MGIEasy Fast PCR-FREE FS Library Prep Set

■ Introduction

The MGIEasy Fast PCR-FREE FS Library Prep Set is specifically designed for WGS library construction for MGI high-throughput sequencing platforms. This library prep set is optimized to convert between 50 ng to 300 ng genomic DNA into a customized library and uses high-quality fast fragmentase to simplify the preparation process and significantly shorten the duration of DNA library construction. This library prep set is applicable for long amplicon DNA and genomic DNA extracted from saliva, oral swab and blood, recommended for preparing low pass WGS sequencing library.

The MGIEasy Fast PCR-FREE FS Library Prep Set adapts to automatic library preparation system MGISP-960 and MGISP-100 and can complete 96 libraries preparation in 1.5 hours at the fastest on MGISP-960. This library prep set provides up to 384 selected barcodes that enable flexible throughput options for 8~384 samples multiplexing. And it supports equal volume pooling of libraries from the same sample type and input amount, eliminating the need for time-consuming library quantitation and normalization steps before pooling.

■ Highlights

◆ **Fast library prep workflow**
Combine the DNA fragmentation, end-repair and add A into one step and reduce the library preparation time to 1.5 hours at the fastest.

◆ **Flexible Throughput Options**
384 selected barcodes enable flexible throughput for 8~384 samples multiplexing.

◆ **Easy to use**
Support equal volume pooling of libraries from the same sample type and input amount, eliminating the need for time-consuming library quantitation and normalization steps before pooling.

◆ **Efficient automatable workflow**
Adapt to MGISP-100 and MGISP-960

Specification

Version	V1.0
Assay Time	1.5~1.8 hours
Hands-On Time	~20 min
Barcode	~384 barcodes
Input Quantity	50 ng ~ 300 ng gDNA
Insert size	200 bp - 600 bp
Sample types	gDNA from blood, saliva, oral swab samples, long amplicon DNA
Species Compatibility	Human, virus long amplicons
Applications	Low pass WGS, virus long amplicons sequencing
Platform Compatibility	DNBSEQ-G400*、DNBSEQ-G50*、DNBSEQ-T7*
Recommended Read Length	PE100/PE150
Adaptation automation platform	MGISP-100 (16RXN) , MGISP-960 (96RXN、384RXN)

■ Product performance

Fast and Flexible workflow

MGIEasy Fast PCR-FREE FS Library Prep Set uses high-quality fast fragmentase to combine the fragmentation, end-repair and add A into one step, and significantly shorten the library preparation time into 1.5 hours at the fastest (from gDNA to ligation library).

Table 1 The library preparation process of the MGIEasy Fast PCR-FREE FS DNA Library Prep Set

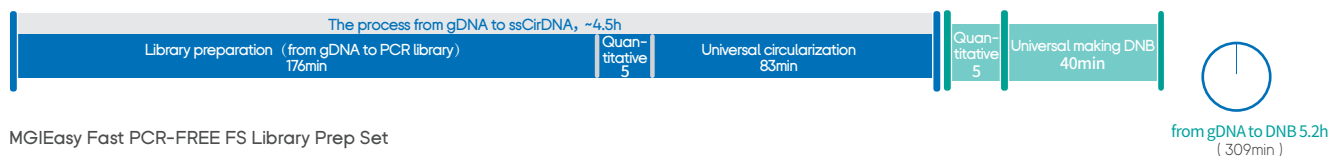| The preparation process	Library preparation（from gDNA to PCR library）< 1.5~1.8h				
	DNA Fragmentation & End-repair and A-tailing	Purification	Adapter ligation	Purification	Purification*
time (min)	28.5	15	10	25	25

* Using the MGI one-step DNB kit, need to add a magnetic purification

Adapt to two circularization sequencing methods

The prepared library adapts to two circularization methods, MGI universal circularization or MGI one-step DNB. MGI universal circularization method: the cyclization of the prepared library by using the MGI circularization kit (MGI Cat No.1000020570) to obtain single-stranded circular DNA (ssCirDNA). The process from gDNA to ssCirDNA takes only 2.5 hours.

MGI one-step DNB method: using the MGI one-step DNB kit (MGI Cat No.1000026466) to complete the library cyclization and DNB making in one step to obtain DNB directly, which simplifies the preparation process from the library to DNB and shortens the DNB preparation time. The whole process from gDNA to DNB can be shortened to less than 3 hours by using MGIEasy Fast PCR-FREE FS Library Prep Set combined with the MGI one-step DNB kit.

