electrophoresis system
- One cartridge – One method: No confusion
- DNA fragment sizing, gDNA quality check, total RNA QC all included.

	<i>Qsep₁</i>	<i>Qsep₁ - Lite</i>
	Professional portable CE system	Entry-level portable CE system
Features	Wide applications	One cartridge - One method: No confusion
WiFi	V	X
Sensitivity	*****	***

More* star indicate better performance.



Qsep₁

- Professional portable capillary electrophoresis system
- Completely software functions, including Smear, RNA auto-assign support
- Higher sensitivity for analyzing diverse samples such as cfDNA (High Sensitivity Cartridge, N1)
(1~16 sample tray will be ready in Q3 2020.)



Moving Biology for Field-test

BiOptic provides total solution, easy to operate and user can take this suitcase to everywhere!

Target Audience :

- Small Clinics : No need to send the sample to central lab and patient can get the report in 1-2 hrs.
- Farm: owners can regularly check their Load for common infections disease

ALL IN ONE *Qsep₁* or *Qsep₁-Lite*



PCR reagents & Buffer & Tips

1. CE optimized PCR 2x MasterMix :

- User can add raw material such as blood or leaves into PCR reagent directly and no need to do DNA extraction.
- DirectGO and ExpressGO can store in room temperature without problem

Qair_{box}

Qamp_{mini}

2. *Qamp_{mini}* Portable PCR Thermal Cycler

- Just 1 kg and only one button to Run

3. *Qsep₁* & *Qsep₁-Lite* Bio-Fragment Analyzers

Load PCR sample into the system and get results in 3 mins

Quantitative and Qualitative all in One

Qsep₁₀₀ System is the most versatile instrument of the *Qsep* Series Bio-Fragment Analyzers. It provides consistent high precision analysis by using the same single channel cartridge as the *Qsep_i*[™]. It provides flexible sample capacity from 1 to 96 samples. *Qsep₁₀₀* System are commonly used in general research laboratories and also a good partner for the NGS QC laboratories.

Qsep₁₀₀

- Flexible sample capacity from 1 to 96 samples
- Commonly used in general research laboratories
- A good partner for the NGS QC laboratories

	<i>Qsep₁₀₀</i>	<i>Qsep₁₀₀ Advance</i>
Sensitivity (S serials and RNA cartridge)	* * * * *	* * * * *
Sensitivity (N serials cartridge)	* * * * *	* *
Protein Labeling Dye	Chromeo-P503	ALEXA 488/FITC Better Resolution

More* star indicate better performance.

Qsep₁₀₀ Advance

- With an alternative detection module provides the best solution for protein analysis

Qsep₄₀₀ High-Throughput (4-Channel) CGE System

Qsep₄₀₀[™] is the highest throughput instrument of the *Qsep* Series Bio-Fragment Analyzers. It carries 4-channel cartridge chamber, which allows 4 samples to be analyzed simultaneously, effectively speeding up the analysis time by 4x (2~7 mins/ 4 samples).

- 4-channel high throughput system
- speeding up the analysis time by 4x (2~7 mins/ 4 samples)
- Intergraded PC and touch screen
- High detection sensitivity in DNA and RNA



4-channel cartridge

Touchscreen Control Panel





Cartridge

Qualitative

	Standard Cartridge (S2)	High Resolution Cartridge (S1)	Fast Cartridge (F3)	High Sensitivity Cartridge (N1)	Kilobase Cartridge (S3)
Specifications					
Cat. No.	C105201 (2 pcs) C105801 (8 pcs) **C405101	C105202 (2 pcs) C105802 (8 pcs) **C405102	C105203 (2 pcs) C105803 (8 pcs) **C405103	C105105 (1pc) C105205 (2 pcs) **C405105	C105206 (2 pcs) C105806 (8 pcs) **C405106
Sample size range	10-5000 bp	10-5000 bp	10-5000 bp	10-5000 bp	10-50000 bp
L.O.D.	0.1 ng/μl*	0.1 ng/μl*	0.1 ng/μl	5 pg/μl*	0.1 ng/μl*
Best resolution	4-10 bp	1-4 bp	≥ 50 bp	≥ 10 bp	10-50 bp
Analysis time (per sample)	2-3 mins	3-5 mins	1-2 mins	2-3 mins	5-21 mins
Sample number (per cartridge)	200 runs	200 runs	300 runs	100 runs	200 runs
Sample consumption (per run)	<0.1 μl	<0.1 μl	<0.1 μl	<0.1 μl	<0.1 μl
Recommended sample volume	0.1 mL tube: 10μl 0.2 mL tube: 20μl Micro vial: 1-2 μl (C104250)	0.1 mL tube: 10 μl 0.2 mL tube: 20μl Micro vial: 1-2 μl (C104250)	0.1 mL tube: 10 μl 0.2 mL tube: 20μl Micro vial: 1-2μl (C104250)	0.1 mL tube: 10μl 0.2 mL tube: 20μl	0.1 mL tube: 10 μl 0.2 mL tube: 20μl Micro vial: 1-2μl (C104250)
Shelf life	6 months	6 months	4 months	4 months	6 months

◆ L.O.D. : 2 pg/μl (If diluted in the water)

◆*Determined by the DNA ladder (15-622 DNA size marker : C109200) as sample

◆**Cat. No. of 4-channel cartridge

Specifications

Quantitative

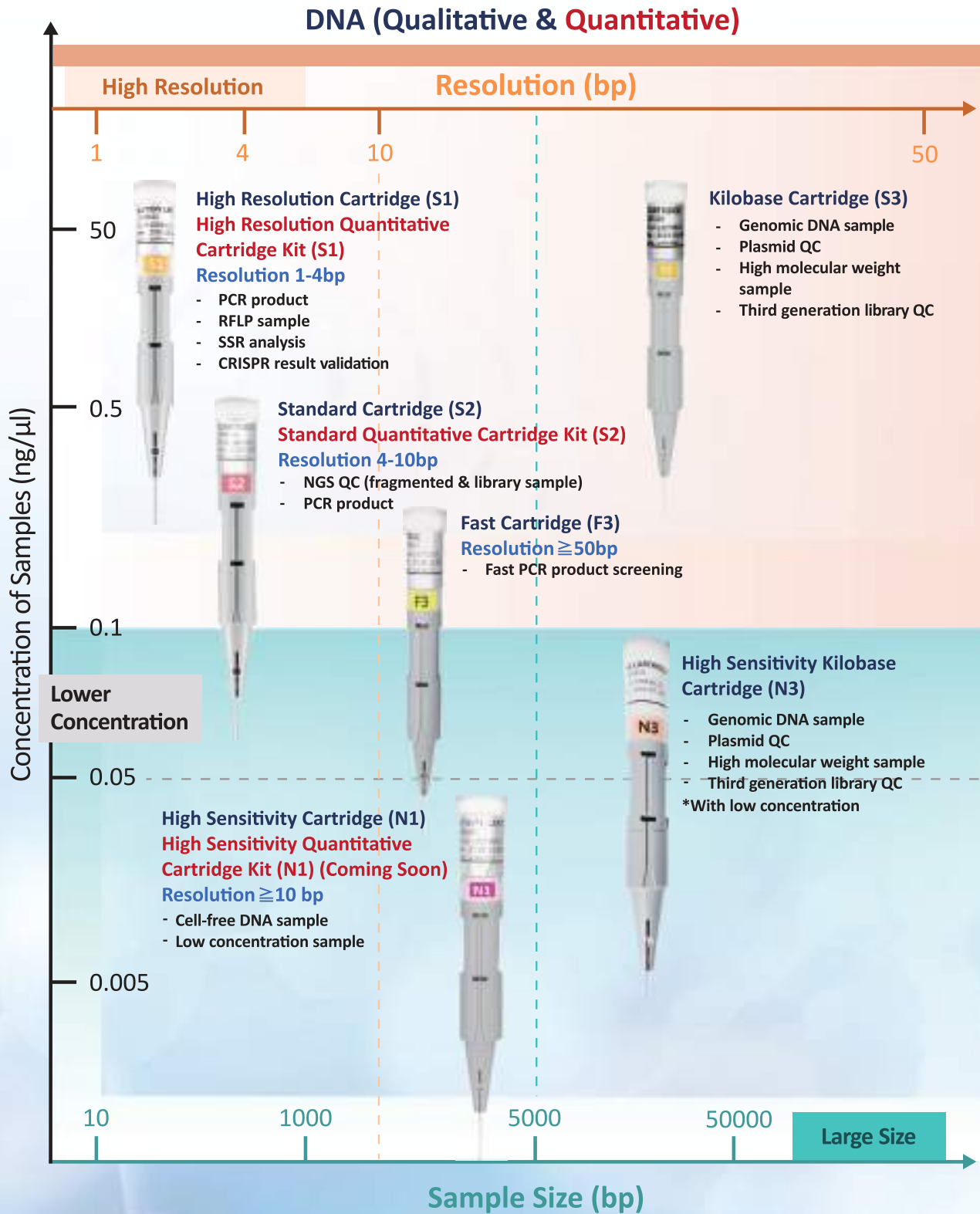
RNA

Protein

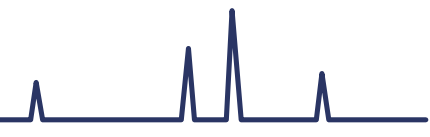
High Sensitivity Kilobase Cartridge (N3)	Standard Quantitative Cartridge Kit (S2)	High Resolution Quantitative Cartridge Kit (S1)	RNA Cartridge (R1)	High Sensitivity RNA Cartridge (NR1)	Protein Cartridge (SDS) (P2)
Specifications					
C105153 (1pc) C105253 (2 pcs) **C405153	C105201-Q (2 pcs) **C405101-Q	C105202-Q (2 pcs) **C405102-Q	C105110 (1 pc) C105210 (2 pcs) C105810 (8 pcs) **C405110	C105111 (1 pc) C105211 (2 pcs) **C405111	C105121 (1 pc) C105221 (2 pcs) **C405121
10-50000 bp	10-5000 bp	10-5000 bp	N/A	N/A	11 - 600 kDa
20 pg/μl*	0.1 ng/μl*	0.1 ng/μl*	5 ng/μl	1 ng/μl	0.5 ng/μl (BSA)
10-50 bp	4-10 bp	1-4 bp	N/A	N/A	N/A
9-25 mins	2-3 mins	3-5 mins	5-10 mins	5-10 mins	>1 - 5 min (<10 - 65 kDa) 5 - 7 min (65 - 155 kDa) <20 min (Up to 600 kDa)
100 runs	200 runs	200 runs	100 runs	100 runs	100 runs
<0.1 μl	<0.1 μl	<0.1 μl	<0.1 μl	<0.1 μl	<0.1 μl
0.1 mL tube: 10μl 0.2 mL tube: 20μl Micro via I: 1-2μl (C104250)	0.1 mL tube: 1μl 0.2 mL tube: 20μl	0.1 mL tube: 1μl 0.2 mL tube: 20μl	0.1 mL tube: 10μl 0.2 mL tube: 20μl Micro via I: 1-2μl (C104250)	0.1 mL tube: 10 μl 0.2 mL tube: 20μl Micro via I: 1-2μl (C104250)	0.1 mL tube: 10μl 0.2 mL tube: 2μl
4 months	6 months	6 months	4 months	4 months	4 months



