Gain greater **insights** into microbial mysteries

Innovative microbial sequencing solutions

M-GL-02402 v2.0

illumina®

Working together to make an impact in the microbial world

Today more than ever, next-generation sequencing (NGS) is empowering a new level of accuracy and speed in obtaining answers in microbial and infectious disease research. This proven sequencing approach greatly enhances research efforts and offers potential solutions to address One Health issues.*

A broader view, a brighter future

With Illumina technology and support, researchers around the world are rapidly sequencing the genomes of microbes and gaining insights into their behavior, interactions with their hosts and environments, evolution, and circulation within and throughout global populations.

Depending on the microbes of interest, sample type, and the kinds of questions you want answered, different NGS workflows and solutions can be used. The optimal workflow should be determined by what goals need to be achieved.

Illumina NGS solutions are up for the challenge

Single-genome, multipathogen, and discovery workflows can support the full range of microbiology and infectious disease research applications.

Illumina offers powerful library preparation kits, sequencing systems, and corresponding analysis and reporting solutions that enable discoveries and provide insights for a better understanding of the microbes most relevant to your research.

ADVANCE YOUR RESEARCH
Learn how the right suite of NGS tools can help you gain a more complete picture in your research

*One Health: cdc.gov/onehealth

WORKFLOW APPLICATION

Microbial discovery

NGS is a useful approach for truly unbiased analysis of a primary sample. Shotgun DNA or RNA sequencing enables analysis of the genetic material present in complex microbial communities, such as environmental samples (eg, wastewater), human microbiomes, and primary samples (eg, sputum, lower respiratory aspirates).

Metagenomics and metatranscriptomics

Illumina DNA Prep

Fast, flexible library prep for microbiome discovery research and surveillance

- Run multiple sample types, DNA or cDNA input amounts, and methods
- Access fast library prep with a total turnaround time of ~3.5 hours
- Apply the DRAGEN™ Metagenomics pipeline to perform taxonomic classification of reads and provide single-sample and aggregate reporting

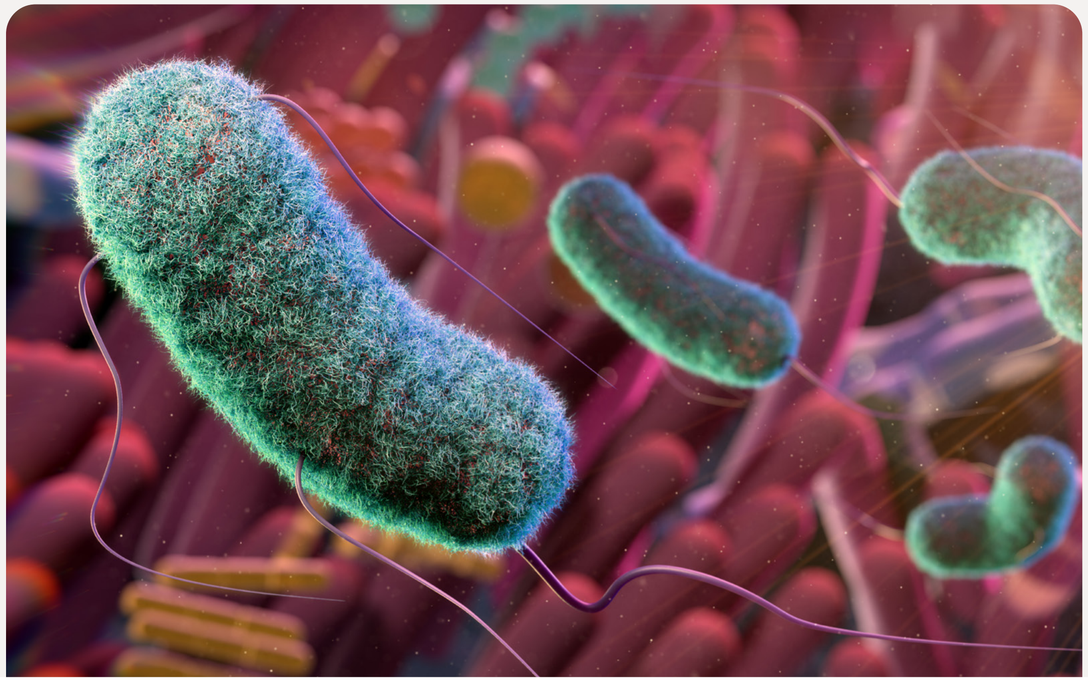
Illumina Stranded Total RNA Prep with Ribo-Zero™ Plus Microbiome

