MiSeqDx™ Cystic Fibrosis System*

Bringing the power of next-generation sequencing to cystic fibrosis testing.

Key Design Elements

- Complete coding regions of the CFTR gene sequenced, including intron/exon boundaries
- Illumina sequencing by synthesis (SBS) chemistry forms the assay foundation
- Single platform for performing both carrier screening and full gene sequencing assays
- Integrated data interpretation and visualization done by the MiSeq Reporter software

System Overview

The MiSeqDx Cystic Fibrosis System consists of the MiSeqDx next-generation sequencing instrument, two assays for cystic fibrosis, and software packages that enable sample tracking, user traceability, and results interpretation. Designed specifically for the clinical laboratory environment, the MiSeqDx system offers a small, approximately two feet square footprint, an easy to follow workflow, and data output tailored to the needs of clinical labs. MiSeqDx is based on the MiSeq® sequencing platform, which has been widely adopted in the research community, and uses proven Illumina SBS chemistry.

Assays in Development

Two assays for cystic fibrosis (CF) testing are in development for use on the MiSeqDx platform:

- **The MiSeqDx Cystic Fibrosis Diagnostic Assay** is designed for simultaneous detection of all mutations and variants within the cystic fibrosis transmembrane conductance regulator (*CFTR*) gene. The test is intended to be used as an aid in the diagnosis of individuals with suspected CF or congenital bilateral absence of vas deferens (CBAVD). Results of this test are intended to be interpreted by a certified clinical molecular geneticist or equivalent.
- **The MiSeqDx Cystic Fibrosis Carrier Screening Assay** is designed for simultaneous detection of clinically relevant variants within the *CFTR* gene, including those currently recommended for carrier screening purposes by the American College of Medical Genetics (ACMG) and the American College of Obstetricians and Gynecologists (ACOG). The test is intended to be used in general population screening to determine CF carrier status, as an aid in newborn screening for CF, and as an initial genetic test to aid in the diagnosis of individuals with suspected CF or CBAVD.

Three-Step Workflow

The MiSeqDx Cystic Fibrosis System workflow starts with genomic DNA (gDNA) extracted from human peripheral whole blood specimens. gDNA samples are then prepared for sequencing through the addition of primers, generating indexed libraries for simultaneous capture and amplification of hundreds of targeted regions in multiple samples. The libraries are added to a MiSeqDx flow cell, which is loaded into the MiSeqDx instrument for sequencing.

To ensure proper system use, the MiSeqDx instrument is equipped with Illumina User Management Software and MiSeq Operating Software. Illumina User Management Software enables laboratories to control and trace system access, ensuring that only authorized personnel are running tests. MiSeq Operating Software controls the MiSeqDx instrument, automating the sequencing process and minimizing user hands-on time.

Sequencing Technology Overview

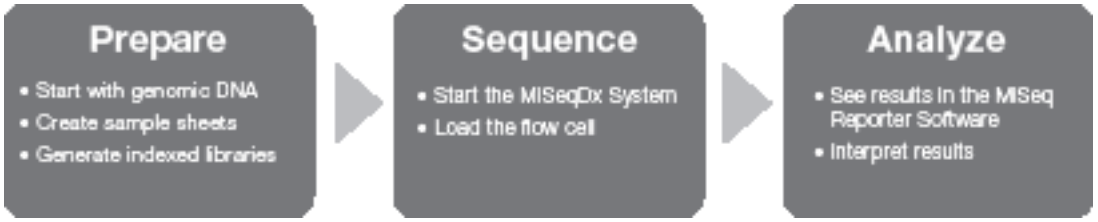
The MiSeqDx system uses proven Illumina SBS technology in which massively parallel sequencing of millions of DNA fragments occurs by a proprietary reversible terminator–based method that detects single bases as they are incorporated into growing DNA strands. A fluorescently labeled terminator is imaged as each dNTP is added and then cleaved to allow incorporation of the next base. Since all four reversible terminator–bound dNTPs are present during each sequencing cycle, natural competition minimizes incorporation bias. Base calls are made directly from signal intensity measurements during each cycle. To learn more about SBS chemistry, visit www.illumina.com.

Figure 1: MiSeqDx Platform

The MiSeqDx Cystic Fibrosis Diagnostic and Carrier Screening Assays run on the MiSeqDx platform.

* This product is for investigational use only. Performance characteristics have not been established.

Figure 2: Three-Step MiSeqDx Assay Workflow



Three basic steps are necessary to perform an assay on the MiSeqDx platform.

Integrated Reporter Software

The MiSeq Reporter Software presents data in an easy-to-access fashion. For the MiSeqDx Cystic Fibrosis Carrier Screening Assay, users can view sequencing results against a pre-determined panel of clinically relevant *CFTR* mutations. When performing the MiSeqDx Cystic Fibrosis Diagnostic Assay, users will see all variants found within the *CFTR* gene. The software will provide relevant information, such as HGVS nomenclature, to assist a certified medical geneticist with interpretation.

Learn More

Learn more about the MiSeqDx Cystic Fibrosis System at www.illumina.com/cysticfibrosis.

MiSeqDx System Specifications

Instrument Configuration
RFID tracking for consumables
MiSeq Operating Software
MiSeq Reporter Software
Instrument Control Computer (Internal)†
Base Unit: Intel Core i7-2710QE 2.10 GHz CPU
Memory: 16 GB RAM
Hard Drive: 750 GB
Operating System: Windows 7 embedded standard
† Computer specifications are subject to change.
Light Emitting Diode (LED)
530 nm, 660 nm
Dimensions
W×D×H: 68.6 cm × 56.5 cm × 52.3 cm (27.0 in × 22.2 in × 20.6 in)
Weight: 54.5 kg (120 lbs)
Crated Weight: 90.9 kg (200 lbs)
Power Requirements
100–240V AC @ 50/60Hz, 10A, 400W
Radio Frequency Identifier (RFID)
Frequency: 13.56 MHz
Power: 100 mW

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