Good Results Depend on



The Use of The Right Cartridges



RNA



RNA Cartridge (R1)

- RNA analysis
- CRISPR QC & analysis



High Sensitivity RNA Cartridge (NR1)

- Low concentration RNA sample
- CRISPR QC & analysis

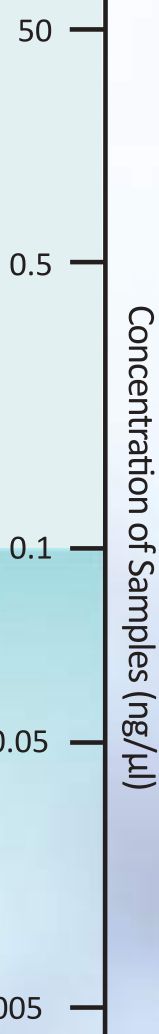
Protein



Protein Cartridge (SDS) (P2)

Sample size range: 11-155 kDa
L.O.D.: 0.5 ng/ μ l (BSA)

- Replace SDS-PAGE
- IgG purity test

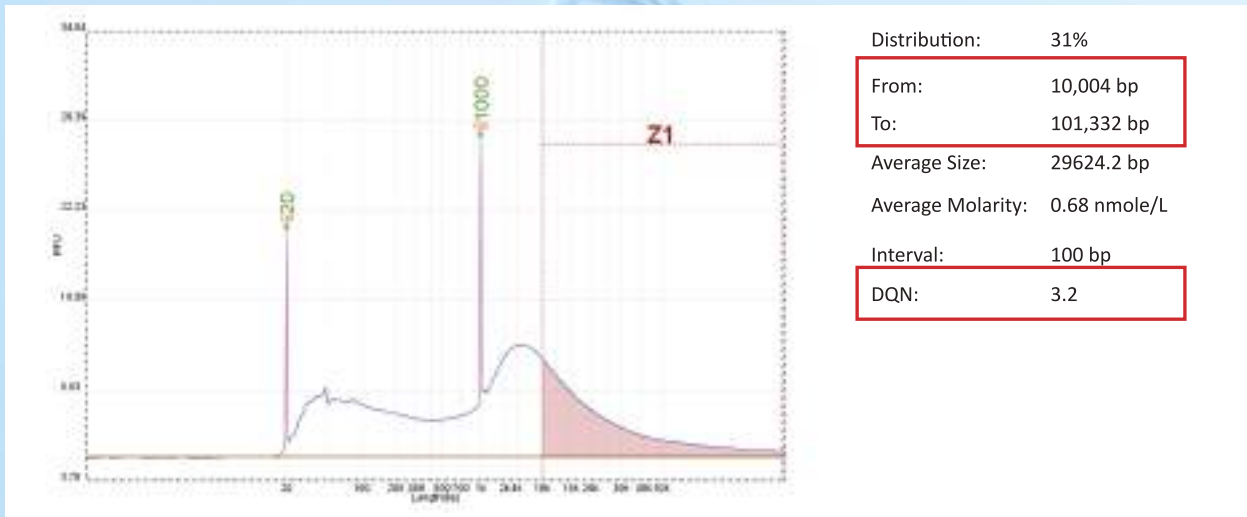




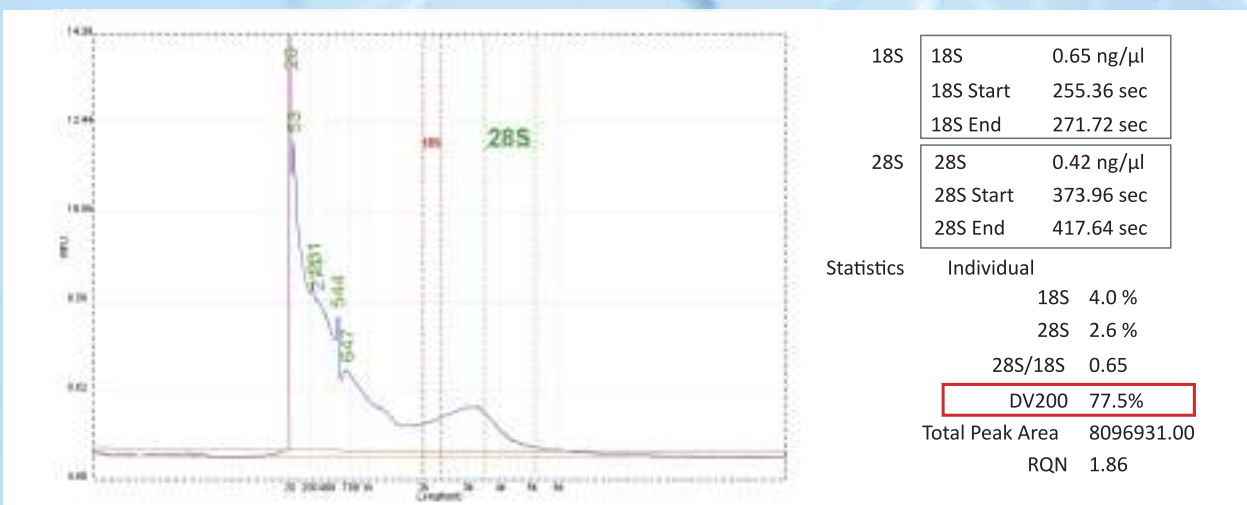
Formalin-fixed, paraffin-embedded (FFPE)

Formalin-fixed, paraffin-embedded (FFPE) tissues used for pathological diagnosis are invaluable resources for profiling gene expression and studying a variety of diseases. The long-term storage of FFPE blocks at ambient temperature are more cost effective than storing frozen tissues at ultra-low temperatures due to maintenance, space, and labor costs. In the present research, FFPE tissues are used as a source of DNA, RNA and proteins from archived and documented materials. The quality of the FFPE tissue is critical for this type of work. Even the most well-preserved tissue will still have degraded DNA, RNA, and generally inactive proteins .

Using *Qsep* Series instruments to analyze the quality of DNA or RNA extracted from FFPE sample, where the integrity of the DNA can be clearly displayed. Most FFPE samples can show significant pattern even after 10-fold dilution. In “Smear” function, user can define the threshold, then system will automatically provide a value called “DQN, DNA Quality Number”, which is the percentage of DNA above the threshold, producing a DQN value of 0–10. A higher score means a higher proportion.



For RNA analysis, DV200 indicates the percentage of fragments over 200 nucleotides.



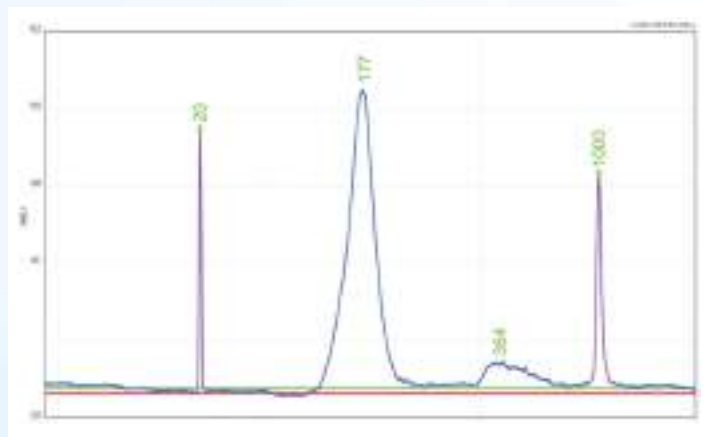
Note : Some FFPE sample extraction kits will have residual components, that will affect the stability of the separation current. In such cases it is recommended to dilute the sample with our 0.1X dilution buffer and apply 5 minutes of purge for every 5 to 6 analysis.



Quality control of cell-free DNA

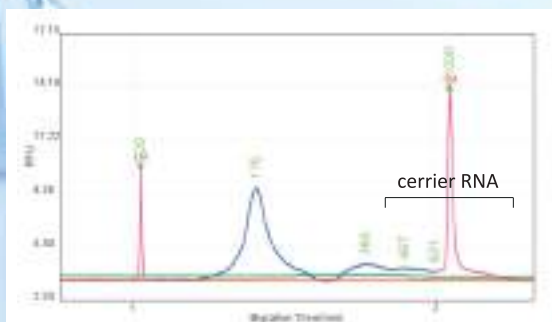
Cell-free DNA (cfDNA) is known to circulate in healthy and pathological conditions, and is present in plasma, serum, cerebral spinal fluid, and saliva. Nowadays, cfDNA is known to be a great target for Non-Invasive Prenatal testing (NIPT) and Liquid Biopsy for cancer diagnosis. The quality of cfDNA sample will strongly influence the downstream application, which makes it a very important step.

To analyze cfDNA, we provide High Sensitivity Cartridge (N1, C105105) to detect sample down to picogram level since the concentration of cfDNA is low (1 to 100 ng per ml of plasma). With *Qsep* Series instruments, user can get reliable size and purity results of cfDNA in 2-3 minutes.

