GeneMind

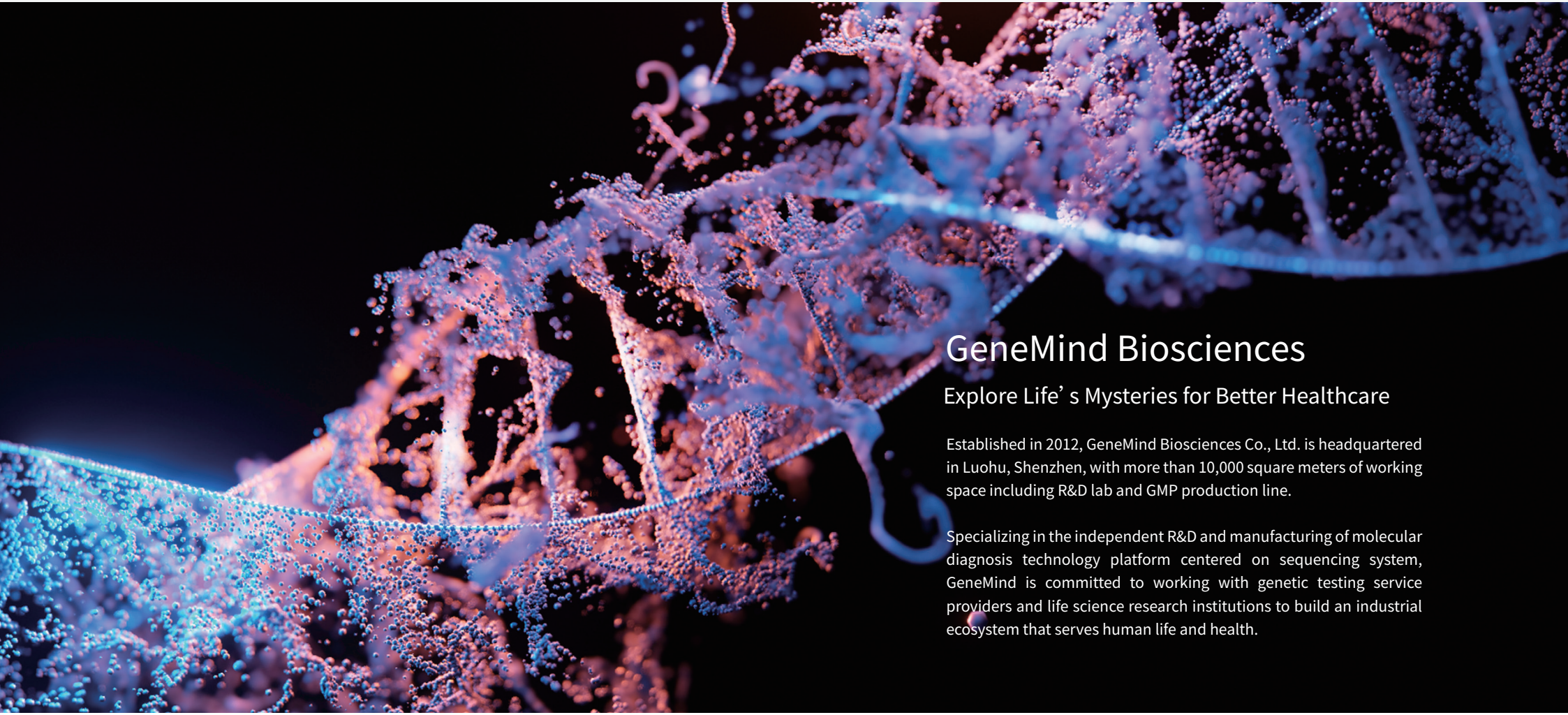
SURFSeq 5000*

High-throughput Sequencing Platform

Fast · Cost-effective · Efficient · Scalable

*Unless otherwise informed, GeneMind sequencing platform and related sequencing reagents are not available in the USA, Canada, Australia, Japan, Singapore, Western Europe, Southern Europe and Nordic countries yet.

Company Introduction



GeneMind Biosciences

Explore Life’ s Mysteries for Better Healthcare

Established in 2012, GeneMind Biosciences Co., Ltd. is headquartered in Luohu, Shenzhen, with more than 10,000 square meters of working space including R&D lab and GMP production line.

Specializing in the independent R&D and manufacturing of molecular diagnosis technology platform centered on sequencing system, GeneMind is committed to working with genetic testing service providers and life science research institutions to build an industrial ecosystem that serves human life and health.

Milestones

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SURFSeq 5000*: Key Functionalities

Wide range application

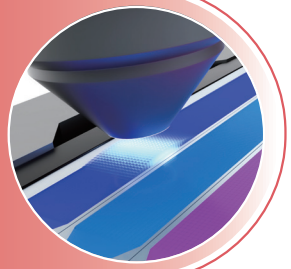
Dual flow cell to support 5 different modes/run

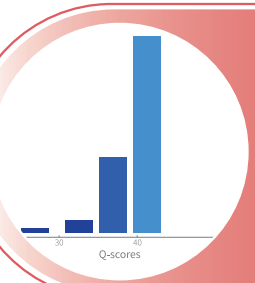
Compatible with most common used applications

Ulter-high sequencing speed

FCM PE150≤24h

Flexible FQ upload node, no need to wait for one flow cell finish the run





Good data quality

Balanced mode: Q30≥90%, Q40≥85%
Enhanced mode: Q30≥95%, Q40≥90%

Lower start-up cost

Wide range selection for sample volume in one run

Most cost-effictive for each sample

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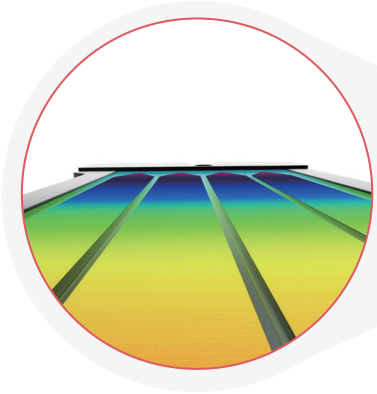
Product Innovation