Fast, efficient library prep that provides robust depletion of undesirable host and pan-bacterial rRNA from complex microbial samples for microbiome analysis

- Eliminate unwanted rRNA from bacteria in complex microbial samples for highly efficient metatranscriptomics research
- Obtain reliable results with an optimized library preparation workflow
- Simplify data analysis and visualization with the BaseSpace™ Microbiome Metatranscriptomics App

UNCOVER MORE
Discover how metatranscriptomics enables community-level gene expression studies

Gut microbiome



WORKFLOW APPLICATION

Single-genome sequencing

Sequencing of a single pathogen is best used in situations when a single, known microbe is being analyzed.* These solutions will help you gain valuable insights in your research as you work to develop effective diagnostic tools, vaccines, and targeted therapies.

MONITOR MORE
Download the single-genome sequencing methods guide to select the right solution for your lab

Small whole-genome sequencing

Illumina DNA Prep

Fast, flexible library preparation kit for characterizing cultured isolates; ideal for investigating foodborne outbreaks and health care–associated infections

- Reduce library preparation time (~3.5 hours) with a low number of steps and minimal hands-on time
- Obtain robust, consistent results over a wide range of DNA inputs, even at low amounts (1 ng)

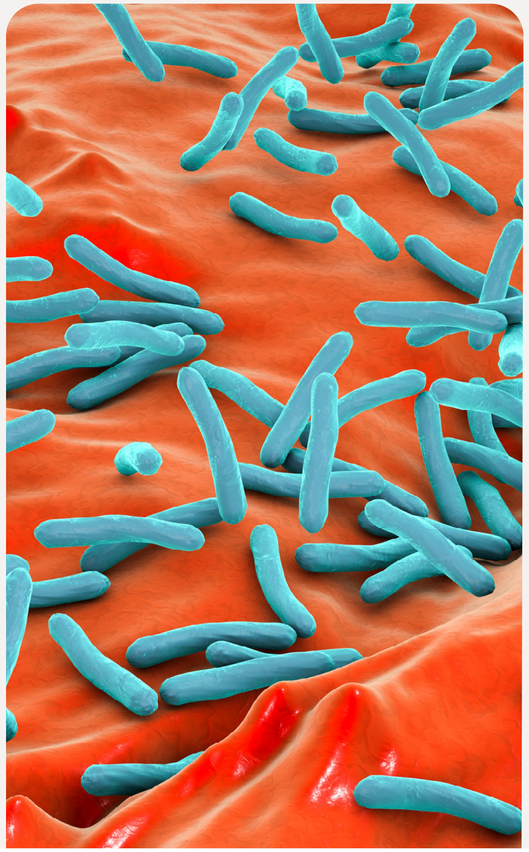
Targeted tuberculosis sequencing

Illumina and GenoScreen Deeplex® Myc-TB Combo Kit

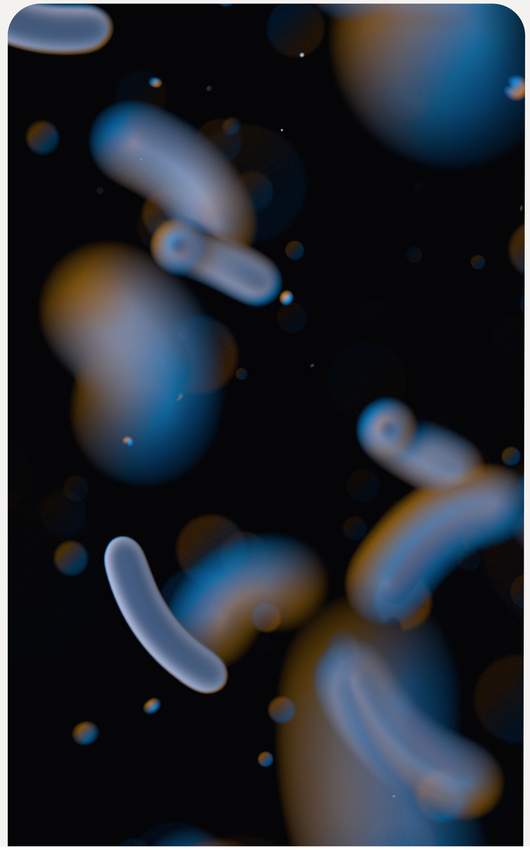
Determine tuberculosis (TB) strain and drug-resistance profiles faster than traditional culture-based methods for a more timely response to this critical public health threat