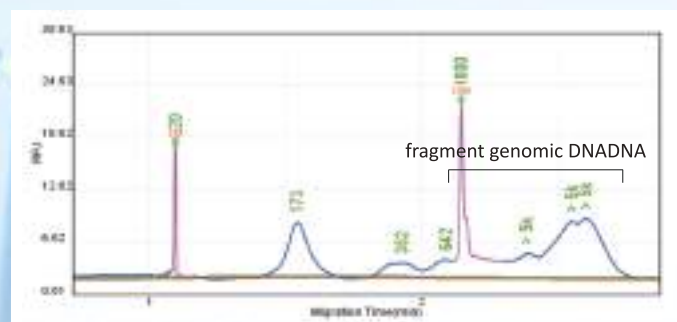


What do we check in quality control of cfDNA ?

For sizing , the common fragment size of cfDNA is the range of 160~ 200 bp. For purity , check if there is carrier RNA or genomic DNA remained in cfDNA sample.



cfDNA sample extracted with carrier RNA. Carrier RNA signal merge with multimers



cfDNA sample with genomic DNA contamination

Highlight

- Fast Analysis : 2 ~ 3 minutes to get result
- High Sensitivity : quantify cfDNA sample down to 5 pg/μl
- Impurity Detection : detect genomic DNA contamination and carrier RNA residue



Quality control of RNA

The ubiquitous nature of RNase will degrade RNA sample, which makes RNA preservation difficult. Degradation of RNA samples by RNase is a major cause of failure during experiments. Thus, the RNA quality detection is very important for downstream experiments (e.g. NGS library quality check).

We provide RNA Cartridge (R1, C105210) to measure total RNA quality. And the *Qsep* Series Bio-Fragment Analyzers come with *Q-Analyzer* software, which uses an RNA Quality Number (RQN) feature as a quality metric indicator. The *Q-Analyzer* software analyses (post analysis) the entire electropherogram of the test result including fast region and ratio of 28S and 18S when calculating the RQN. Furthermore, our High Sensitivity RNA Cartridge (NR1, C105211) is suitable for the low concentration RNA samples, where the operation can preserve/reduce the consumption of precious amounts of RNA sample.

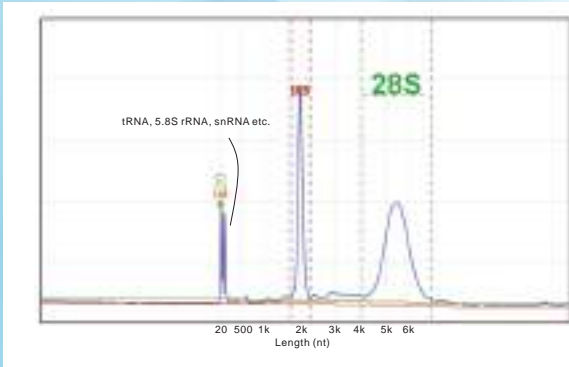
Features

- ❑ Two types of RNA cartridge have been designed for analyzing a wide range of sample concentrations
- ❑ Minimum sample requirement: 2 µl
- ❑ RQN and DV200 are automatically assigned by the *Q-Analyzer* Software

Applications

- ✓ Total RNA QC
- ✓ RQN algorithm for RNA quality determination
- ✓ DV200 evaluation for FFPE RNA sample analysis

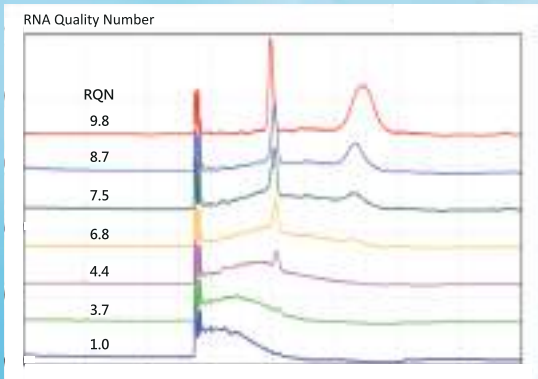
18S/28S are automatically assigned



Total Peak Area	100.0 %
18S Area	21.9 %
28S Area	57.2 %
Ratio (28S/18S)	2.01
RNA Quality Number	9.84

The 18S and 28S rRNA can be auto assigned in the result table. Other RNA relevant information such as 28S/18S ratio, individual percentage of 18S and 28S to total peak area will be shown on the table. DV200 value is calculated with the percentage of fragments >200 nucleotides.

RNA Quality Number



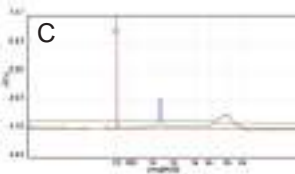
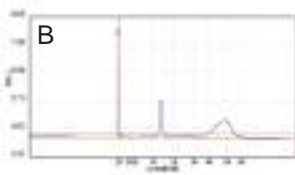
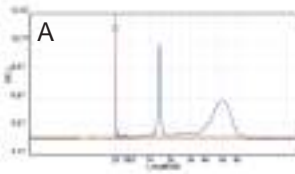
RNA quality and integrity will influence the success of the downstream experiments such as real-time PCR.

The figure indicates that the *Qsep* Series Bio-Fragment Analyzers can easily detect even slight degradation of total RNA. The *Q-Analyzer* Software will provide the RNA quality number (RQN) automatically which could help the user to identify the integrity of the RNA sample. The RQN of 10 represents intact RNA and RQN of 1 represents completely degraded RNA.

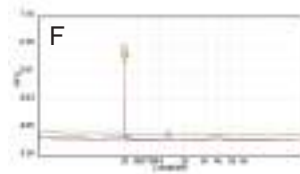
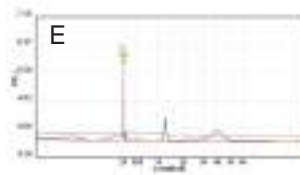
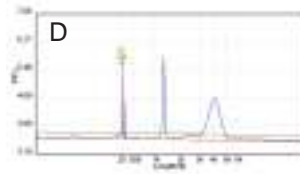


The detection range of two sensitivity RNA cartridges

High Sensitivity RNA Cartridge (NR1)



RNA Cartridge (R1)



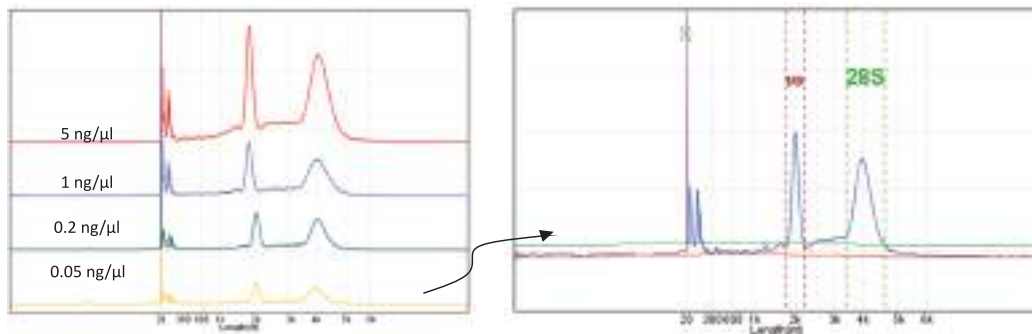
The left figure shows different detection ranges of two sensitive RNA cartridges (A-C; D-F : 5, 1, 0.5 ng/μl).

NR1 cartridge can detect as low as 0.5 ng/μl and R1 cartridge can detect to as low as 1 ng/μl. We provide a wide range solution for the end-user by choosing the appropriate cartridge kit according to their RNA concentration.

The appropriate detection range of the NR1 and R1 cartridges are shown in the table below.

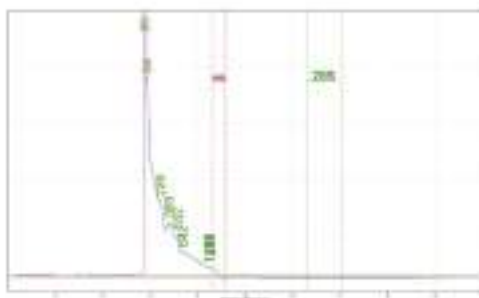
	NR1	R1
RNA Conc.	1~20 ng/μl	5~100 ng/μl
Runs	100	100
Shelf life	4 months	4 months

*Dilute with 1x dilution buffer (in DNase/RNase free water)



For the High Sensitivity RNA Cartridge (NR1, C105211), it could detect low concentration total RNA sample (50 pg/μl diluted with ddH₂O). The 18S rRNA signal to noise value (S/N) is 104.26.

Formalin-fixed, paraffin-embedded (FFPE) tissues in RNA analysis



Total Peak Area	100.0 %
18S Area	1.6 %
28S Area	0.5 %
Ratio (28S/18S)	0.32
RNA Quality Number	1.17
DV200	56.5 %

Sample from Formalin-fixed, paraffin-embedded (FFPE) tissues in RNA analysis the DV200 indicates percentage of fragments over 200 nucleotides. For the details, please refer to FFPE session.



Quality control of high molecular weight DNA (HMW DNA)

With ongoing innovation and improvements in biotechnology industry now scientists are able to isolate longer and longer lengths of DNA at high molecular weight (HMW DNA) for genome research. For downstream applications such as the third-generation sequencing, the HMW DNA quality becomes an important issue.

Qsep Series instruments combined with Kilobase Cartridge Kits (S3, C105206) / High Sensitivity Kilobase Cartridge Kits (N3, C105253) provides a novel biomolecules analysis platform with rapid, convenient and reliable solution for HMW DNA quality control.

