EuroClone®

MGI 华大智造

Genetic Sequencer

DNBSEQ-G50

Compact & flexible, enhancing your daily sequencing capability

CB CE NMPA

- Low-pass whole genome sequencing
  Flexible throughput of 100M/500M
- Low-frequency variant detection
  Down to 0.5%
- Small genome assembly
  10 Gb in 10 hours

Product Introduction

DNBSEQ-G50 is a compact and flexible benchtop genetic sequencer. With the design of two different flow cells, it empowers flexibility and creates a perfect balance between speed and affordability. FCS (Flow Cell Small) allows short turnaround time for short turnaround time (STAT) samples and FCL (Flow Cell Large) enables lower cost per sample.

DNBSEQ-G50 offers 3-4 read length options for both FCS and FCL, which support a wide range of research and clinical applications such as low-pass whole genome sequencing, targeted sequencing, small whole genome sequencing, RNA sequencing and whole exome sequencing, etc.

1 High Resolution Camera
2 Laser
3 Injection Pump
4 Flow Cell Holder
5 Rotary Valve
6 DNB Loading System
7 Reagent Kit
8 Reagent Compartment
9 Touch Screen
10 Reagent Container

MGI's Proprietary DNBSEQ™ Technology

INCREASED ACCURACY

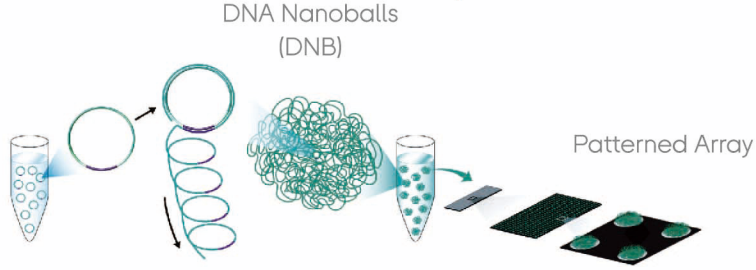
No PCR amplification is required. Our unique Rolling Circle Replication (RCR) technology employed in DNBSEQ™ library construction eliminates errors associated with PCR. Only the original template DNA is used to generate copies and therefore amplification errors do not accumulate, resulting in greater accuracy for detection of significant mutations such as Indels and SNPs.

DECREASED DUPLICATES

Optimized Patterned Array technology ensures that only one single DNB is attached at each spot, which results in greater saturation of DNB on the flow cell with unprecedented uniformity. This enables an industry-leading detection capability with a reduced duplication rate.

REDUCED INDEX HOPPING

The combination of MGI platform's unique library preparation method and RCR amplification results in much lower index hopping rates (0.0001%~0.0004%) compared to other platforms.



Key Applications

Applications	FCS	FCL
Low-pass Whole Genome Sequencing (e.g. non-invasive prenatal testing, preimplantation genetic screening, copy numbervariation detection, etc.)	▲	▲
Hybridization capture-/multiplex PCR- based Targeted Sequencing (e.g. oncology panels, inherited diseases panel, etc.)	▲	▲
Small Whole Genome Sequencing (e.g. microbial metagenomics, isolated bacteria,	▲	▲
RNA Sequencing (e.g. RNA expression profiling, transcriptome sequencing, etc.)	▲	▲
Whole Exome Sequencing	▲	▲
Human Whole Genome Sequencing		▲

FCS
75~100M reads
SE100, PE100, PE150

FCL
~500M reads
SE50, SE100, PE100, PE150

* Compatible applications ▲

** Key applications ▲

Customer Stories

Case 1: Low-pass Whole Genome Sequencing

Background DNBSEQ-G50 is used for pre-implantation genetic screening (PGS) in one clinical services laboratory to detect chromosome aneuploidy in embryos. The test assesses all 23 pairs of chromosomes, including the two sex chromosomes (X and Y). Only healthy embryos are selected for subsequent implantation to increase In Vitro Fertilization (IVF) pregnancy success rate.

Result Validated with large number of national standards and clinical samples, DNBSEQ-G50 shows great reproducibility with low CV (coefficient of variation) values in copy number ratio. This allows the laboratory to detect micro-duplication and microdeletion as small as 4Mb.