MGIEasy FS PCR-Free DNA Library Prep Set

The process from gDNA to ssCirDNA，~4.5h

| Library preparation（from gDNA to PCR library）176min | Quan-titative 5 | Universal circularization 83min | Quan-titative 5 | Universal making DNB 40min |

from gDNA to DNB 5.2h
（309min）

MGIEasy Fast PCR-FREE FS Library Prep Set
The cyclization of the prepared library by using the MGI circularization kit (MGI Cat No.1000020570)

Library preparation < 1.5h

| Library preparation（from gDNA to PCR library）78.5min | Quan-titative 5 | Universal circularization 63min | Quan-titative 5 | Universal making DNB 40min |

from gDNA to DNB 3.2h
（191.5min）

MGIEasy Fast PCR-FREE FS Library Prep Set
Using the MGI one-step DNB kit (MGI Cat No.1000026466) to complete the library cyclization

Library preparation < 1.8h

| Library preparation（from gDNA to PCR library）78.5min | Purification* 25min | Quan-titative 5 | MGI one-step DNB 45min |

from gDNA to DNB 2.6 h
（153.5min）

* Using the MGI one-step DNB kit，need to add a purification

Figure 1 The whole process from gDNA to DNB under different library preparation methods and circularization methods

Calculations made assuming 4 samples were processed at a time by manual. The MGIEasy Fast PCR-FREE FS Library Prep Set adapts to two circularization methods: 1) MGI universal circularization method, it takes 2.5 hours to complete the process from gDNA to ssCirDNA. Adding universal making DNB step, the whole process from gDNA to DNB is in 3.2 hours. 2) MGI one-step DNB method, it only takes 2.6 hours to complete the process from gDNA to DNB. The universal making DNB step: using the make DNB reagent in the MGI sequencing reagent set to make DNB.
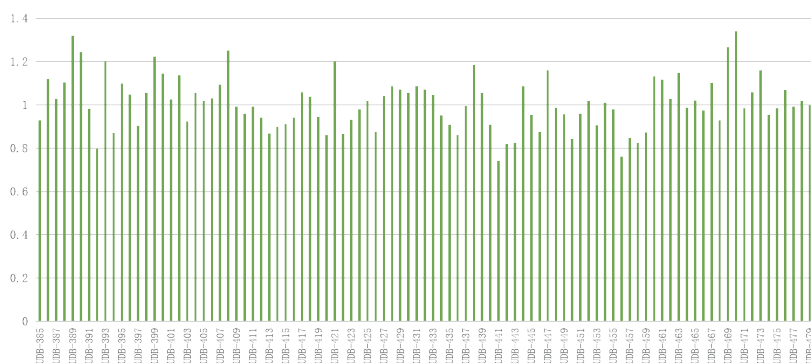
Flexible throughput for 8 ~ 384 samples multiplexing

The MGIEasy Fast PCR-FREE FS Library Prep Set series provide up to 384 selected unique barcodes that enable accurate assignment of reads and efficient use of the flow cell, and support flexible throughput for 8~384 samples multiplexing. The 384 barcodes are provided in the form of 96-plate Set A, B, C and D.

Support equal volume pooling of libraries from the same sample type and input amount

The MGIEasy Fast PCR-FREE FS Library Prep Set delivers consistent library yields under the same DNA input amount, which supports equal volume pooling of libraries from the same sample type and input amount, eliminating the need for time-consuming library quantitation and normalization steps before pooling. The 384 selected barcodes lead to the uniformity of barcode splitting ratio to enable equal volume pooling of libraries from the same sample type and input amount.

Libraries produced with 88 saliva gDNA and 8 NA12878 of the same starting amount using the MGIEasy Fast PCR-FREE FS Library Prep Set and pooled the 96 libraries with equal volume for making DNB and sequencing. The sequencing result showed the good uniformity of the reads percentage of these libraries and the coefficient of variance (CV) was 12.02%. The barcode split rate reached 97.06%.
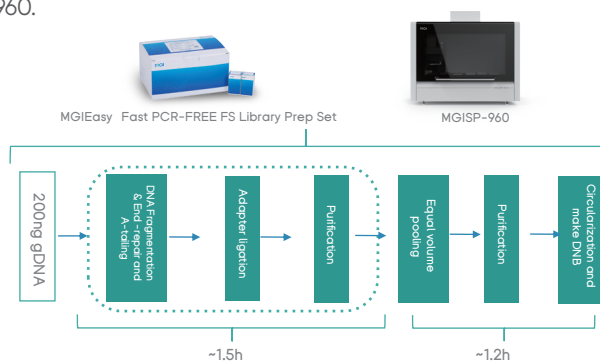

Figure 2 The reads percentage of the different libraries which pooled with equal volume for sequencing

Libraries were prepared from 200ng saliva gDNA and NA12878 using the MGIEasy Fast PCR-FREE FS Library Prep Set combined with the MGI one-step DNB kit (MGI Cat No.1000026466) on MGISP-960 and sequenced on DNBSEQ-T7* at PE100 for 1x low pass WGS.