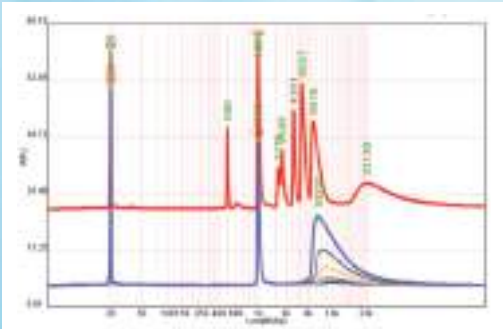
Features

- Wide sizing range - up to 50 kb
- High Sensitivity - LOD up to 50 pg/ μ l
- Rapid analysis - 10 mins / 4 samples
- High Stability - CV% \leq 2.0%
- Easy to use – 3 steps to start analysis

Applications

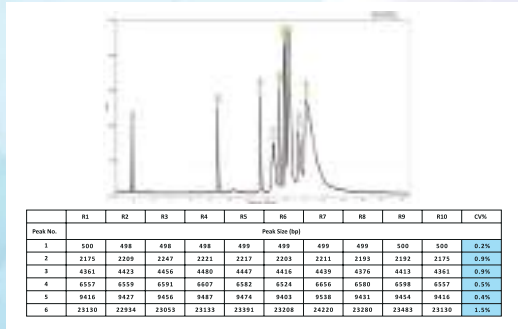
- Plasmid QC
- Genomic DNA QC
- The third generation library QC

High Sensitivity



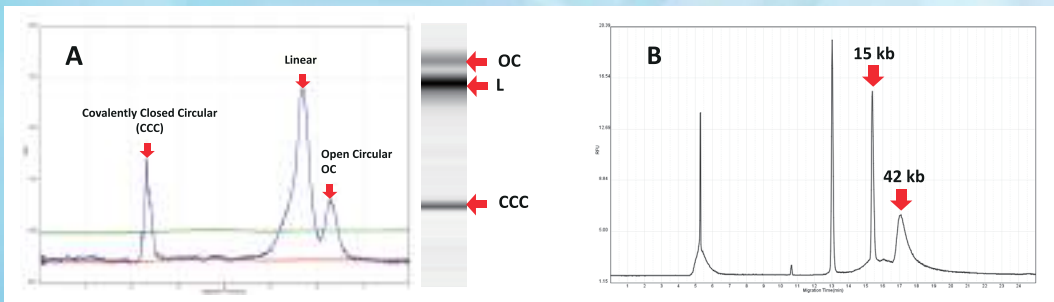
10 kb library is serially diluted and analyzed by High Sensitivity Kilo Base Cartridge, N3 (C105153), on *Qsep*₁₀₀. The LOD can reach 32.75 pg/ μ l.

High Reproducibility



The 500 bp – 23 kb size marker (C109700) is tested repeatedly by S3 cartridge on *Qsep*₁₀₀. The sizing results present high reproducibility. The coefficient of variation (CV%) is less than 2.0% for each peak.

Plasmid QC



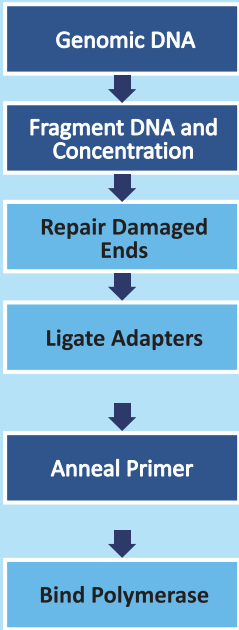
Electropherogram of purified plasmid DNA analyzed by S3 cartridge on *Qsep*₁₀₀. A.) The plasmid DNA presents 3 typical structures of covalently closed circular (CCC), liner (L) and open circular (OC) forms. B.) Plasmid is digested by restriction enzyme and it becomes 2 fragments, 15 kb and 42 kb.



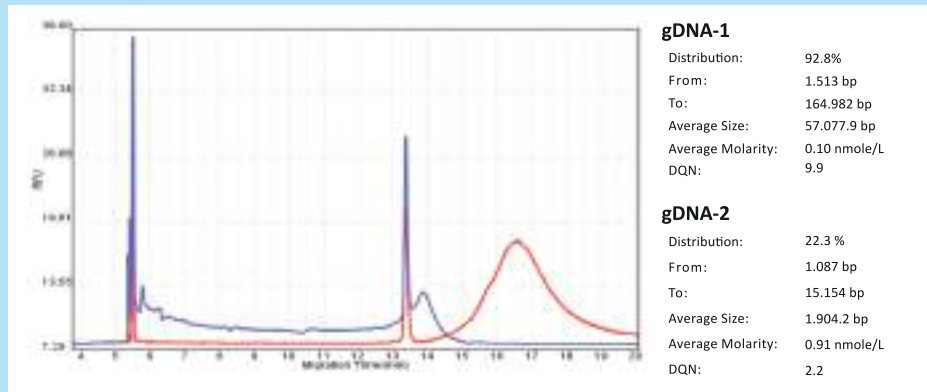
Quality control of the third-generation sequencing library

Currently, the most popular technologies of the third-generation sequencing are Single-Molecule real-time sequencing (SMRT) which is launched by Pac Bioscience and Nanopore sequencing released by Oxford Nanopore technologies. The third-generation sequencing can provide long reads (10 kb≤) for high quality assembly of whole genome. Moreover, in order to obtain qualified reads after sequencing, the library construction and quality check is also important in the third-generation sequencing.

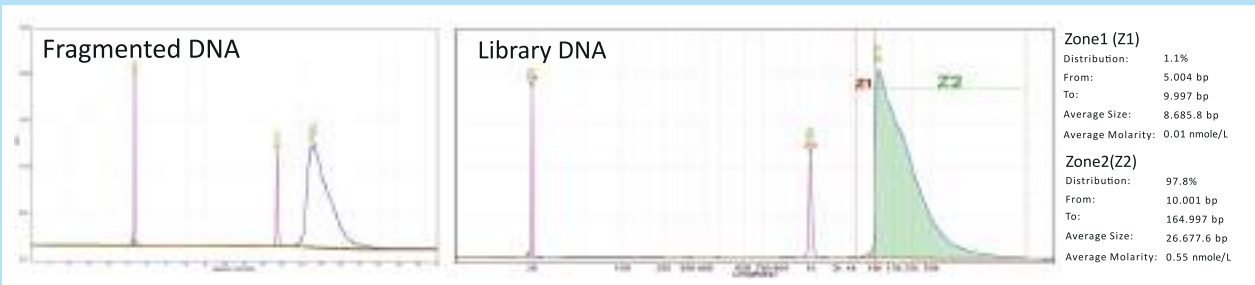
Qsep Series platforms are able to provide sizing information up to 50 kb, which are powerful tools for quality check during library construction. Also, high sensitivity and high reproducibility performance of *Qsep* Series platforms provides scientists reliable and quality results utilizing small amounts of samples.



Workflow of library construction of the third-generation sequencing. The dark blue box indicates the main quality check point during library construction.



Two genomic DNA samples are analyzed by S3 cartridge (Kilobase Cartridge) on *Qsep*₁₀₀ after extraction. The average size of gDNA-1 (red line) is 57,077 bp with high intact quality (DNA Quality Number, DQN= 9.9). Genomic DNA-2 (blue line) is degraded severely (DQN= 2.2)



Appearance of sheared DNA from *Qsep*₁₀₀. Lambda DNA is sheared by Covaris® g-TUBE® for 10 kb library preparation and analyzed by S3 (Kilobase Cartridge) on *Qsep*₁₀₀ after purification.

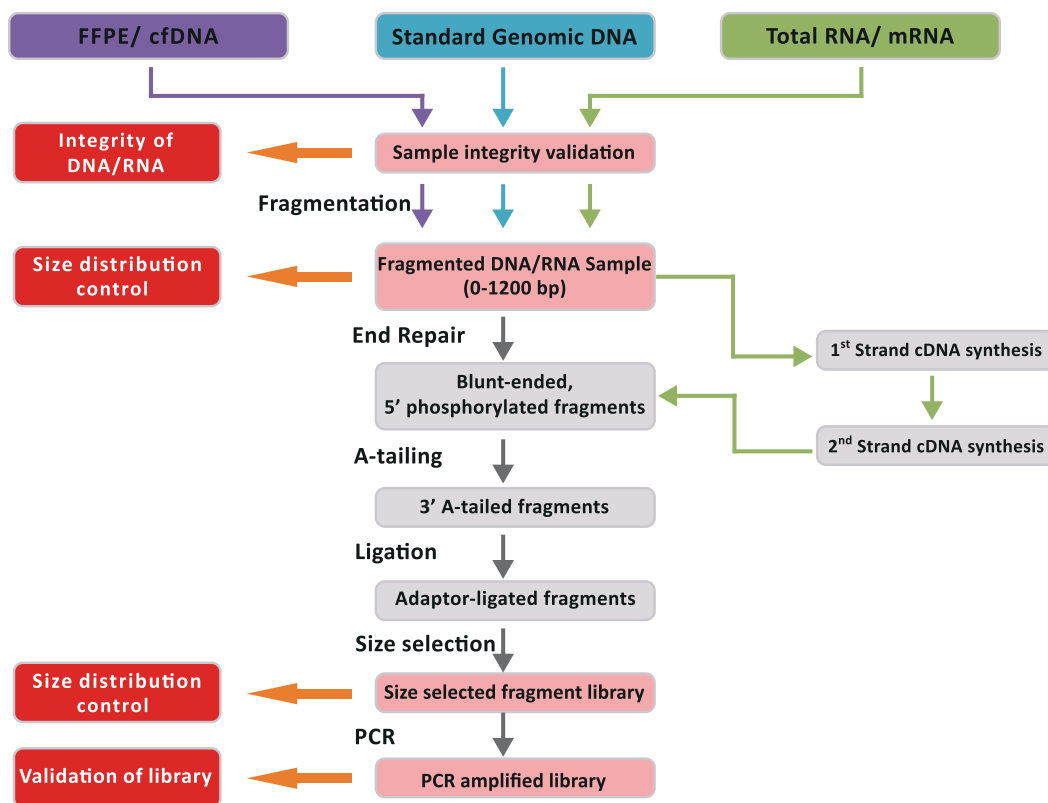
The electropherogram of DNA library on *Qsep*₁₀₀. The library is prepared for SMRT sequencing by PacBio SMRTbell 10 kb Template Preparation Kit. The library shows clear cut off pattern on *Qsep*₁₀₀ and distribution of over 10 kb fragments is 97.8% (Z2).



Next Generation Sequencing (NGS)

Next Generation Sequencing (NGS) is a widely used technology in research, biotech industry, and clinical diagnostics. As NGS technology rapidly develops, many commercial NGS platforms have been launched. Though these NGS platforms are based on different principles, sample preparation is the most critical step of all platforms. Sample preparation for NGS needs to be quality controlled to ensure getting reliable sequencing results.

There are several checkpoints in library preparation workflow. *Qsep* Series Systems provides an ideal quality control platform for DNA/RNA sample integrity check, size distribution control, and library validation. For users with different throughput needs, BiOptic provides various types of instruments (*Qsep₁*, *Qsep₁₀₀*, *Qsep₄₀₀*) meeting the end users requirements. Throughputs of 1 to 96 samples can be analyzed utilizing the *Qsep* Series Products improving efficiency and lowering cost.