Fig. 1-1 Consistency on key data parameters

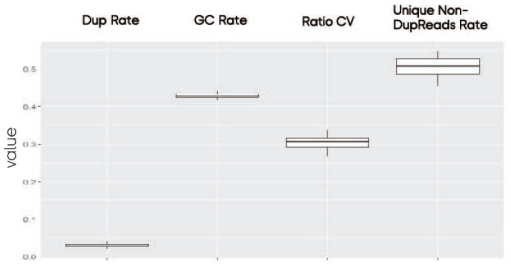
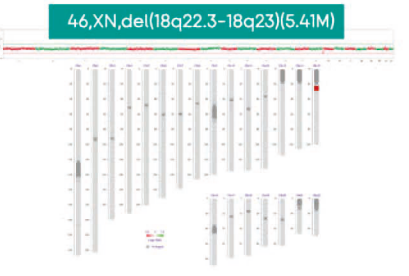


Fig. 1-2 Example report with small-size aneuploidy



Conclusion DNBSEQ-G50 generates highly consistent and reproducible data enabling accurate detection of subchromosomal copy number variations.

Case 2: Low-Frequency Variant Detection with Targeted Panel

Background A clinical services laboratory developed a pan-cancer panel based on DNBSEQ-G50 platform. The hybridization capture-based panel covers single nucleotide variant (SNV), insertion and deletion (Indel), and structural variant (SV) in one analysis.

Result DNBSEQ-G50 generates an average of 579M reads and Q30 of 90% with PE100 sequencing. Using dual barcodes with UMI, the detection rate reaches 100% for variants with frequency ranging from 0.5%-1.0%.

Tab. 2-1 Major variants covered in the panel

Variant type	Gene	Variant
Indel	EGFR	p.Δ E746-A750
Indel	EGFR	p.V769_D770insASV
SNV	AKT1	p.E17K
SNV	PIK3CA	p.E545K
SV	EML4-ALK	p.COSF734 (EML4-ALK)
SV	ROS1	p.CD74-ROS1 fusion

Tab. 2-2 Key data parameters

Item	Total Reads (M)	Q30 (%)
Run1	582	90.2
Run2	579	90
Run3	577	90
AVG	579	90
STD	2.9	0.1
CV	0.50%	0.10%

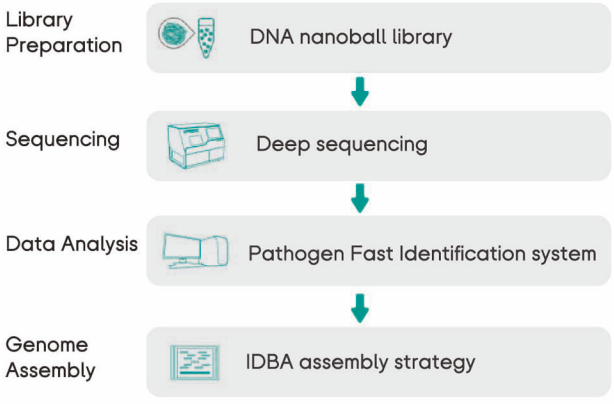
Conclusion DNBSEQ-G50 can be used to detect low-frequency tumor variants down to 0.5% using dual barcodes with UMI.

Case 3: Small Whole Genome Assembly

Background A local Center for Disease Control and Prevention (CDC) in East China used DNBSEQ-G50 to confirm and study the first coronavirus case found in the region.

Result Respiratory sample from the first local case of coronavirus was deep-sequenced on DNBSEQ-G50 with SE100. Data output is 32Gb with total reads of 318M. 2,337,442 SARS-Cov-2 reads were identified and assembled with highly-efficient IDBA method by compatible software. As a result, the full-length SARS-Cov-2 whole genome (29.9Kbp) was obtained.