- Produces results in < 48 hours directly from sputum, no culture required
- Provides secure, automated analysis and easy interpretation of results via the Deeplex Myc-TB Web App
- Predicts resistance to 15 anti-TB drugs

Mycobacterium tuberculosis bacteria



Escherichia coli bacteria



*Data on file. Illumina, Inc. 2024

WORKFLOW APPLICATION

Single-genome sequencing

Targeted virus characterization

COVIDSeq™ Assay and COVIDSeq Test

Scalable, simple, and affordable solutions for whole-genome analysis of the SARS-CoV-2 virus to aid in COVID surveillance and viral research efforts

96-and 3072-sample kit versions

Flexible input for multiple sample types, including nasal swabs and wastewater samples

Produces highly accurate virus characterization enabled by the Illumina DRAGEN COVID Lineage App*

Illumina Microbial Amplicon Prep–Influenza A/B

Simple and affordable whole-genome characterization of influenza A and B viruses for surveillance and seasonal vaccine research

Covers more than 98% of both influenza A and B virus genomes†

Streamlines workflows; nine hours from extracted RNA to sequence-ready library

Simplifies whole-genome analysis and variant interpretation with the DRAGEN Targeted Microbial App

Illumina Microbial Amplicon Prep

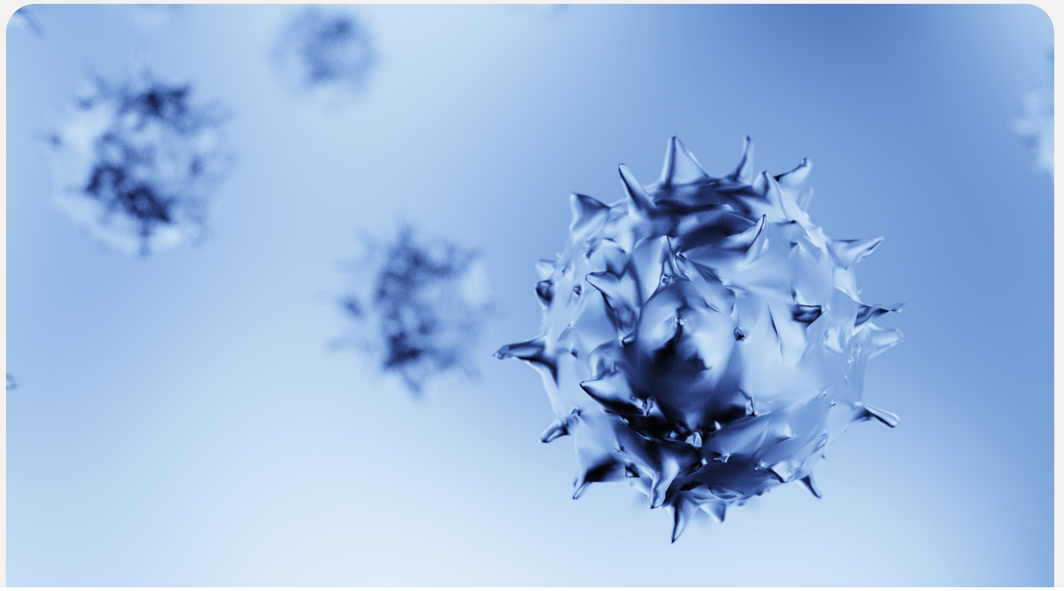
Flexible, streamlined NGS library preparation kit that enables various public health surveillance and microbial research applications

Pairs with lab-designed primers, published primers, or commercially available primer sets

Simplifies analysis with Illumina's powerful DRAGEN Targeted Microbial App

Enhances flexibility to accommodate different sample types, including nasal swabs, wastewater, and culture