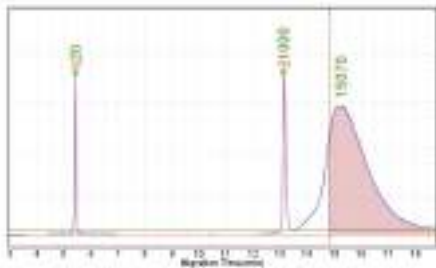


Highlights

- Ideal QC platform : completely covering the QC steps in NGS from upstream gDNA, total RNA to the final library sample.
- All in one : get size and concentration in a single run for your library sample
- High flexibility : no need for collecting sample
- Reliable standard : provide DQN and RQN as tools for standardization of NGS quality control



QC steps in NGS workflow performed with *Qsep* Series Instruments

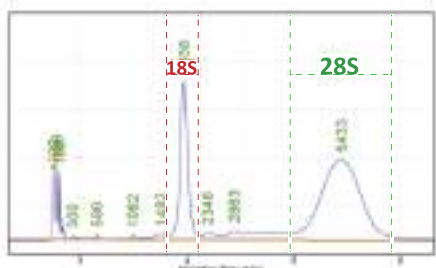


Distribution :	81.5 %	Average Size:	36,854.7dp
From :	10,007 bp	Average Molarity:	0.12 nmole/L
To :	164,996 bp	DQN:	8.5

Genomic DNA (gDNA) Integrity Check

With Kilobase and High Sensitivity Kilobase Cartridge (S3, C105206 & N3, C105153), it's easy to distinguish intact and degraded gDNA. *Q-Analyzer*TM Software also provide a DNA Quality Number (DQN) calculated from user-defined threshold for determining the quality of gDNA samples.

*gDNA sample analyzed by S3 cartridge, 10 kb as user-defined threshold, get 8.5 DQN

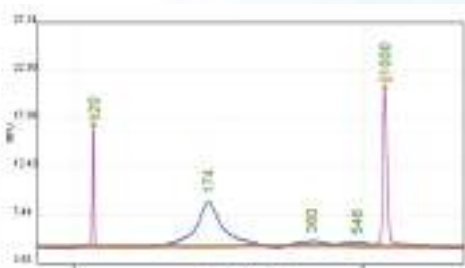


18S Start Time	227.00 sec.	18S Area	1,206,408	22.2 %
18S End Time	244.60 sec.	28S Area	3,145,641	58.0 %
28S Start Time	292.00 sec.	Ratio (28S / 18S)	2.61	
28S End Time	354.60 sec.	RNA Quality Number	9.84	
Total Peak Area	5,423,216	DV200	98.3 %	

Total RNA Quality Control

Using RNA cartridge (R1 & NR1) to determine the quality of RNA sample, *Q-Analyzer*TM software can automatically assign 18S/28S region and provide RNA Quality Number (RQN) for quick determination of which sample is suitable for downstream application. DV200 also provided as an indicator for FFPE RNA.

* 50 ng/ul total RNA sample analyzed by R1 cartridge

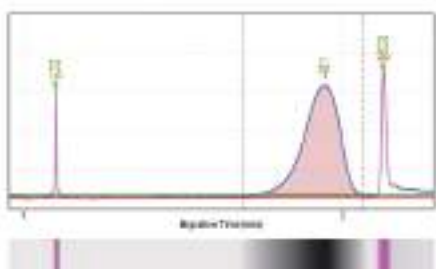


No	Time (sec.)	RFU	PeakArea	bp	Concn. (pg/ul)	PeakStart (sec.)	PeakEnd (sec.)
1	64.04	12.10	109,640	20	N/A	62.68	64.64
2	87.96	4.63	782,171	174	70.91	75.00	102.24
3	109.36	0.58	99,318	360	7.01	102.60	114.32
4	118.68	0.47	71,608	546	5.07	114.36	121.72
5	124.56	15.93	462,608	1000	N/A	121.72	131.16

Cell-Free DNA (cfDNA) Quality Control

Qsep Series Systems with High Sensitivity Cartridge (N1, C105105) are able to provide reliable size and purity results of cfDNA in about 2-3 minutes. Low concentration cfDNA, down to 5 pg/ul, can be detected and contamination present within gDNA sample can be also resolved easily.

*cfDNA in 0.5x Dilution Buffer analyzed by N1 Cartridge (C105105)



Distribution :	98.1 %	Average Size:	488.5dp
From :	272 bp	Average Molarity:	15.72 nmole/L
To :		DQN:	9.9

Range	Avg. bp	ng/ul	nMole/L	Percent
272-400	363.0	0.87	3.69	15.4
400-600	483.9	3.64	11.58	71.0
600-800	364.2	0.45	1.04	10.8
800-977	861.4	0.03	0.05	1.0

Fragmented and Library Sample Validation

The size distribution and concentration are two critical information for determining fragmented or library sample quality. With Standard Quantitative Cartridge Kit (S2, C105201-Q), reliable qualification and quantification results can be provided in 2-3 minutes.



Quantitative Applications



DNA quality control is an important checkpoint for downstream experiments including in DNA size, intact as well as DNA quantity. Generally, scientists require to quantify and qualify DNA separately for DNA quality control leading to extra work and additional costs. Our *Qsep* Series Systems combined with the quantitative cartridge kits (C105201-Q and C105202-Q) can provide not only the DNA size intact information but also accurate concentration of each DNA fragments in one step analysis, which makes DNA quality control process to be easier and faster without any loss of sample.

Features

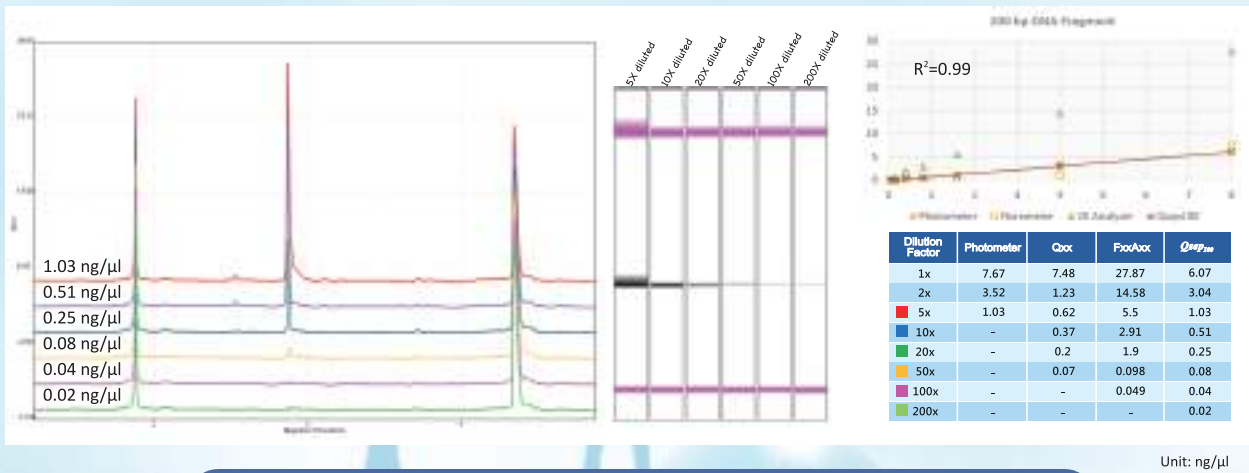
- Wide quantitative range: 0.2 to 50 ng/μl (C109201-Q and C109202-Q) / 5 to 500 pg /μl (C105105-Q and C105205-Q)
- Quantitative size range: up to 5000 bp
- Rapid analysis: 3 to 5 mins / 1 or 4 samples
- High Stability: CV% ≤ 2.0% (sizing) / CV% ≤ 4.0% (quantity)
- Quantification of selective DNA size range

Applications

- ✓ DNA fragment Quantification
- ✓ NGS library Quantification
- ✓ Cell-free DNA Quantification

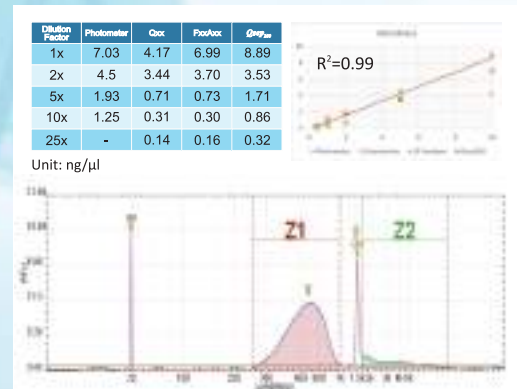
DNA fragments quantification

The 200 bp DNA fragment is serially diluted and analyzed by the High Resolution Quantitative Cartridge Kit (C105202-Q) using *Qsep*₁₀₀ instrument. The 200 bp fragment is detectable after being diluted to 0.02 ng/μl. The quantitative results of *Qsep*₁₀₀ show high sensitivity and high linear regression ($R^2=0.99$) compared with other platforms.



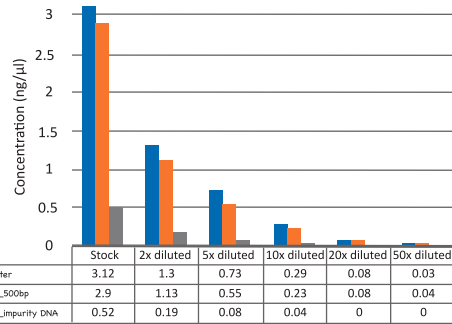
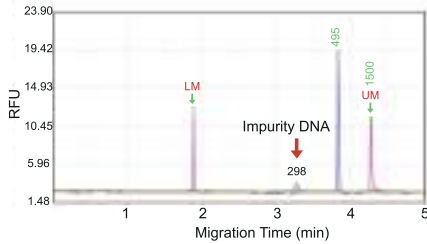
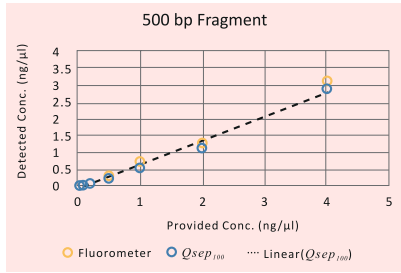
Determine the distribution and concentration of NGS library

The NGS library is required to be constantly controlled in distribution and concentration before sequencing in order to obtain qualified results. *Qsep*₁₀₀ not only provides distribution but also the concentration of NGS library in one step analysis. Concentration of selective size range provides exact information for quality control. The NGS library is serially diluted by dilution buffer and analyzed by Standard Quantitative Cartridge Kit (C105201-Q) using *Qsep*₁₀₀. High detection sensitivity limited sample requirement and high linear regression provides accurate concentration information for the NGS library.