Patterned array flow cells enable 2X higher density of signals

HyEND advanced surface amplification technology makes over 80% utilization rate of each flow cell

Supports real-time FastQ generation to allow customers to obtain data from different applications of the same sequencing run

SURFSeq 5000* Specification

Specification								
Flow cell	**Lane**	**Throughput (Reads/FC)**	**Type**	**Read Length**	**Data output[1] (FC×2)**	**Balance Mode**	**Enhanced Mode**	**TAT[2]**
FCM	4	500 M	100cycles	SE100	50 Gb × 2	Q30⩾90% Q40⩾85%	Q30⩾95% Q40⩾90%	12 hr
				PE50	50 Gb × 2			12 hr
			200cycles	PE100	100 Gb × 2			18 hr
			300cycles	PE150	150 Gb × 2			24 hr
FCH	4	2000 M	50cycles	SE50	100 Gb × 2			14 hr
			100cycles	SE100	200 Gb × 2			21 hr
				PE50	200 Gb × 2			21 hr
			200cycles	PE100	400 Gb × 2			34 hr
			300cycles	PE150	600 Gb × 2			47 hr

Main Features	
Two flow cell with 5 different sequencing modes	Individually addressable flow cell lanes with manual onboard independent lane loading
Support one or two flow cell in a time	User-friendly interface to easily switch read/index sequence
Obtain data in real-time at high-speed	Obtain data in batches based on different applications in one run
RFID recognize cartaidge information	Automatical post-run wash

1.The percentage of bases above Q30 and run time is the average of an internal standard library over the entire run. The actual performance is affected by factors such as sample type, library quality, and insert fragment length.
2.Run time was calculated based on dual flow cell mode, and includes sample loading, sequencing, base calling and data processing.

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SURFSeq 5000* application

Application	Read length	Data/sample	FCM*1	FCM*2	FCH*1	FCM*1+FCH*1	FCH*2
			500 M	1000 M	2000 M	2500 M	4000 M
WGS	PE150	100Gb/sample	1	2	6	7	12
Targeted panel (FFPE)	PE150	5Gb/sample	25	50	100	125	200
Targeted panel (ctDNA)	PE50	10Gb/sample	4	8	16	20	32
RNAseq	PE150	10Gb/sample	12	25	50	62	100
WES	PE150	10Gb/sample	12	25	50	62	100
Single cell	PE150	60Gb/sample	2	4	8	10	16

Note:Recommended date output and sample numbers are only for reference,actual application will require optimisation adjustments.

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Application summary

PE 150
30 runs data

Q 30 ⩾ 92%

Output reads ⩾ 2300 M

Multi-application comparison testing among different platforms(Competitor A and Competitor B)

WGS

WES

Panel

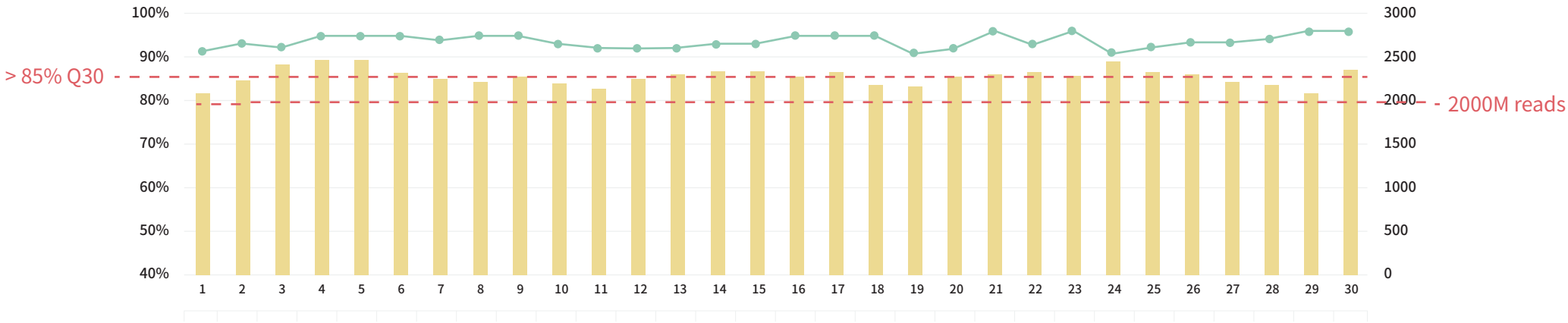
RNA

mNGS

WGBS

Summay reports

30 runs data quality statistic analysis(FCH PE150)			
Indicator	**Mean**	**SD**	**CV**
Output Reads	2300 M	150 M	10.2%
Q30	92.3%	3.0%	3.2%

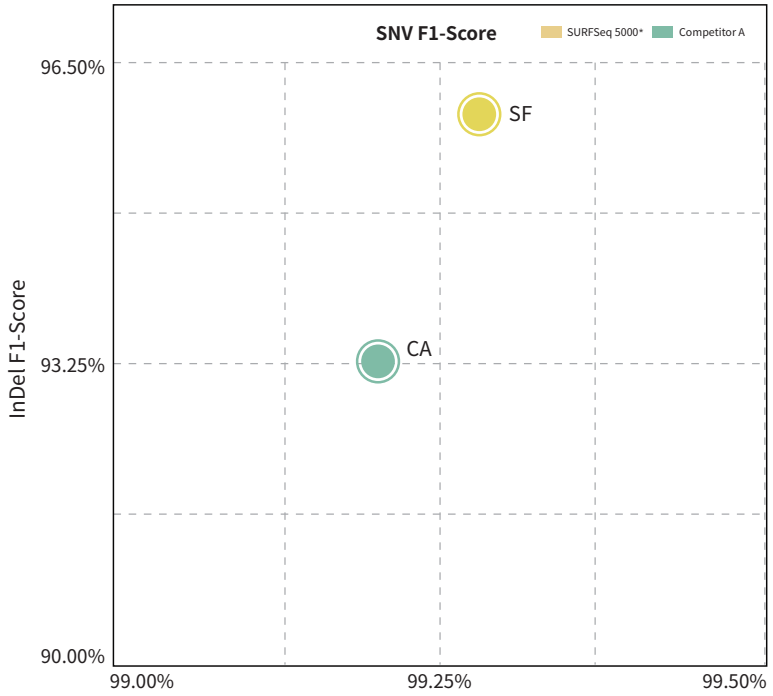


Application-WGS (Human)