Fig. 3-1 Virus identification and genome assembly workflow



Tab. 3-2 Pathogen Fast Identification Report

#	Species	Reads	Relative abundance
1	2019-nCoV	2,337,442	60.685
2	Proteus phage VB PmiS-Isfahan	3,344	0.087
3	Parvovirus NIH-CQV	203	0.005
4	Severe acute respiratory syndrome-related coronavirus	140	0.004
5	uncultured crAssphage	64	0.002
6	Bat coronavirus BM48-31/BGR/2008	43	0.001
7	Staphylococcus virus IPLA5	42	0.001
8	Rhodoferax phage P26218	41	0.001
9	Acanthamoeba polyphaga moumouvirus	34	8.827e-04
10	Megavirus chilensis	22	5.712e-04

Conclusion DNBSEQ-G50 helps to identify unknown pathogens and obtain whole genome information in a short period of time.

Total Solution

Based on DNBSEQ-G50, MGI offers automated total solutions to cover the entire sequencing workflow from automated library preparation, sequencing, to bioinformatic analysis. The total solutions are developed based on the same set of hardware compatible with different applications, providing an ease-to-use one-stop solution for end users.

Library preparation	Sequencing	Data analysis
		
MGISP-100 Automated sample preparation system	**DNBSEQ-G50** Benchtop genetic sequencer	**MegaBOLT** Bioinformatics analysis accelerator

The total solution supports a wide range of applications to enhance your daily sequencing capabilities, including low-pass whole genome sequencing, hybridization capture- and multiplex PCR-based targeted sequencing, small whole genome sequencing, RNA sequencing and whole exome sequencing, etc.

Highly automated

The sample extraction and library preparation processes are highly automated driven by MGISP-100. With downstream sequencing data automatically transferred to bioinformatic workstation for data analysis and reporting, the entire sequencing workflow are simplified with less hands-on time and less dependent on manpower. This allows novice users to pick up high throughput sequencing solutions easily.

Highly accurate

The library preparation process is highly automated to avoid risks of manual error or variability; The sequencing process is guaranteed with a high level of accuracy and reduced index hopping by DNBSEQ™ technology; The data analysis process is empowered by MegaBOLT, providing a perfect balance between speed and accuracy.

Highly versatile

The total solution is an open system, which also supports third-party library preparation kits and bioinformatic software.

DNBSEQ-G50 Specifications

Flow cell specifications

Flow cell type	Reads*	Read length	Data output	Run time**	Q30**
FCS	100M	SE100	~10G	~10 hrs	>80%
	100M	PE100	~20G	~30 hrs	>85%
	75M	PE150	~23G	~43 hrs	>80%
FCL	500M	SE50	~25G	~11 hrs	>85%
	500M	SE100	~50G	~17 hrs	>85%
	500M	PE100	~100G	~47 hrs	>85%
	500M	PE150	~150G	~66 hrs	>80%

*The maximum number of effective reads are based on the sequencing of an internal standard library. Actual output may vary depending on the sample type and library preparation method.
** The percentage of bases above Q30 is the average of an internal standard library over the entire run. The actual performance may vary depending the sample type, library quality and insert fragment length.