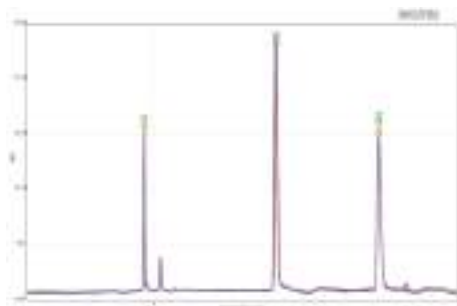
Identify size and concentration of impure DNA from samples



The NoLimits 500 bp DNA fragment (Thermo Fisher, SM1641) is serially diluted and analyzed by *Qsep*₁₀₀ and conventional fluorometer. The conventional Fluorometers can only quantify total dsDNA amount but the *Qsep*₁₀₀ system allows to identify the distinct fragments and provides concentration information of the 500 bp fragment and the impurity of DNA.

High Reproducibility of size and concentration in quantitative cartridge kit

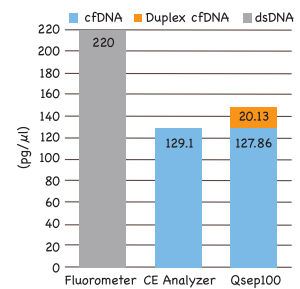
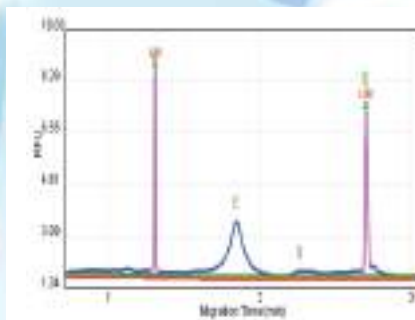
PCR product		
Test	Size (bp)	Concentration (ng/μl)
R1	255	1.82
R2	255	1.88
R3	255	1.87
R4	255	1.81
R5	255	1.82
R6	255	1.85
R7	255	1.84
R8	255	1.84
Average	255	1.84
STD	-	0.025
CV%	-	1.3%



PCR product was diluted in dilution buffer and analyzed by Standard Quantitative Cartridge Kit (C105201-Q) on *Qsep*₁₀₀. The repeat test displays high reproducibility of size and concentration. The CV% is less than 2.0%.

Cell-free DNA Quantification

Cell-free DNA was extracted from 1ml blood and detected by different platforms. *Qsep*₁₀₀ system provides the distinct size and concentration information of cfDNA in 3 mins.



Product Information

Catalog Number	Product Name	Quantitative Range (Size)	Quantitative Range (Concentration)	Applications
C105201-Q	Standard Quantitative Cartridge Kit	20 to 5000 bp	0.2 to 50 ng/μl	NGS library Quantification
C105202-Q	High Resolution Quantitative Cartridge Kit	20 to 5000 bp	0.2 to 50 ng/μl	RFLP/ DNA Quantification
*C105205-Q	High Sensitivity Quantitative Cartridge Kit	20 to 1500 bp	5 to 500 pg/μl	cfDNA Quantification

*Launch in 2020 Q3



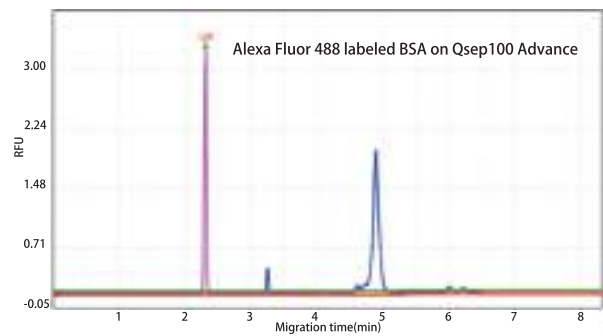
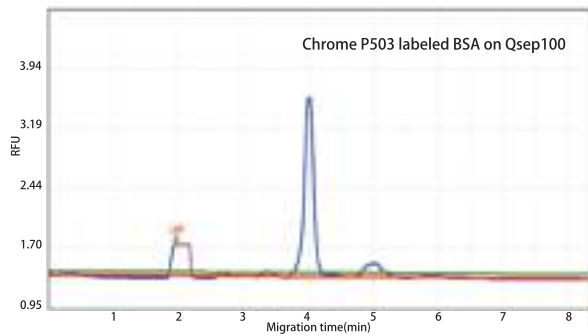
Biochemical characterization and quality control of proteins

Sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) has been used for size-based separations of proteins for over four decades. However, due to the limitations of traditional SDS-PAGE system such as biohazard reagent usage, intensive laborious operation, and data processing, BiOptic Inc. has dedicated in development of a fully automated capillary gel electrophoresis (CGE) system in the presence of SDS for qualitative protein analysis. The SDS-CGE system incorporates a capillary gel cartridge filled with in-house synthesized polymer(s) and standardized methodology for enhanced detection of fluorescently labeled proteins.

Both newly developed copolymer formulations and standardized methodologies are being practiced in our SDS-CGE system to study the biochemical properties of various proteins and to monitor their quality control in Biosimilars. *Qsep* Series products offers on-column detection, automation, great resolving power. And capability for accurate protein quality and molecular weight determination.

Fluorescent Protein Labeling

	<i>Qsep</i> ₁₀₀	<i>Qsep</i> ₁₀₀ Advance
Applicable Dye	Chromeo P503	FITC / Alexa Fluor 488
Resolution (P2 cartridge)	Good	<i>Excellent</i>

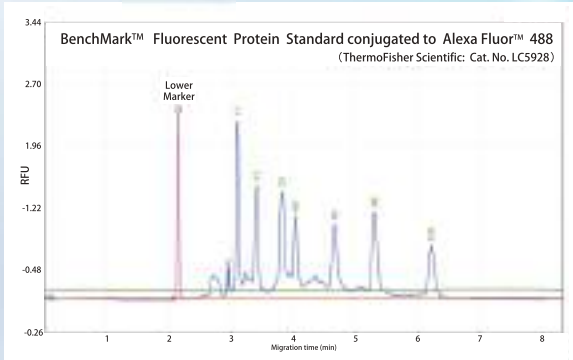


Information of the Protein labeling Dye :

Product Description	Spectrum
Alexa Fluor™ 488 NHS Ester (Succinimidyl Ester)	Ex : 493 nm, Em : 516 nm
Chromeo™ P503	Ex : 503 nm, Em : 600 nm (conjugated)

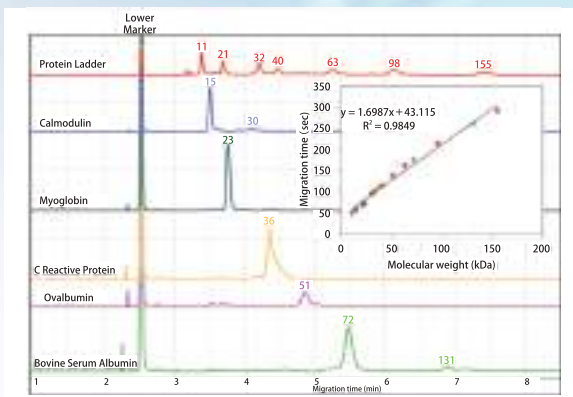


Protein sizing coverage for P2 cartridge



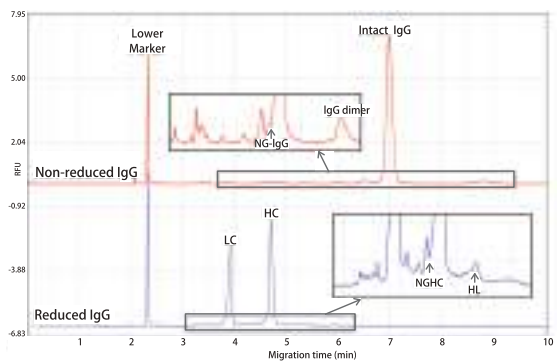
A protein size ladder (BenchMark™) containing 7 recombinant proteins of 11-155 kDa was well separated in 8 minutes on *Qsep₁₀₀* Advance.

Apparent molecular weight determination for unknown proteins



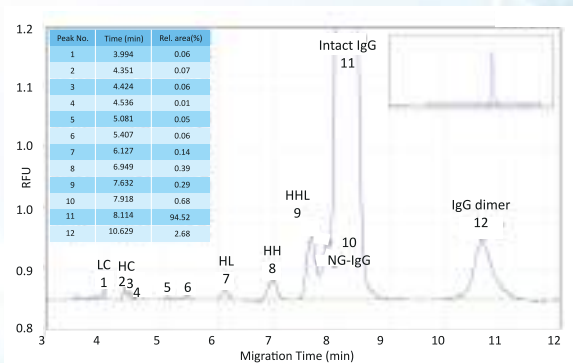
Protein size ladder was used to assist in gel formulation phase to optimize the resolving capacity of the gel and to estimate the MW of unknown proteins.

Biochemical properties of IgG – subunits and aggregates



The structure study and heterogeneity assay provide high-resolution separation for either reduced or non-reduced IgG molecules.