- Sample type:Human standard library
- Library:5 WGS PCR-Free libraries
- Sequencing platform:SURFSeq 5000*(SF), Competitor A(CA)
- Read length:PE150
- Data analysis:100×effective reads/sample for deep analysis

	Sample ID	Raw Q30%	Mapping Ratio	Error Ratio
HG001	SF_1	93.8%	99.9%	0.18%
	CA_1	92.2%	99.6%	0.19%
HG002	SF_2	93.9%	99.9%	0.19%
	CA_2	92.8%	99.6%	0.19%
HG003	SF_3	93.6%	99.8%	0.17%
	CA_3	92.9%	99.5%	0.19%
HG004	SF_4	94.1%	99.6%	0.18%
	CA_4	92.6%	99.2%	0.19%
HG005	SF_5	93.7%	99.8%	0.18%
	CA_5	92.6%	99.5%	0.20%

Conclusion: High data quality of WGS samples ensures accurate SNV (>99%) /InDel calling (>95%).



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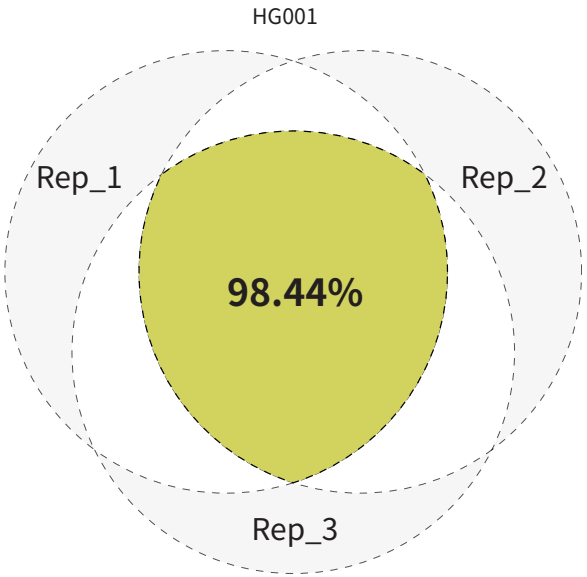
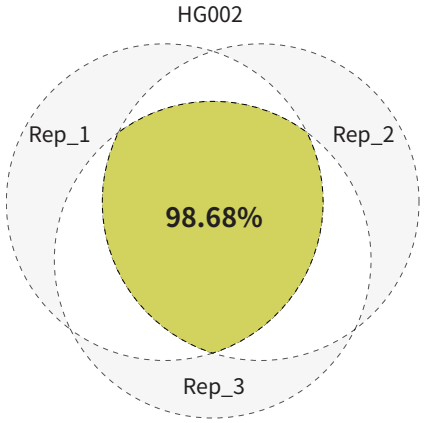
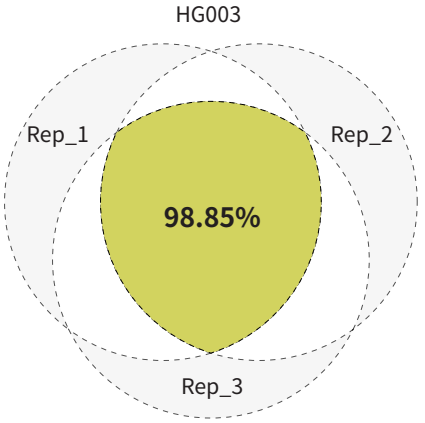
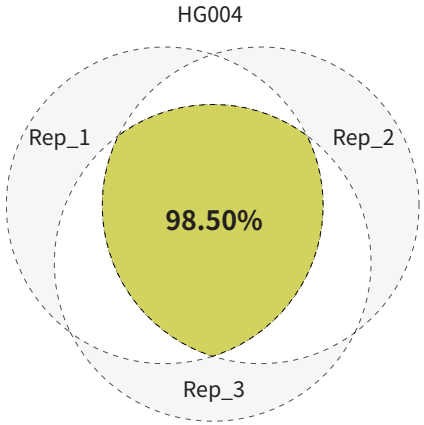
Application-WGS (Human)

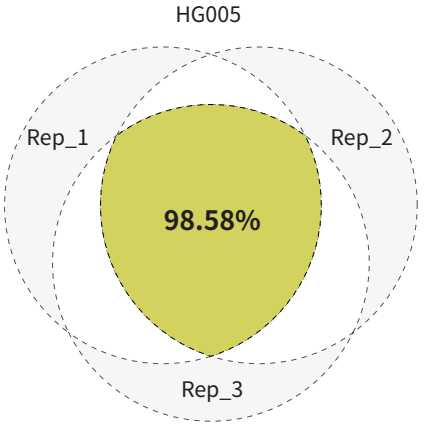
Conclusion:SNV/InDel detection in all samples showing a high consistency (>98%) in different batches.





