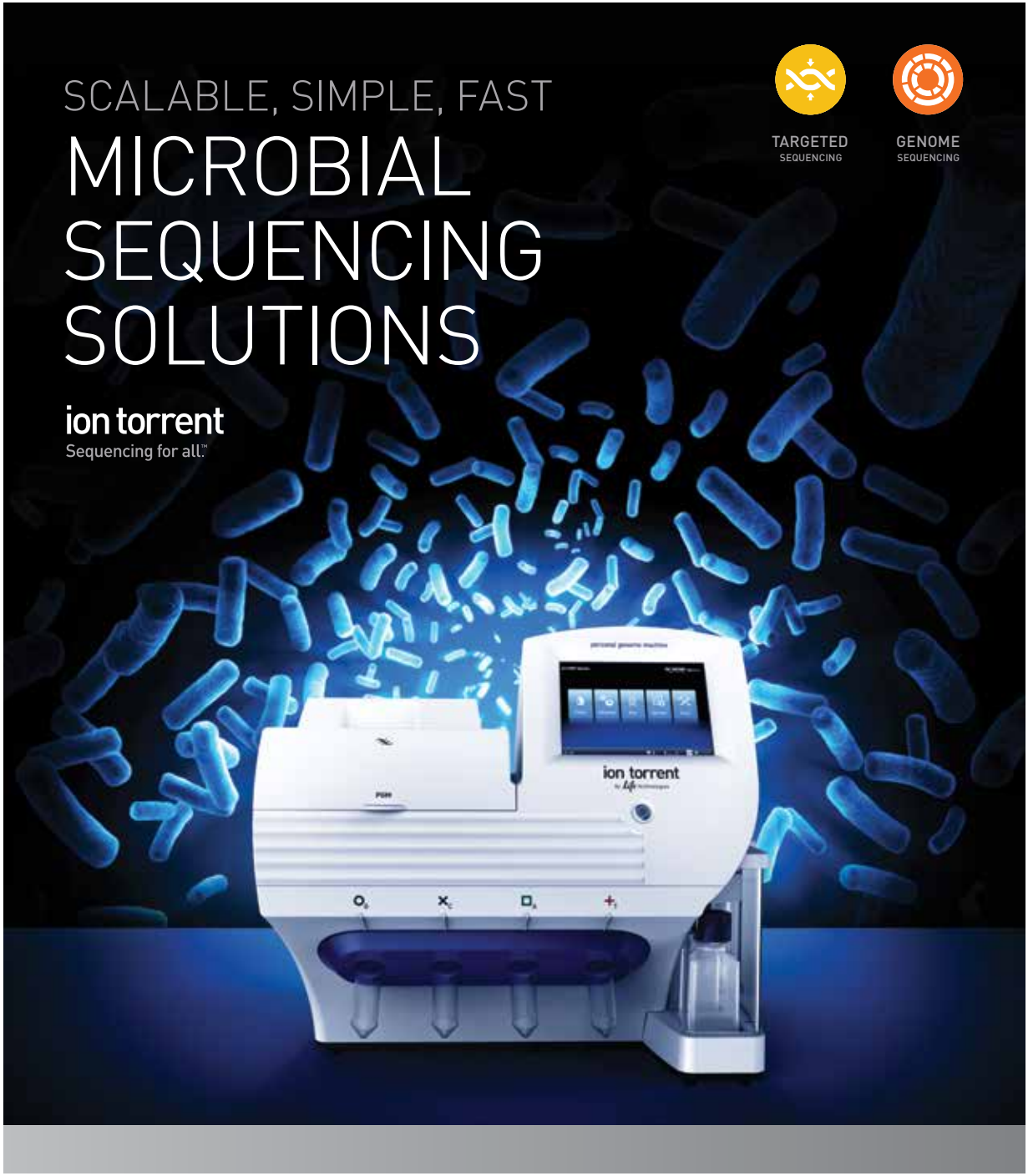
SCALABLE, SIMPLE, FAST

MICROBIAL SEQUENCING SOLUTIONS

TARGETED SEQUENCING

GENOME SEQUENCING

ion torrent
Sequencing for all.™



life technologies™

TRANSCRIPTOME SEQUENCING | EXOME SEQUENCING | TARGETED SEQUENCING | GENOME SEQUENCING

ION TORRENT™ SEMICONDUCTOR SEQUENCING

Ion semiconductor sequencing has made sequencing both fast and affordable. Now, more laboratories can adopt powerful next-generation sequencing technology—with increased throughput, higher accuracy, and longer reads—to get microbial answers faster.

With the Ion Torrent™ PGM™ System, you can advance from sequencing only targeted regions of genomes (eg., multilocus sequence typing (MLST)) to sequencing complete genomes faster, and at a fraction of the cost of Sanger based sequencing.

The power of the Ion PGM™ System is to discriminate between closely related strains and to track in real time the evolution of disease-associated isolates, offering the possibility of immediate identification of outbreak strains.

PROVEN

In just the past two years, scientists using the Ion PGM™ System have produced more than 80 peer-reviewed publications focused on microbiology.

SIMPLE

Affordable whole-genome sequencing enables microbiologists to increase discriminatory power and accuracy while using a single technology.

FAST

The Ion PGM™ Sequencer is faster than any other sequencer, only 4 hours to get long-read (400 base) sequencing results.

"During the 2011 *E. coli* outbreak, the Ion PGM™ System was critical in facilitating a rapid response during disease surveillance, investigating outbreaks, and determining disease etiology."

