Genomics Services

ABSTRACT

The Genomics and Epigenomics Core Facility of the WCM Core Laboratories Center (CCLC) provides state-of-the-art instruments and services, and expertise in their applications, to the Weill Cornell Medicine (WCM) community and to outside investigators. Resources and services include next-generation sequencing, epigenomic assays, single cell genomics, nucleic acid mass spectrometry, and real-time PCR. The facility provides consultation on project design and data analysis, and offers seminars, educational workshops and training.

OVERVIEW

History: The WCM CCLC Genomics and Epigenomics Core Facility was established in the fall of 2009 to the program of integration of two previously separate core facilities, the Genomics Resource Core Facility (GRCF) and the Genomics Core Facility (GCF) established in 2001. Location: The core is located in the ’A’ and ’B’ floors of the ’W’ building and the ’P’ at the ’W’ building at 1300 York Avenue, New York, NY. WCM Core Laboratories Center (CCLC): The WCM CCLC was established in 2007 in addition to genomics and epigenomics, the CCLC includes core facilities that offer resources and services in proteomics and metabolomics, synthetic and analytical chemistry, cell biology, imaging technologies, information services, and advanced technology environments.

Next Generation Sequencing: The core facility has 3 Illumina instruments, including HiSeq 2500/4000, NextSeq 500/550, and MiSeq. These platforms are ideal for targeted sequencing, targeted exome and RNAseq, transcriptome sequencing, and small RNA sequencing. The HiSeq 2500 currently runs HiSeq HiSequenx (HiSeq 2500/4000) and NextSeq 500. HiSeq HiSequenx is designed for running all Illumina platforms, including HiSeq, MiSeq, and NextSeq. NextSeq 500 provides comprehensive sequencing and genotyping assays, enabling researchers to perform large-scale studies with high accuracy and efficiency. MiSeq is designed for targeted sequencing, targeted exome, transcriptome, and small RNA sequencing.

Sample Preparation: Sample preparation for next-generation sequencing includes DNA purification and preparation, RNA purification, and cDNA synthesis. DNA purification and preparation include DNA extraction, DNA quantification, and DNA quality assessment. RNA purification includes RNA extraction, RNA quantification, and RNA quality assessment. cDNA synthesis includes cDNA synthesis, cDNA quantification, and cDNA quality assessment.

Sample Preparation

Illumina MiSeq

Next Generation Sequencing

Illumina HiSeq 2500

Applications include:

- Whole genome sequencing
- Targeted exome sequencing
- RNAseq
- Amplicon-seq
- Custom applications

Next Generation Sequencing

Illumina NextSeq 500

Applications include:

- Long reads
- Single cell genomics
- Cost-effective sequencing
- Single cell transcriptome
- Single-cell protein expression

Long Reads & Single Cell Genomics

10X Genomics Chromium

Applications include:

- Single cell genomics
- Single cell transcriptome
- Single cell protein expression
- Single cell epigenomics

Sample preparation services are available for all platforms, including Illumina, 10X Genomics, and PacBio. These services include DNA extraction, DNA quantification, DNA quality assessment, RNA extraction, RNA quantification, RNA quality assessment, cDNA synthesis, cDNA quantification, cDNA quality assessment, and library construction. The core facility provides comprehensive sequencing and genotyping assays, enabling researchers to perform large-scale studies with high accuracy and efficiency. MiSeq is designed for targeted sequencing, targeted exome, transcriptome, and small RNA sequencing.

Library Construction

Real-time PCR

Applications include:

- qPCR
- gene-expression
- genotyping
- single-cell RNAseq
- SNP genotyping
- epigenetic analysis
- metabolomics

Next Generation Sequencing

Sanger Sequencing and Fragment Analysis

Applications include:

- Sanger sequencing
- Fragment analysis
- Next-generation sequencing
- High-throughput sequencing

Sample Preparation

Genomics Services

Nucleic Acid Mass Spectrometry

MassArray

Applications include:

- SNP genotyping
- Single nucleotide polymorphisms
- Genetic variations
- Single cell analysis
- Gene expression
- Metabolomics

Consultation, Workshops and Training

Consultations on project design and data analysis available upon request. Resources and tools and training available through the CCLC and Genomics Core Facility.

Bar-Coding

Sample preparation services are available for all platforms, including Illumina, 10X Genomics, and PacBio. These services include DNA extraction, DNA quantification, DNA quality assessment, RNA extraction, RNA quantification, RNA quality assessment, cDNA synthesis, cDNA quantification, cDNA quality assessment, and library construction. The core facility provides comprehensive sequencing and genotyping assays, enabling researchers to perform large-scale studies with high accuracy and efficiency. MiSeq is designed for targeted sequencing, targeted exome, transcriptome, and small RNA sequencing.