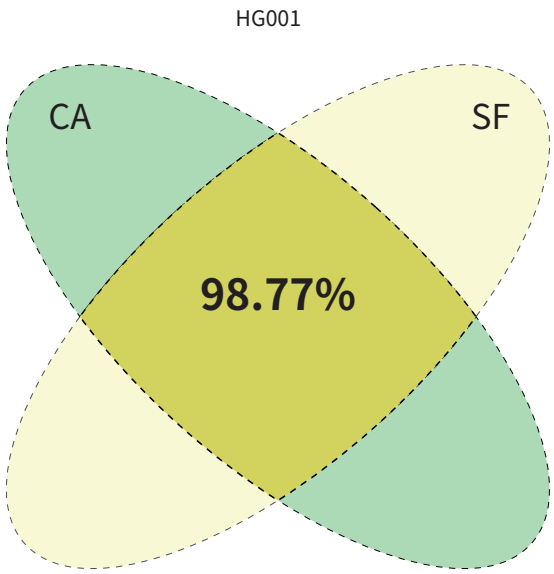


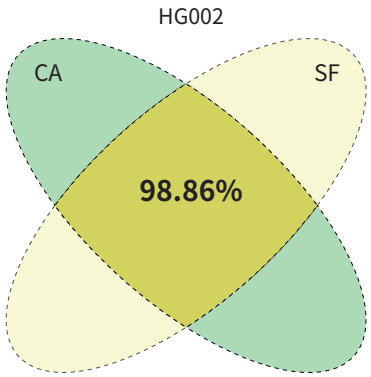


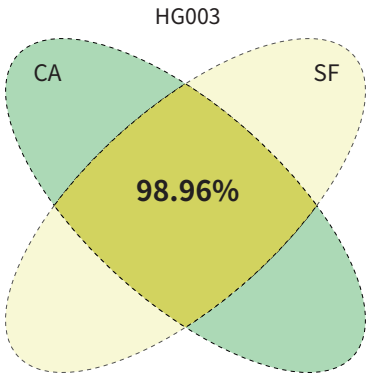


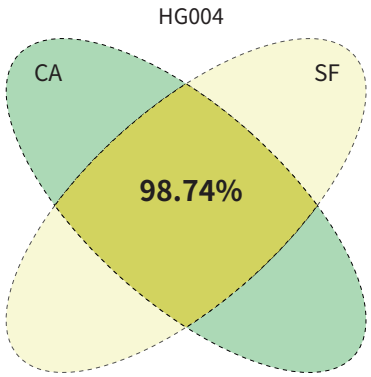
Application-WGS (Human)

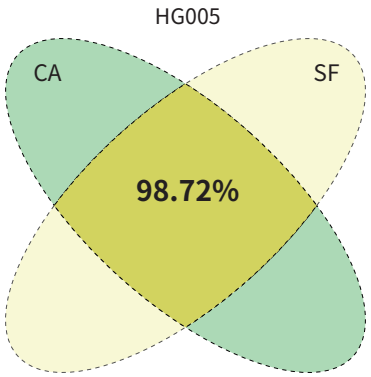
Conclusion: The SNV/InDel result is quite comparable between SF and CA platform (>98%).









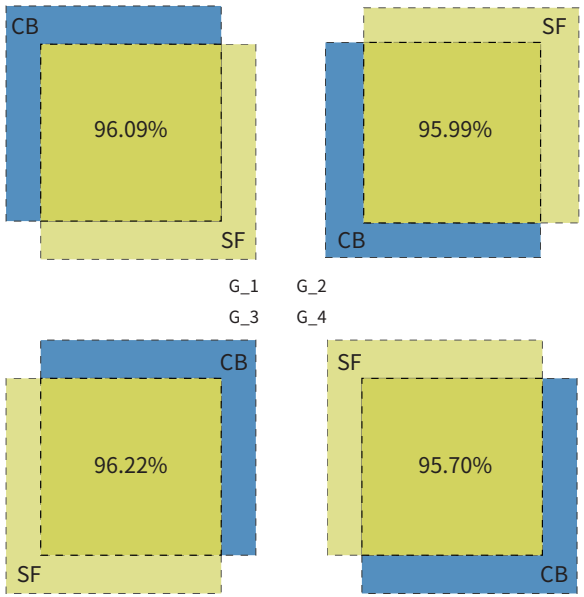


Application-WGS (Animal)

- Sample type:Four chicken WGS standard libraries
- Sequencing platform:SURFSeq 5000*(SF), Competitor B(CB)
- Read length:PE150
- Analysis:26Gb/sample for deep analysis

Sample ID	G_1		G_2		G_3		G_4	
Platform	SF	CB	SF	CB	SF	CB	SF	CB
Raw Q30	95.9%	91.9%	95.2%	91.0%	95.5%	90.3%	96.1%	90.8%
Mapping Ratio	99.7%	99.6%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%
Coverage ⩾1×	98.9%	99.3%	99.2%	99.2%	99.3%	99.3%	98.9%	98.9%
Mean Coverage	25.6X	25.8X	25.4X	25.8X	25.3X	25.8X	25.6X	25.8X
SNP	6624k	6683k	6802k	6874k	6625k	6703k	6746k	6839k
InDel	871k	881k	890k	905k	878k	893k	892k	908k

SNP and InDel results



Conclusion:Q30 is higher than Competitor B.As for the mapping rate, coverage, SNP and Indel detection results are quite comparable with competitors.

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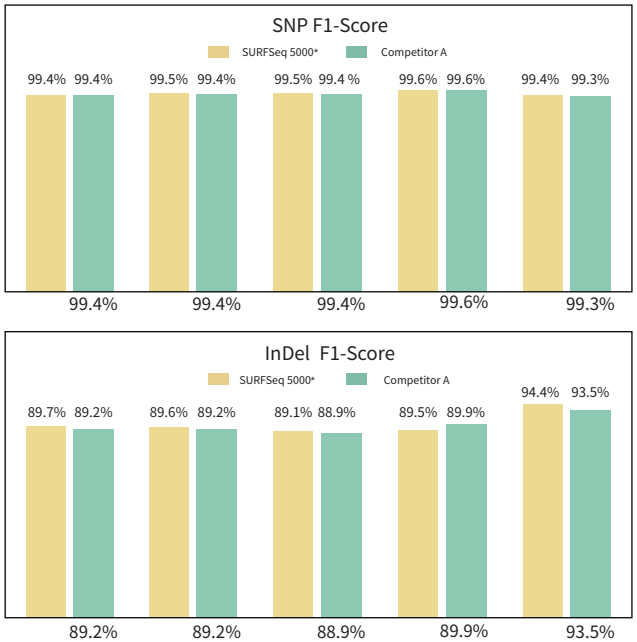
Application-WES

- Sample type:5 Human WES libraries
- Library prep:Agilent SureSelect Human All Exon V6
- Sequencing Platform:SURFSeq 5000*(SF), Competitor A(CA)
- Read length:PE150
- Analysis:100×effective reads/sample for deep analysis

Sample ID	HG001		HG002		HG003		HG004		HG005	
Platform	SF	CA	SF	CA	SF	CA	SF	CA	SF	CA
Raw Q30	90.9%	94.9%	91.3%	94.9%	90.8%	94.6%	91.4%	94.8%	90.9%	94.7%
Mapping Ratio	99.9%	99.8%	99.9%	99.8%	99.9%	99.8%	99.9%	99.8%	99.9%	99.8%
Coverage ⩾10×	99.0%	99.3%	99.2%	99.4%	98.6%	98.5%	99.0%	99.2%	98.2%	98.0%
Coverage ⩾30×	93.3%	93.6%	93.1%	92.7%	89.1%	87.2%	93.3%	92.9%	87.0%	85.4%



Conclusion:Q30 is a little bit lower than Competitor A.As for mapping rate, coverage, SNP and Indel detection results are quite comparable with competitors.