Efficient automatable workflow

The MGIEasy Fast PCR-FREE FS Library Prep Set adapts to automatic library preparation system MGISP-960 and MGISP-100 and can complete 96 libraries preparation in 1.5 hours at the fastest on MGISP-960.

For the samples of the same sample type and input amount, the whole process from gDNA to DNB for 96 samples can be shortened to less than 3 hours by using the Fast PCR-FREE for library construction combined with equal volume pooling and one-step DNB on MGISP-960.

Figure 3 The whole process from gDNA to DNB for 96 samples can be shortened to less than 3 hours at the fastest on MGISP-960.
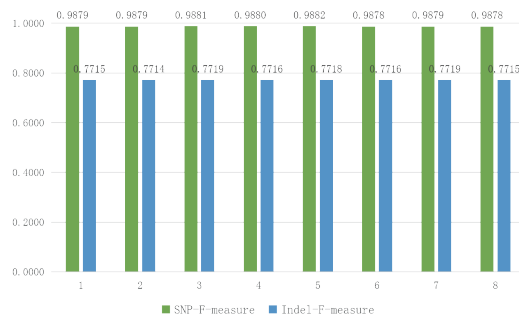
Adapt to low pass WGS application for multiple sample types

Libraries were prepared from blood, saliva, oral swab samples and NA12878 (as control) using the MGIEasy Fast PCR-FREE FS Library Prep Set on MGISP-960 for 1x low pass WGS. The sequencing result showed that the coverage of different samples was more than 60% (Figure 4). The variation detection results of the NA12878 sequencing data showed that the SNP F-measure >0.98, the Indel F-measure >0.7. And the performance of the MGIEasy Fast PCR-FREE FS Library Prep Set is consistent with that of the MGIEasy FS PCR-free DNA Library Prep Set (Fig. 5).

Figure 4 Genomic coverage of different sample types under average 1x sequencing depth

1, 2 Libraries prepared using MGIEasy FS PCR-free DNA Library Prep Set
3-8 Libraries prepared using MGIEasy Fast PCR-FREE FS Library Prep Set

Figure 5 Comparison of the variation detection performance of the MGIEasy Fast PCR-FREE FS Library Prep Set and the MGIEasy FS PCR-free DNA Library Prep Set

Libraries were prepared from blood, saliva, oral swab samples and NA12878 (as control) with 200ng input amount using the MGIEasy Fast PCR-FREE FS Library Prep Set combined with the MGI one-step DNB kit (MGI Cat No.1000026466) on MGISP-960. Sequencing performed on DNBSEQ-T7* at PE150 for 1x low pass WGS.

Libraries were prepared from 200ng NA12878 using the MGIEasy Fast PCR-FREE FS Library Prep Set combined with the MGI one-step DNB kit (MGI Cat No.1000026466) and on MGISP-960. For comparison, libraries were also prepared using the MGIEasy FS PCR-free DNA Library Prep Set on MGISP-960. Sequencing performed on DNBSEQ-T7* at PE150 for 1x low pass WGS.

■ Summary

MGIEasy Fast PCR-FREE FS Library Prep Set V1.0 provides the fast, flexible and automatable library preparation workflow that enables to complete 96 libraries preparation in 1.5 hours at the fastest on MGISP-960 and can support flexible throughput for 8~384 samples multiplexing. It is easy to use and supports equal volume pooling of libraries from the same sample type and input amount, especially suitable for large-scale library preparation. This product performs well in low-pass WGS and is suitable for large-scale low-pass WGS application of blood, saliva, oral swabs samples.

■ Ordering Information

Product	Configuration	Cat No.
MGIEasy Fast PCR-Free FS Library Prep Set	16 RXN	940-000019-00
	96 RXN	940-000021-00
	384 RXN	940-000026-00

■ Contact Us

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