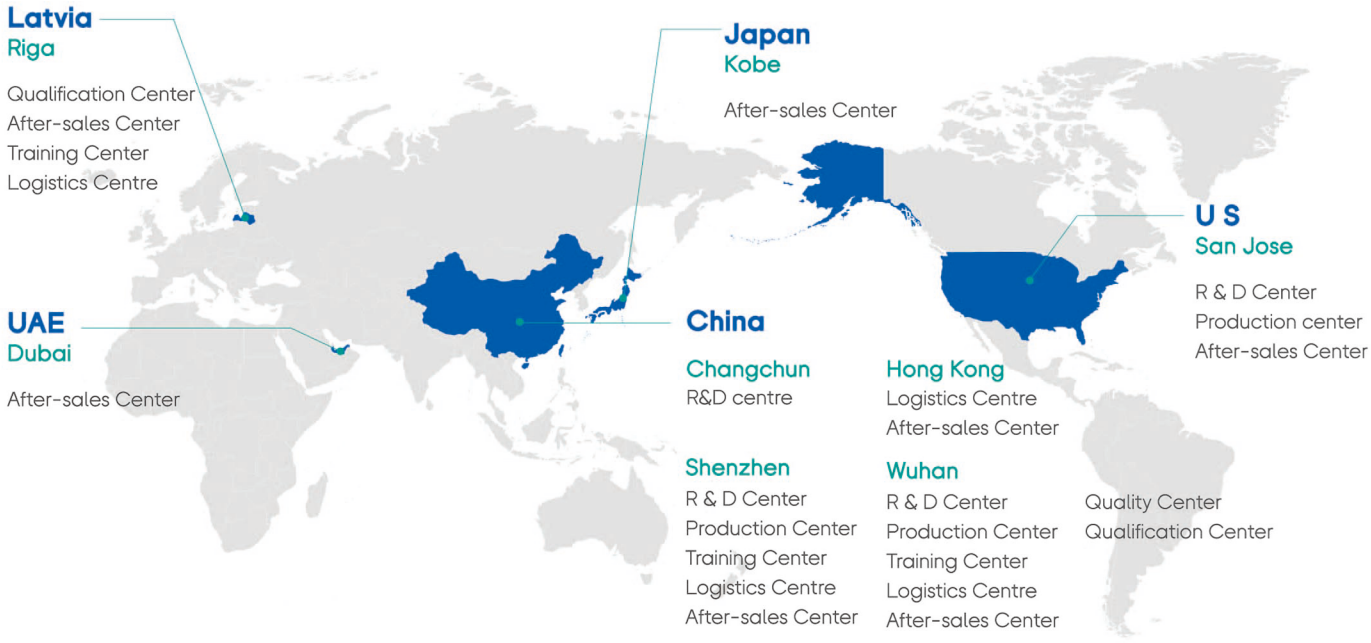
System specifications

Model*	Model*	Intended Use
	DNBSEQ-G50	IVD (In Vitro Diagnostics)
	DNBSEQ-G50RS	RUO (Research Use Only)

Dimensions	654 × 489 × 545 mm	
Weight	85 kg	
Power	Voltage	100 V ~ 240 V
	Frequency	50/60 Hz
	Rated power	900 VA
Touch Screen	LCD touch screen	
	Touch screen size	10 inches
	Touch screen resolution	1280 × 800 (60 Hz)
Maximum Sound Pressure	70 dB	
Shell Protection Grade	IPX0	
Operating Environment Requirements**	Temperature	19℃ ~25℃
	Humidity	20% RH ~ 80% RH, non-condensing
	Air pressure	70 kPa ~ 106 kPa
	Max. altitude	3000 m
Control Computer Configurations***	CPU	i7-4790
	RAM	16 GB
	Hard disk	1.25 TB
	Solid state disk	250 GB
	Operating system	Windows 10

*The model no. is model classification for internal references. Performances are the same across all the models.
** For indoor use only; The flow cells can be stored and transported at room temperature. No liquid is needed.
*** Supporting computer configurations and system updates.

MGI Global Presence



Technical Support Globally

The technical support team has a complete global coverage including technical services centers and multiple locations in major international regions to maximize customer satisfaction.

Multiple local technical support centers around the world provide timely and effective technical support and training

Online technical support accessible worldwide, with a fully functioning call center (Toll-Free Hotline: 4000-966-988) (9:00AM-12:00PM,13:00PM-18:00PM, Beijing time, workday) and multi-language online training courses coming soon

Comprehensive Instrument Service and Warranty Plans Globally

Warehouses in Shenzhen, Wuhan, Qingdao, Tianjin, Hong Kong, Taipei, Bangkok (Asia-Pacific); Brisbane (Australia, Oceania); Riga (Latvia, Europe); and San Jose (the USA, Americas) are established to ensure sufficient supply of maintenance parts for major regions.

Free installation and system verification services (including the QC reagents and consumables) are provided to turn your investment into production quickly.

MGI is responsible for any manufacturing defects or faults on the system within the warranty. Warranty covers labor, parts and travel charges.

One free instrument preventive maintenance provided with warranty, along with a variety of available extended warranty support plans.

DNBSEQ-G50	DNBSEQ-G400	DNBSEQ-T7
		
Compact and flexible sequencer with total solutions, recommended for small whole genome sequencing and targeted sequencing projects.	Stable and flexible sequencer, recommended for medium to large genome sequencing projects.	Fast and flexible ultra-high-throughput sequencer, recommended for large genome sequencing projects and population studies.

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