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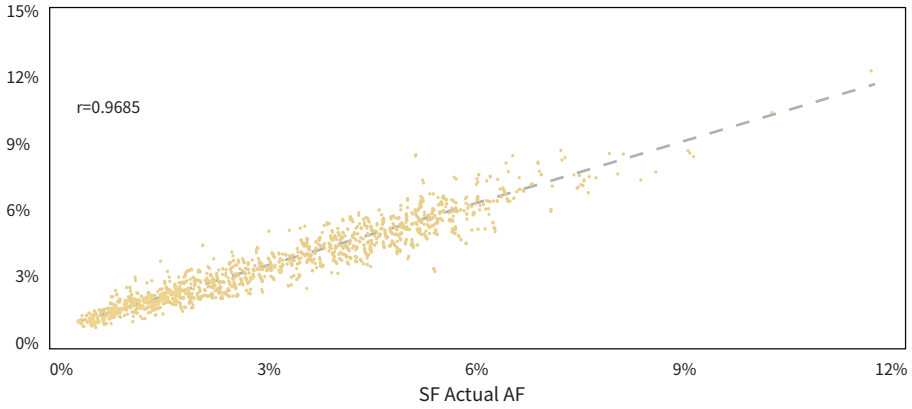
Application-Target commercial panel

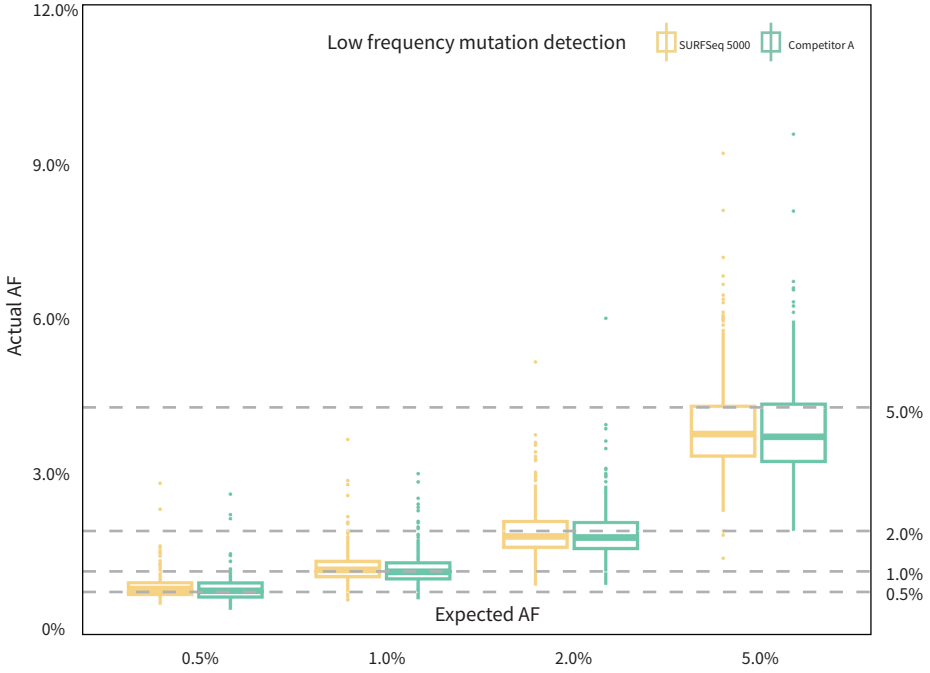
- Sample typr:Four Standard panels (0.5%,1.0%, 2.0%, 5.0%)
- Library prep:iGeneTech TargetSeq Pan-Cancer Panel and Twist cfDNA Pan-Cancer reference standard
- Sequencing platform:SURFSeq 5000*(SF), Competitor A(CA)
- Read length:PE150
- Analysis:20Gb/sample to do deep analysis

Conclusion:SURFSeq 5000* showing a quite comparable results with Competitor A in the low frequencing mutation detection.

Statictics result of variants calling

Variant_ Recall	SNV_Recall (227)				InDel_Recall (215)		
VAF	0.50%	1.00%	2.00%	5.00%	1.00%	2.00%	5.00%
SF	99.0%	99.6%	99.6%	99.6%	68.6%	88.5%	89.8%
CA	99.1%	99.6%	99.6%	99.6%	69.8%	86.1%	89.8%