Quality control for biosimilars – Impurities of IgG



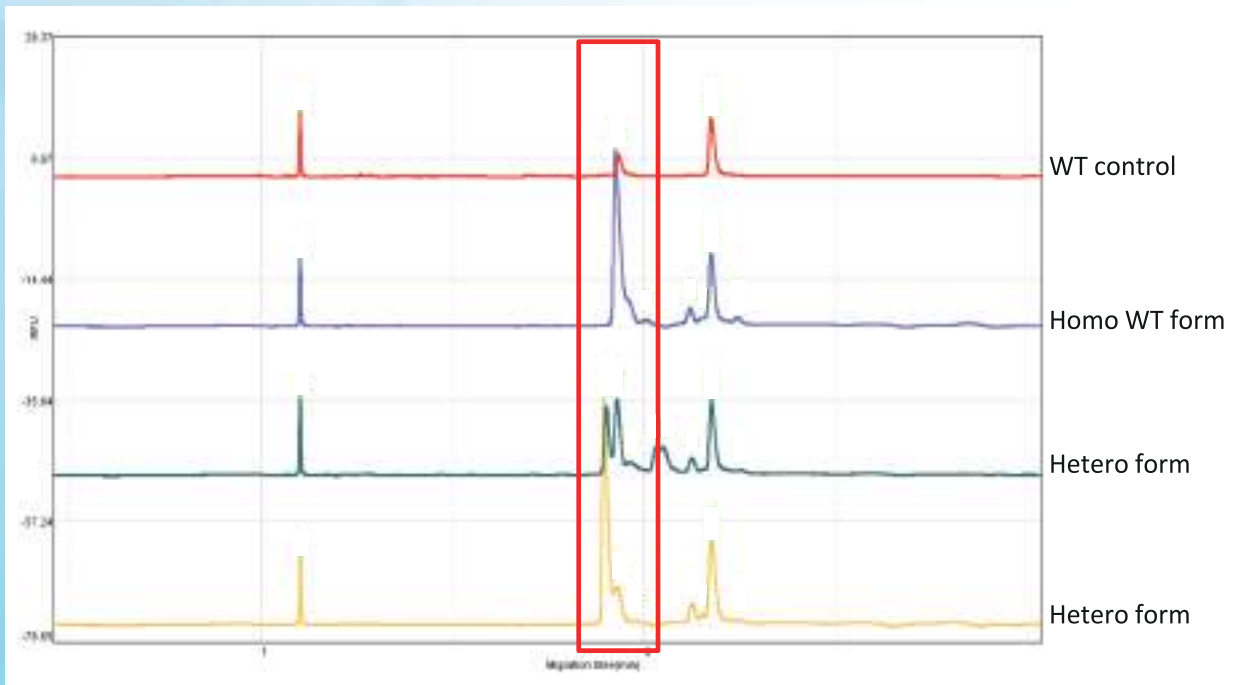
Relative peak area for non-reduced IgG impurities could be detected below 0.1%.



CRISPR / Cas9

CRISPR is a genome engineering technique that uses protein to interact with DNA. CRISPR typically uses a version of the Cas9 nuclease to cut double-stranded DNA at a specified point in the genome, after that the cell's endogenous machinery will repair the break. Under the right circumstances, the cell can be made to incorporate a donor DNA sequence into the break site, thus allowing for gene insertion, modification, or knockout. CRISPR-Cas9 targets a specific genetic location determined by a homologous RNA (termed a guide RNA or gRNA). And unlike editing with TALENs (transcription activator-like effector nucleases) or ZFNs (zinc finger nucleases), using a gRNA means that no elaborate protein engineering is required to achieve sequence specificity, and is thus easier and faster.

CRISPR Results Validation



High Resolution Application in CRISPR QC

The figure shows that the Zebrafish genome samples are edited by CRISPR (Knock out 8bp). Before using *Qsep₁₀₀*, they used sequencing to check the results of CRISPR. However, the Zebrafish has two copies (two alleles), Sanger sequencing unable to distinguish the Hetero Deletion form, especially when the signal of the minor peak is much weaker than the major peak. In *Qsep₁₀₀* platform, it can easily distinguish the 3 different forms (Homo WT, Hetero, and Homo Del forms), and also obviously display the minor peak (yellow line). Hence, users may know which sample is well edited.

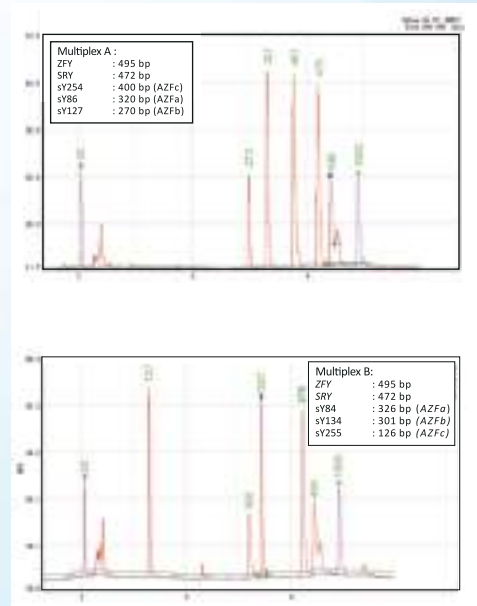
In CRISPR workflow, the most important key is the characterization of positive clones, while screening methods and reagent QC are often overlooked. To characterize the CRISPR modified lines requires Sanger sequencing or next-generation sequencing (NGS). While sequencing is not efficient as a screening protocol due to the cost, resource requirements, and time. *Qsep* Series Bio-Fragment Analyzers provides high resolution detection in CRISPR QC application, which is importance to achieve successful results.



More Applications

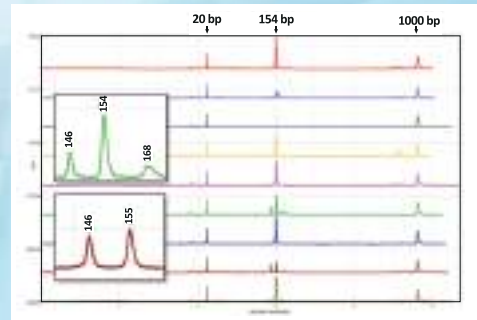
Y chromosome microdeletion_AZF Deletion

Y chromosome microdeletion (YCM) symptom is often present in a numerous men with reduced fertility. Spermatogenesis, which is an essential reproductive process, is regulated by Y chromosome specific gene. Most of these genes located in a specific region known as the azoospermia factor region (AZF) in the long arm of the human Y chromosome. The major cause of male infertility is the AZF microdeletions, which is the most frequent structural chromosomal abnormalities. AZF could be further divided into three subregions: AZFa, AZFb and AZFc. Specific sequence-tagged site (STS) could be used to identify these regions. *Qsep* Series Bio-Fragment Analyzers, which are based on capillary electrophoresis technology, offering a viable solution for detecting Y chromosome microdeletions rapidly and at higher sensitivity. The right figures show ZFX/Y and SRY are the internal control. Specific sequence-tagged site (STS) is detected by *Qsep*₁₀₀ and the result shows that the AZFc has been microdeleted.



SSR/Microsatellites

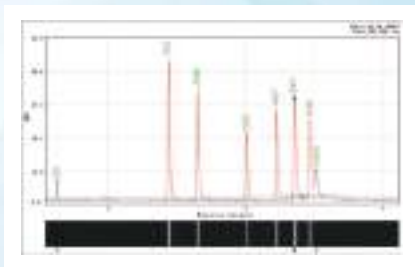
SSR/microsatellite marker library workflows can be improved by incorporating high-throughput, high-accuracy DNA fragment analysis technologies of BiOptic's *Qsep* Series Bio-Fragment Analyzers. The figure in right indicated that the bright green and the brown peaks represent different strains of *Torreya grandis* compared to other peaks. Strains identification was performed by using the High Resolution Cartridge (S1, C105202) in *Qsep*₁₀₀ Bio-Fragment Analyzer.



The right figure shows three strains of the *Torreya grandis* that have been identified.

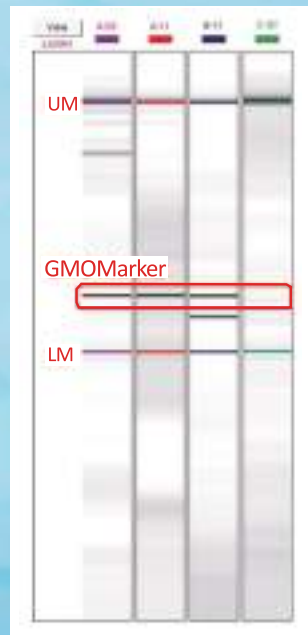
Viral Pathogen Identification

Each viral species has unique infectious transport and persistence characteristics, which specially relays on different clinical treatments to cure. Thus, the identification of viral pathogen species is very important.



Virus	Expect size
Enterovirus	194 bp
Influenzavirus 4	249 bp
Metapneumovirus	351 bp
Influenzavirus b	465 bp
Bocavirus 1/2/3/4	579 bp

GMO sample test (Soy Bean)





Qexp Test Kits

Qexp-MDx Series



● Qexp-MDx ALDH2 Genotyping Kit (C900100-24 & C900100-48)

BiOptic, Inc. provides an optimized Qexp-MDx Series Kit with its core Qsep Series products of fully-automated capillary electrophoresis platforms, mini PCR and powerful DirectGO reagent, which eliminates the need for extraction and purification of nucleic acid providing rapid, accurate and cost-effective detection platform.

What is ALDH2?

Common symptoms of alcohol intolerance are facial warmth and redness which is a complex physiological issue. This condition is called an ALDH2 deficiency. The ALDH2 deficiency is the most common enzymopathy in the world, where 8% of the world population are affected by this syndrome. It is caused by a single point mutation, also called "Asian Alcohol Facial Flushing Syndrome" which is caused by the accumulation and sensitivity to acetaldehyde toxicity after alcohol consumption. Acetaldehyde is classified as Group 1 carcinogen by WHO.

Few Steps to Get Results

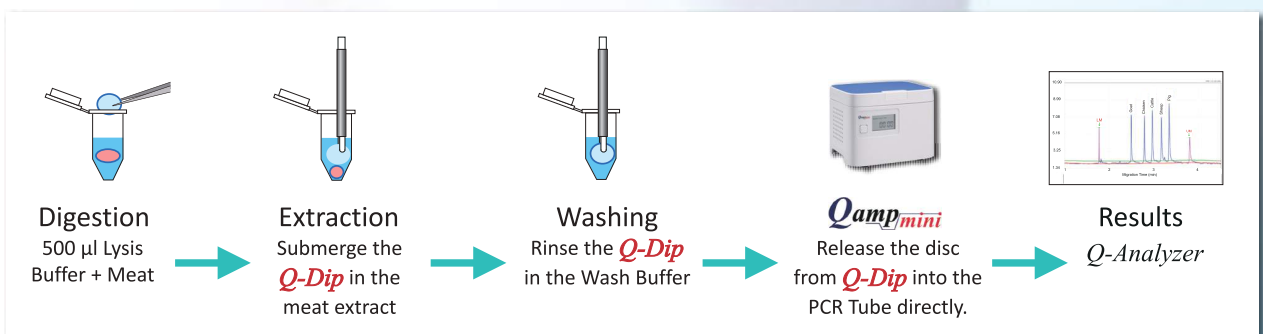


Qexp-FS Series

● Qexp-FS Meat 5-species Kit (goat, chicken, cattle, sheep, pig)(C900200-24 & C900200-48)

An increase for globalized food safety issues are in great demand for food research and monitoring. BiOptic has established the Qexp-FS Series Kit to be applied to the demanding field of food safety.