Influenza virus



† Data on file. Illumina, Inc. 2024

WORKFLOW APPLICATION

Multipathogen sequencing

Hybrid-capture enrichment sequencing solutions are ideal for when certain pathogens are suspected to be present—or for surveillance of multiple known pathogens. They allow for targeted or whole-genome sequencing of multiple organisms without requiring the high read depth needed for shotgun metagenomic sequencing of unenriched libraries.*

ANALYZE MORE
See how targeted pathogen sequencing brings more profiling capabilities to your lab

Broad viral, zoonotic, and environmental surveillance

Viral Surveillance Panel v2

Extensive, whole-genome sequencing (WGS) panel for reliable characterization of the most critical viral public health threats for broad-based surveillance efforts

- Conduct WGS of > 200 viruses identified as high risk to public health and > 230 antiviral-resistance variants in influenza virus
- Benefit from compatibility with a range of host and environmental sample types
- Detect low-abundance viruses that shotgun sequencing would miss‡
- Analyze and interpret data with ease using the DRAGEN Microbial Enrichment Plus App

Respiratory Virus Enrichment Kit

Extensive, streamlined workflow offering highly sensitive detection and characterization of common respiratory viruses

- Conduct WGS of > 40 respiratory viruses, including influenza A and B viruses, SARS-CoV-2, and many more
- Identify targeted viruses and new variants present and track variants from a variety of sample types
- Detect low-abundance viruses that shotgun sequencing would miss‡
- Analyze and interpret data with the intuitive DRAGEN Microbial Enrichment Plus App

Pan-Coronavirus Panel

Expertly designed panel for research and surveillance of known and closely related novel coronaviruses

- Characterization of > 200 known coronaviruses
- Analysis and interpretation of data with the easy-to-use DRAGEN Targeted Microbial Enrichment App

Coronavirus (COVID-19)

‡Data on file. Illumina, Inc. 2024

WORKFLOW APPLICATION

Multipathogen sequencing

Flexible, comprehensive syndromic sequencing and antimicrobial resistance surveillance

Respiratory Pathogen ID/AMR Enrichment Panel Kit

Comprehensive panel designed for reliable identification and quantitation of respiratory pathogens and characterization of associated antimicrobial resistances for clinical research and surveillance

Identifies > 280 pathogens associated with respiratory tract infections

Characterizes antimicrobial resistance of > 2000 markers associated with 26 antimicrobial classes

Accommodates a variety of sample types

Performs automated analysis powered by the DRAGEN Microbial Enrichment Plus App

Urinary Pathogen ID/AMR Enrichment Panel Kit

The broadest sequencing-based panel for detecting urinary pathogens and their associated antimicrobial resistances for clinical research and surveillance

Identifies > 170 pathogens associated with urinary tract infections

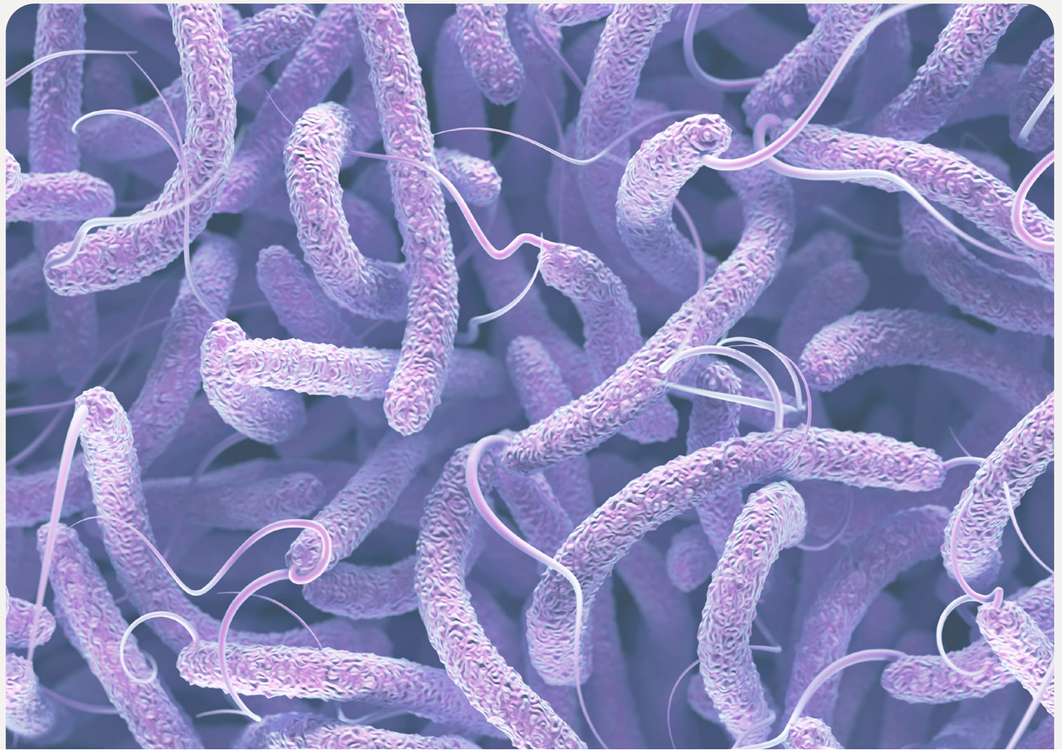
Characterizes antimicrobial resistance of > 3700 markers associated with 18 antimicrobial classes