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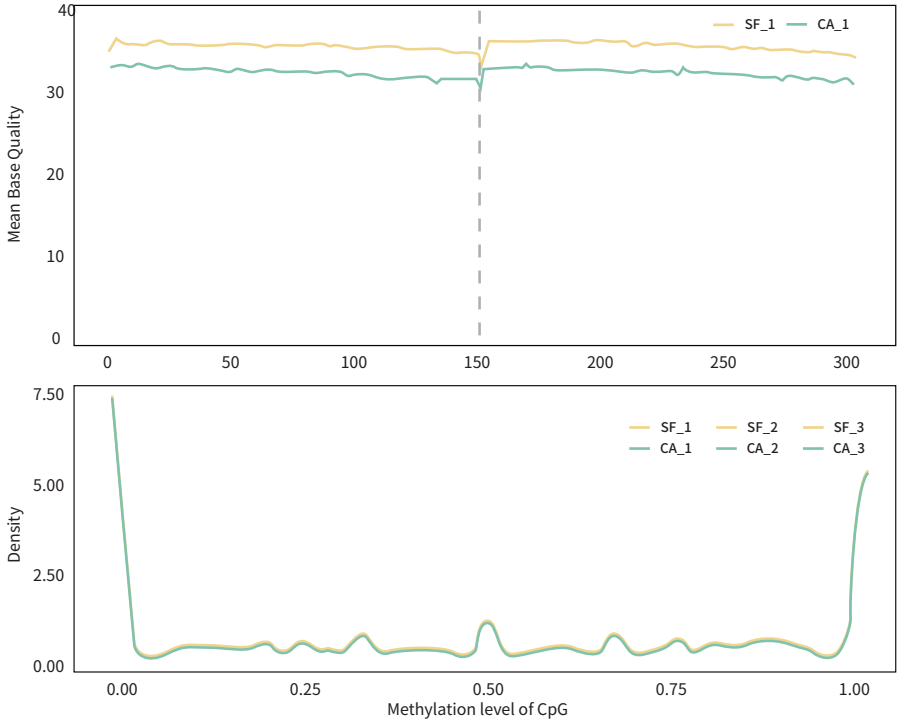
Application-WGBS

- Samlp type:GIAB HG001
- Library prep:WGBS library
- Sequencing platform:SURFSeq 5000* (SF), Competitor A(CA)
- Read length:PE150
- Data analysis:120Gb/sample for deep analysis

Conclusion:SURFSeq 5000* performs better than CA platform in Q30, mapping rate and duplication rate results. Methylation level analysis, SURFSeq 5000* showes excellent performance on intra-platform repeatability and consistency.

summary peport						
Platform	SF (0% Balance Library)			CA (Pooling with WES)		
Sample ID	SF_1	SF_2	SF_3	CA_1	CA_2	CA_3
Raw_Q30	93.81%	94.17%	93.01%	88.23%	91.18%	90.22%
Mapping Ratio	80.04%	81.53%	81.25%	78.10%	78.88%	75.68%
Duplication Ratio	15.20%	19.40%	20.00%	21.50%	21.80%	19.60%



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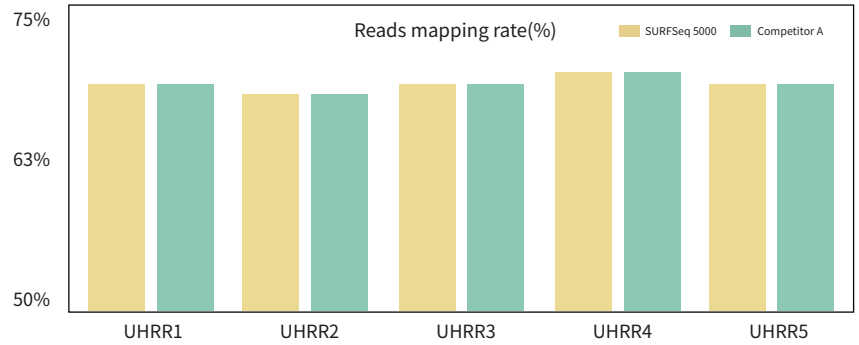
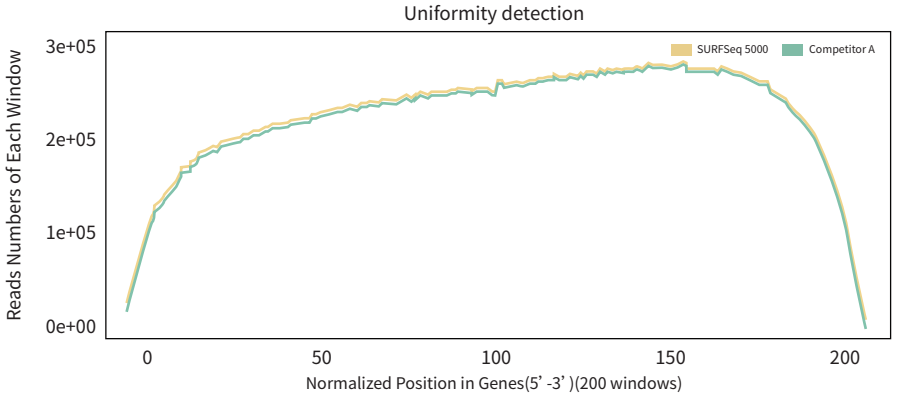
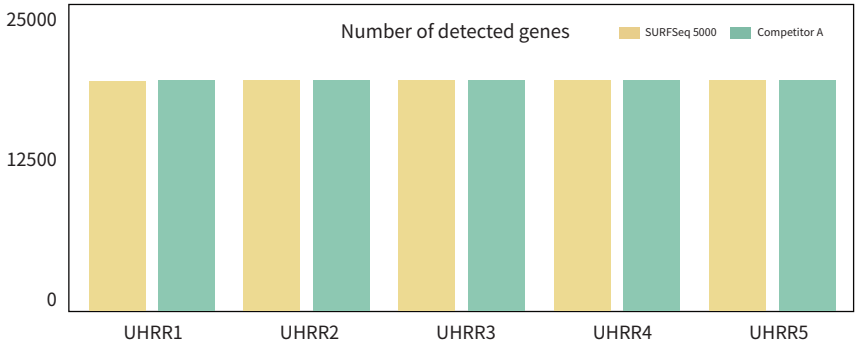
Application-RNAseq