We have established a workflow to rapidly determine the identity of meat in the field using the portable instruments of Qamp_{mini}[™] Thermal cycler for PCR mediated DNA amplification, and the Qsep₁[™] Bio-Fragment Analyzer (based on capillary gel electrophoresis technology) for the analysis of PCR products. This kit targets five species (Goat 159 bp, Chicken 228 bp, Cow 273 bp, Sheep 334 bp and Pig 396 bp). The Q-Analyzer[™] software is used to automatically call peaks and calculate PCR product sizes (numbers of base pair) to verify the identity and origin of the meat. Portability of the instruments and straightforward sample preparation provides a complete and systematic workflow that can be easily employed in field applications, slaughter-houses and food or meat processing facilities. It is envisioned that other applications focused on plant or fish identification, or screening for GMOs in a cost-effective manner will be developed in the near future



● *Qexp*-MDx ApoE Genotyping Kit (C900400-24 & C900400-48)

Apolipoprotein E (ApoE) is a 34 kDa protein involves in fats metabolism. It is located at human chromosome 19 and associated with Alzheimer's disease and cardiovascular disease. ApoE gene has three polymorphic alleles that encode three protein isoforms— $\epsilon 2$ (Cys112/Cys158), $\epsilon 3$ (Cys112/Arg158) and $\epsilon 4$ (Arg112/Arg158), everyone inherits one of three alleles from each parent and resulting in six possible genotypes— $\epsilon 2/\epsilon 2$, $\epsilon 2/\epsilon 3$, $\epsilon 2/\epsilon 4$, $\epsilon 3/\epsilon 3$, $\epsilon 3/\epsilon 4$, $\epsilon 4/\epsilon 4$. According to previous studies, if there is an $\epsilon 4$ in ApoE gene may cause high risk of late onset Alzheimer's disease. Furthermore, Familial type III hyperlipoproteinemia is frequently mentioned associated with the ApoE $\epsilon 2/\epsilon 2$. *Qexp*-MDx ApoE Genotyping Kit provides a fast and simple method of direct Multiplex PCR without DNA extraction in whole blood or saliva.



Qexp-Vet Series

The Veterinary Diagnostics Market has a relatively high growth rate compared to human in vitro diagnostic markets. The main reasons are the increase of animal agriculture and the increase of pet markets. The common screening method for such application is the Lateral Flow Assays (LFA) fast screening diagnosis, which provides extremely fast detection, but often has false negative results due to low sensitivity. Nucleic acid-based detection platforms provide more accurate results and therefore is the preferred methodology. BiOptic's R&D team has developed the core products of *Qsep* series instruments, which are fully-automated capillary gel electrophoresis (CGE) platforms for nucleic acid applications. BiOptic has also launched the newly developed mini PCR instrument *Qamp mini* and DirectGO PCR reagents that can simplify the nucleic acid extraction step. Usually, nucleic acid needs to be extracted before amplification. However, by utilizing BiOptic's direct-PCR + CGE platform the detection time can be greatly reduced. The overall time to complete a full test (sample to result) is one hour.

● *Qexp*-Vet Canine blood pathogens kit

The detection process is less than 30 minutes by using *Qsep* system.

Name of pathogens	abbr.
Anaplasma platys	AP
Ehrlichia canis	EC
Babesia canis	BC
Babesia gibson	BG
Mycoplasma haemocanis/haemofelis	Mh
Candidatus Mycoplasma haemominutum/haematovarum	CMh
Babesia atoqueune-resistant gene (BG cytochrome b gene)	BGC

● *Qexp*-Vet Canine respiratory pathogens kit





Qsep Series Bio-Fragment Analyzers

Cat #	Product
C400100	Qsep ₄₀₀ Bio-Fragment Analyzer
C100100	Qsep ₁₀₀ Bio-Fragment Analyzer
C100101	Qsep ₁₀₀ Advance Bio-Fragment Analyzer
C100001	Qsep ₁ Bio-Fragment Analyzer
C100001-L	Qsep ₁ -Lite Bio-Fragment Analyzer

Qsep₄₀₀ cartridge kits- 4-channel cartridge kit

Cat #	Product	
C405101	4-Channel S2-Standard Cartridge	1 Cartridge/Box
C405102	4-Channel S1-High Resolution Cartridge	1 Cartridge/Box
C405106	4-Channel S3-Kilobase Cartridge	1 Cartridge/Box
C405103	4-Channel F3-Fast Cartridge	1 Cartridge/Box
C405105	4-Channel N1-High Sensitivity Cartridge	1 Cartridge/Box
C405110	4-Channel R1-RNA Cartridge	1 Cartridge/Box
C405153	4-Channel HS-Kilobase Cartridge	1 Cartridge/Box
C405111	4-Channel NR1-HS RNA Cartridge	1 Cartridge/Box
C405121	4-Channel P2-Protein Cartridge	1 Cartridge/Box
C405101-Q	4-Channel S2-Standard Quantitative Cartridge Kit	1 Cartridge/Box
C105102-Q	4-Channel S1-High Resolution Quantitative Cartridge Kit	1 Cartridge/Box

Qsep₁ & Qsep₁₀₀ cartridge kits- 1-channel cartridge kit

Cat #	Product	
C105201	S2-Standard Cartridge	2 Cartridges/Box
C105801	S2-Standard Cartridge	8 Cartridges/Box
C105202	S1-High Resolution Cartridge	2 Cartridges/Box
C105802	S1-High Resolution Cartridge	8 Cartridges/Box
C105206	S3-Kilobase Cartridge	2 Cartridges/Box
C105806	S3-Kilobase Cartridge	8 Cartridges/Box
C105153	HS-Kilobase Cartridge	1 Cartridge/Box
C105253	HS-Kilobase Cartridge	2 Cartridges/Box
C105203	F3-Fast Cartridge	2 Cartridges/Box
C105803	F3-Fast Cartridge	8 Cartridges/Box
C105105	N1-High-Sensitivity Cartridge	1 Cartridge/Box
C105205	N1-High-Sensitivity Cartridge	2 Cartridges/Box
C105110	R1-RNA Cartridge	1 Cartridge/Box
C105210	R1-RNA Cartridge	2 Cartridges/Box
C105810	R1-RNA Cartridge	8 Cartridges/Box
C105111	NR1- HS RNA Cartridge	1 Cartridge/Box
C105211	NR1- HS RNA Cartridge	2 Cartridges/Box
C105121	P2-Protein Cartridge	1 Cartridge/Box
C105221	P2-Protein Cartridge	2 Cartridges/Box
C105201-Q	S2-Standard Quantitative Cartridge Kit	2 Cartridges/Box
C105202-Q	S1-High Resolution Quantitative Cartridge Kit	2 Cartridges/Box



Qsep Series products

Cat #	Product	
C109100-500A	20bp&1000bp Alignment Marker	500 µL/ Vial
C109102-500A	20bp&5000bp Alignment Marker	500 µL/ Vial
C109109-500A	20bp&1500bp Alignment Marker	500 µL/ Vial
C109110-500A	20bp&15000bp Alignment Marker	500 µL/ Vial
C109120-500A	5x Lower Alignment Marker	500 µL/ Vial
C109200	15-622bp Size Marker	500 µL/ Vial
C109300	50bp-3000bp Size Marker	500 µL/ Vial
C109400	100bp-10kb Size Marker	100 µL/ Vial (5 tubes/ bag)
C109700	Size Marker (500bp-23kb)	500 µL/ Vial
C104401	Mineral Oil	25 ml/ bottle
C104402	Dilution Buffer	50 ml/ bottle
C104408-10X	10X Dilution Buffer	8 ml/ bottle
C104403	Separation Buffer (for DNA cartridge use)	250 ml/ bottle
C104409-10X	10X Separation Buffer (for RNA cartridge use)	15 ml/ bottle
C104201	<i>Qsep</i> ₁₀₀ Buffer Tray	10 Pcs/ bag
C104250	8-STRIPS Micro Vial	10 units/ Bag
C104253	<i>Qsep</i> ₇ 16-Tube Strip	10 Pcs/ bag
C104254	<i>Qsep</i> ₇ 8-Tube Strip	10 Pcs/bag
C104002-100	<i>Qube</i> -Purge Station for 1-channel	
C104002-400	<i>Qube</i> -Purge Station for 4-channel	
C104301-00	<i>Qair</i> _{box} (Portable DC Air Pump)	

Qamp_{mini} product

Cat #	Product	
C310200	<i>Qamp</i> _{mini} Thermal Cycler (Including writer (C310202) and programmable chip (C310203-1))	
C310202	<i>Qamp</i> _{mini} Writer	1 set
C310203-1	<i>Qamp</i> _{mini} Programmable Chip	1 pc
C310203-5	<i>Qamp</i> _{mini} Programmable Chip	5 pc
C310203-10	<i>Qamp</i> _{mini} Programmable Chip	10 pc

PCR Reagents

Cat #	Product	
C108100-CE	ExpressGO™ PreMix-CE 2X Master Mix	1.25 ml/ Vial
C108200-CE	DirectGO™ PreMix-CE 2X Master Mix	1.25 ml/ Vial
C108300	AccuGO™ Pfu proofreading DNA Polymerase (including 5X AccuGO Reaction Buffer)	1.25 ml/ Vial

Qexp Test Kits

Cat #	Product	
C900100-24 C900100-48	<i>Qexp</i> -MDx ALDH2 Genotyping Kit	
C900400-24 C900400-48	<i>Qexp</i> -MDx ApoE Genotyping Kit	
C900200-24 C900200-48	<i>Qexp</i> -FS Meat 5-species Kit	