Accommodates a variety of sample types

Performs automated analysis powered by the DRAGEN Microbial Enrichment Plus App

DETECT MORE
Download the Precision Metagenomics eBook to go deeper into sequencing possibilities

Vibrio cholerae bacteria



SEQUENCING PLATFORM

Introducing the MiSeq™ i100 Series

Impossibly simple sequencing, from the setup to data analysis

The MiSeq i100 Series brings sequencing capabilities to users of all levels. Advancements in system design, sequencing chemistry, and data analysis integration deliver operational simplicity, exceptional speed, and proven accuracy.

As part of an end-to-end NGS solution, the MiSeq i100 Series provides same-day results for various applications that have impacts in infectious disease and microbiology. Whether tracking outbreaks, classifying novel microorganisms, or researching microbiomes, the simplicity of MiSeq i100 enables sequencing with confidence and certainty.

SIMPLIFIED RUN SET-UP
Completed in three steps in under 20 minutes. Download the MiSeq i100 Series infographic to learn more

ENHANCED FLEXIBILITY
Multiple reagent kits support a wide range of throughputs and applications. Check out the MiSeq i100 Series virtual overview for details

SEQUENCING PLATFORM

Advanced flexibility

Scalable output enables expanded applications

With the MiSeq™ i100 Series, you can access 10 reagent configurations across multiple flow cell options and read lengths. You can readily increase sample throughput and perform deeper sequencing for various applications, from sWGS to metagenomics and more.

MiSeq i100 Series System§

MISEQ I100 SERIES | SEQUENCING SYSTEM

Outputs ranging from 1.5 to 15 Gb
Read lengths from 1 × 100 bp to 2 × 300 bp
5M and 25M flow cells

MiSeq i100 Series Plus System

MISEQ I100 SERIES | PLUS | SEQUENCING SYSTEM

Outputs ranging from 1.5 to 30 Gb
Read lengths from 1 × 100 bp to 2 × 300 bp
5M, 25M, 50M, and 100M flow cells

§ Available in 2025.

SEQUENCING PLATFORMS

Choose the right platform for your lab

Trusted technology and proven performance empower microbiologists and infectious disease researchers to explore further, with confidence, so your lab can optimize its daily workflows.

EXPLORE MORE
Find additional details on Illumina sequencing platforms




Key specifications	iSeq™ 100 System	MiSeq i100 Series	NextSeq™ 1000 and 2000 Systems	NovaSeq™ X Series
Max output per flow cell	1.2 Gb[a]	30 Gb[b]	540 Gb[a]	8 Tb[c]
Run time (range)	~9.5–19 hr[e]	~4–15 hr[d]	~8–44 hr[d]	~17–48 hr[d]
Max reads per run (single reads)	4M[a]	100M[a]	1.8B[a]	26B (single flow cell)[c] 52B (dual flow cells)[c,e]
Max read length	2 × 150 bp	2 × 300 bp	2 × 300 bp	2 × 150 bp
Ideal applications and methods[f]				
Small WGS	✓	✓	✓	
Microbial community diversity analysis	✓	✓		
Shotgun metagenomics		✓	✓	✓
Microbial gene expression/ metatranscriptomics		✓	✓	✓
Microbial discovery		✓	✓	✓
Targeted pathogen surveillance	✓	✓	✓	

a. Maximum specifications based on a P4 flow cell run; P4 flow cells are available for the NextSeq 2000 System only.