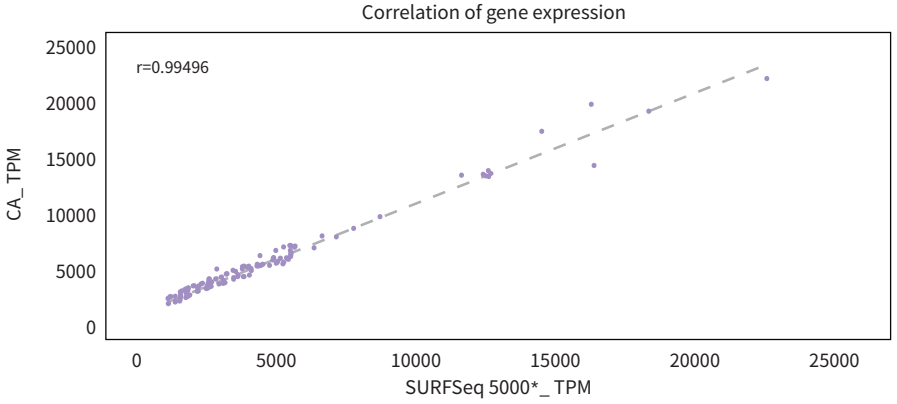
- Sample type:5 UHRR (Universal Human Reference RNA) standard libraries
- Sequencing platform:SURFSeq 5000* (SF), Competitor A(CA)
- Read length:PE150
- Data analysis:12Gb/sample for deep analysis

Conclusion: Mapping reads，detected gene numbers and the uniformity of transcription coverage are similar in two platforms. The correlation of gene expression reaches to 0.99，showing a high consistency.









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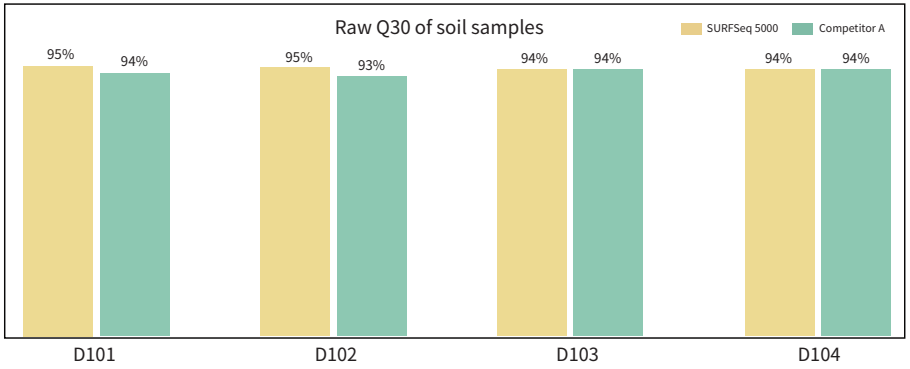
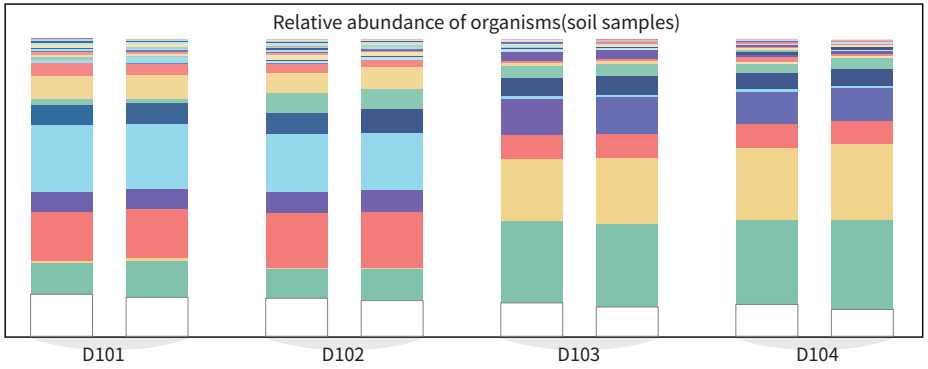
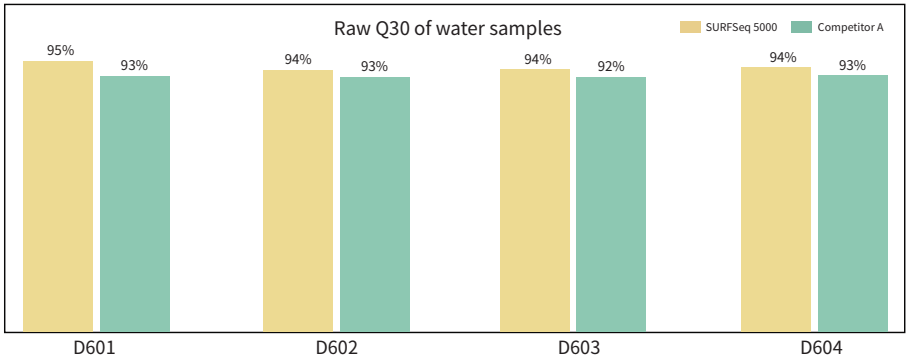
Application-mNGS

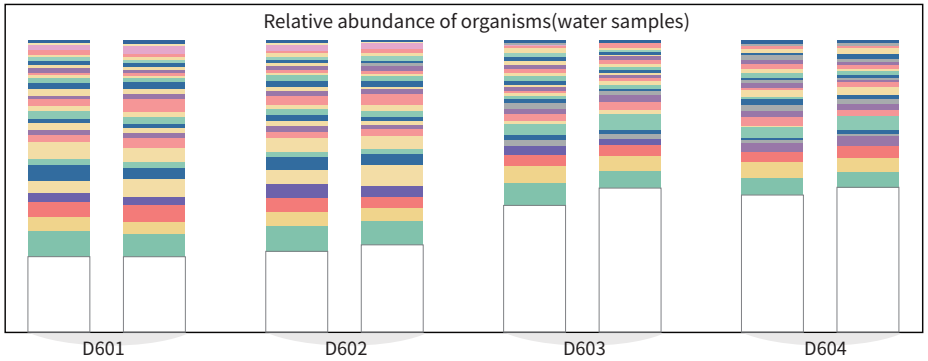
- Sample type:Soil，water
- Library:8 mNGS libaries
- Sequencing platform:SURFSeq 5000*(SF), Competitor A(CA)
- Read length: PE150
- Data analysis:10Gb/sample for deep anaysis

Conclusion: SURFSeq 5000* results are comparable to CA platforms, showing a quite good data performance.