b. Maximum specifications based on a 100M flow cell run; 100M flow cells are available for the MiSeq i100 Plus System only.

c. Specifications based on the Illumina PhiX control library or a TruSeq™ DNA Library created with NA12878 at supported cluster densities. Performance may vary based on library type and quality, insert size, loading concentration, and other experimental factors.

d. Run times include cluster generation, sequencing, and base calling on a NextSeq 1000, or NextSeq 2000 System and calling on a NextSeq 1000 or NextSeq 2000 System. Run times include automated onboard cluster generation, sequencing, automated post-run wash, and base calling on the NovaSeq X Systems.

e. Run times include cluster generation, sequencing, base calling, and quality scoring.

f. Check mark indicates an application or method optimized for the sequencing system.

DATA ANALYSIS

Turn data into meaningful results

Intuitive, efficient Illumina data analysis solutions are built with the same exceptional level of accuracy, accessibility, and security standards as Illumina sequencing solutions. The apps meet a broad range of microbial research, regardless of bioinformatics experience.

EASY ACCESS
Explore BaseSpace™ Sequence Hub, a user-friendly genomics cloud-computing platform that helps simplify analysis

Overview of apps

Microbiome Metatranscriptomics App

Performs taxonomic and pathway enrichment analysis on metagenomic samples. Analyzes RNA sequencing libraries derived from microbiological communities using a four-step pipeline.

16S Metagenomics App

Analyzes DNA from amplicon sequencing of prokaryotic 16S small subunit rRNA genes. Provides visuals of taxonomic classification.

SRST2 App

Reports the presence of STs (sequence types) from an MLST database and/or reference genes from a sequence data base of virulence genes, resistance genes, and plasmid replicons.

Deeplex Myc-TB Web App**

Provides secure, automated analysis and easy interpretation of results from the Illumina and GenoScreen Deeplex Myc-TB Combo Kit.

DRAGEN small Whole Genome Sequencing (sWGS)

The DRAGEN sWGS App enables read mapping of single microbial genomes to a reference genome. (Available in early 2025)

DRAGEN Microbial Enrichment Plus App

Delivers easy-to-use, powerful secondary analysis of Illumina infectious disease and microbiology hybrid–capture enrichment panel kits, with workflows for sample QC, viral WGS, pathogen detection and quantification, and antimicrobial resistance (AMR) marker profiling.

DRAGEN Metagenomics Pipeline

Aligns reads from shotgun metagenomic samples to genomic references, classifying to the lowest common level (down to genus level). Provides taxonomic classification for complex microbial samples.

DRAGEN Targeted Microbial App

Analyzes sequencing libraries generated from Illumina infectious disease and microbiology amplicon panel kits, such as the COVIDSeq Test and Illumina Microbial Amplicon Prep.

DRAGEN

** Not available on BaseSpace Sequence Hub.

Working as one, your lab and Illumina can bring the benefits of NGS-powered microbiology and infectious disease research to everyone

How can we help you?

At Illumina, we offer technology and support to cover integrated NGS workflows—from library preparation to sequencing to data analysis to sharing. With optimized end-to-end solutions, you'll experience unrivaled accuracy, operational simplicity, and fast turnaround times.

Illumina is committed to promoting global health

Beyond product offerings, Illumina offers a wide range of educational resources, support, and training programs to enhance your research. Let's make an impact, together.

Learn how NGS can support your microbiology research goals

Next-generation sequencing (NGS) is opening new doors in microbial genomics, revealing fresh insight into how microbes impact humans and the environment. With NGS, see the bigger picture by examining the smallest details in the tiniest organisms. Learn more about how NGS can change your approach to microbiology.

Find the right workflow for your microbiology application

Take the guesswork out of your next workflow. The NGS Workflow Finder provides personalized solution recommendations and resources for your microbiology and infectious disease applications.

illumina®

We are always available for questions, insights, and conversation.
Visit us at illumina.com.

1.800.809.4566 toll-free (US) | +1.858.202.4566 tel
techsupport@illumina.com | www.illumina.com