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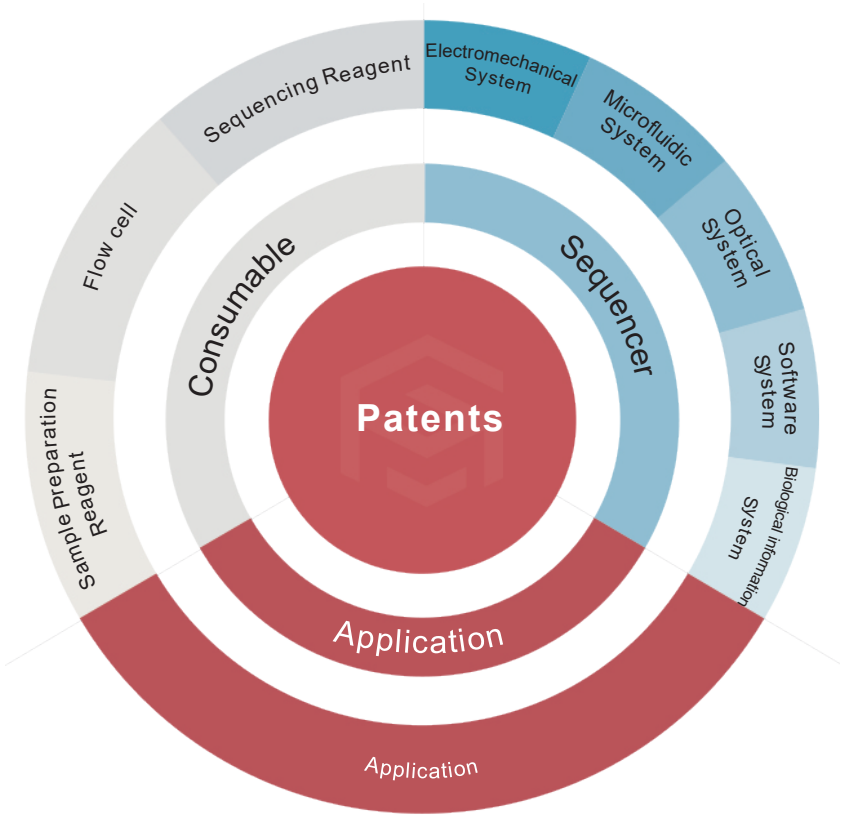
Intellectual Property & Qualifications



Sequencing systems are multidisciplinary specialities that combine optics, fluids, algorithms, chemistry and molecular biology. Since its establishment, GeneMind has been specializing in the independent R&D and manufacturing of molecular diagnosis technology platform centered on sequencing system. We have continuously innovated and accumulated a lot of intellectual property rights in the underlying technologies such as instrument hardware, reagent, flowcell and software algorithms.

As of October 2023, GeneMind has more than 300 granted domestic and foreign patents, and has successfully obtained ISO 13485 medical device quality management system certification. The sequencer, reagent kits and other products have also received CE certification, NMPA medical device approval.

300+

Patents granted

ISO 13485:2016

Quality Management System Certification

34

NMPA approval/ CE IVD registration

10+

Academic papers

Independent Research & Development

In addition to the innovative breakthroughs in sequencer development, GeneMind has also realized the independent R&D and production of core materials such as enzymes, nucleotide analogues, fluorochrome and flowcell. The company has the ability to develop and manufacture the total solution of "instrument-reagent-flow cell-software" independently, and are able to provide customers total solution with good quality, low cost and short delivery time.

The total area of R&D and production in use is nearly 10,000 square meters, with sequencer production factory, GMP reagent kit production line, flow cell laboratory, organic synthesis laboratory and enzyme engineering laboratory. The designed annual capacity of sequencer is 1000 units and the annual capacity of kits is 2.4 million tests.

- Sequencer Production Line
  Designed with annual production capacity of 1000 sequencers

- Flow cell Lab
  In-house production of sequencing flowcell

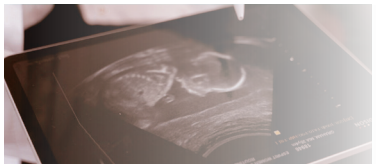
- Organic Synthesis Lab
  Able to synthesize our own nucleic acid and fluorochrome

- Reagent Kits Production Line
  Designed as a GMP workshop to produce kits for 2.4 million tests annually

- Enzyme Engineering Lab
  Independent research and development of core enzyme

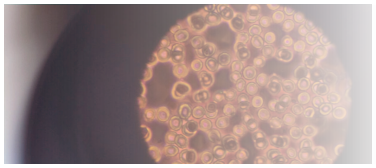
Applications

- Reproductive Health



- Genetic & Rare Diseases

- Pathogen Detection



- Oncology

- Animal Genomics

- Agrigenomics

Product Information

Product Type	Product Nme	Product Code
Sequencer	SURFSeq 5000 Sequencing System Set*	SQ00023
Reagent	SURFSeq 5000 Sequencing Kit V1.0（FCM 100cycles）*	S000236
	SURFSeq 5000 Sequencing Kit V1.0（FCM 200cycles）*	S000237
	SURFSeq 5000 Sequencing Kit V1.0（FCM 300cycles）*	S000238
	SURFSeq 5000 Sequencing Kit V1.0（FCH 50cycles）*	S000239
	SURFSeq 5000 Sequencing Kit V1.0（FCH 100cycles）*	S000240
	SURFSeq 5000 Sequencing Kit V1.0（FCH 200cycles）*	S000241
	SURFSeq 5000 Sequencing Kit V1.0（FCH 300cycles）*	S000242

Specification	
Dimensions	1090 mm×690 mm×810 mm
Weight	240 kg
Power	2000 VA
Power requirement	100 -240 V ~，50/60 Hz
Operating environment	Temperature：19 °C-25 °C Humidity：20%-80% relative humidity (no-condensing) Altitude：below 3000 meter
Computer	CPU：Intel Xeon Gold 6342 Memory：256 GB Hard Drive 1：2 TB SSD Hard Drive 2：17 TB HDD System：Windows10 x64

For Research Use Only

*Unless otherwise informed, GeneMind sequencing platform and related sequencing reagents are not available in the USA, Canada, Australia, Japan, Singapore, Western Europe, Southern Europe and Nordic countries yet.

GeneMind

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