DAG HARMSEN, MD
PROFESSOR, HEAD OF RESEARCH
DEPARTMENT FOR PERIODONTOLOGY,
UNIVERSITY OF MÜNSTER, GERMANY

Join the Ion Torrent™ worldwide development community at **lifetechnologies.com/ioncommunity**

The Ion Community allows researchers to openly share methods and data, to both evaluate the technology and build on it. Ion Torrent™ has opened its protocols, datasets, and source code to the world to enable the community to drive application development.

MICROBIAL SEQUENCING

APPLICATIONS

DISCOVERY & CHARACTERIZATION

Whole-genome shotgun sequencing offers important new opportunities for the discovery and characterization of microbial organisms. For researchers characterizing the genomic structures of microbes, *de novo* sequencing and assembly of complete genomes is an important step. Ion Torrent™ semiconductor sequencing has revolutionized *de novo* sequencing for microbial research by providing a simple, low-cost system that delivers accurate results in less than a day. With 400-base sequencing on the Ion PGM™ System, sequencing assembly metrics are better than ever, giving you a fast path to whole-genome sequencing.

METAGENOMICS

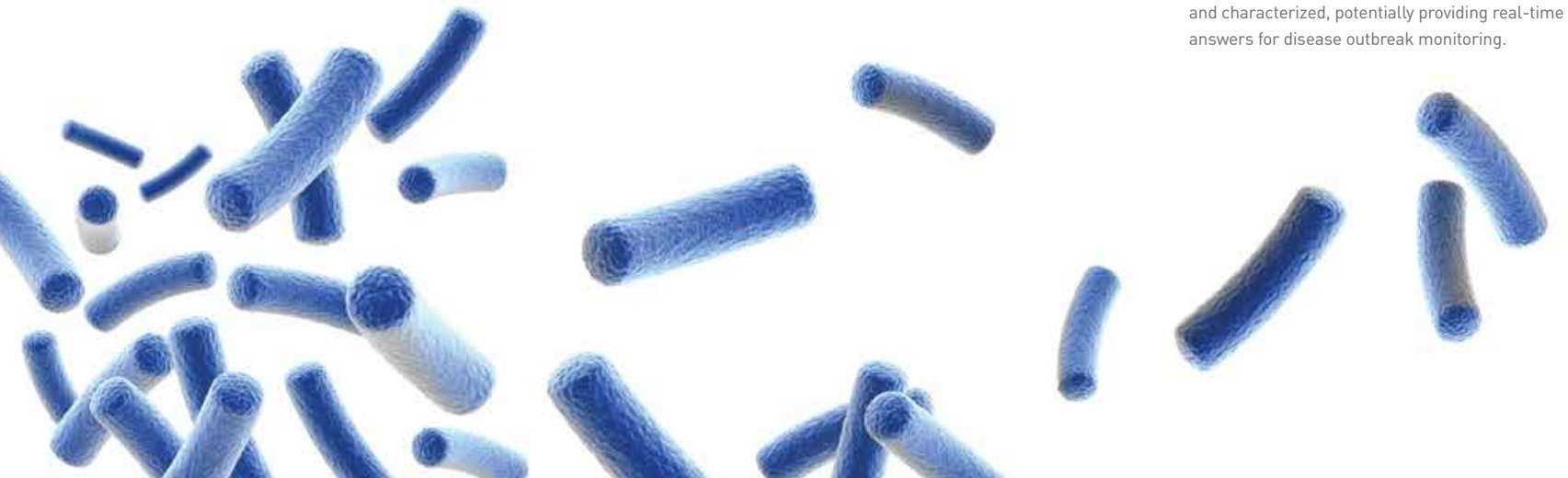
Ion semiconductor sequencing accelerates and simplifies metagenomics research by using whole-genome or targeted sequencing of the bacterial 16S rRNA gene (16S sequencing). By eliminating the need to clone samples prior to sequencing, one of the main biases in sampling is removed. Direct sequencing of samples on the Ion PGM™ System can be performed quickly, and with more amplicons, to deliver better discrimination between organisms. Unlike other next-generation sequencers, the Ion PGM™ System enables you to read through low complexity sequences with ease.

BACTERIAL TYPING

Fast and accurate typing is essential to monitor or characterize bacteria or viruses, to elucidate bacterial transmission chains, or to understand health and disease conditions in specific human populations. Ion semiconductor sequencing paired with Ridom™ SeqSphere+™ automated software enables any microbiologist to use a genome-wide approach to bacterial typing. Instead of sequencing just a few regions of interest, the Ion PGM™ System provides rapid, low-cost complete-genome sequence information. By using hundreds to thousands of genes for typing, the result is higher discrimination and more accurate typing of individual strains. Within a working day, a specific isolate can be sequenced and characterized, potentially providing real-time answers for disease outbreak monitoring.

VIRAL TYPING

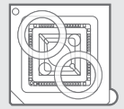
To target the prediction of patterns of evolution and emergence of disease agents, the Ion PGM™ System paired with PathAmp™ FluA reagents and the Pathogen Analyzer Plugin for Torrent Suite™ Software provides a streamlined workflow for complete influenza A genome sequencing. Researchers can produce influenza A typing in under a day, with highly accurate sequence data that enables more effective influenza surveillance. This allows you to refine the selection of vaccine strains and to improve predictions of future antigenic characteristics.



"Using next-generation sequencing technology makes whole influenza genome sequencing much easier, and much less expensive than older sequencing techniques, when used appropriately."

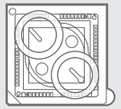
STEVE GLAVAS
HEAD OF NGS PLATFORM,
SWEDISH INSTITUTE FOR COMMUNICABLE DISEASE CONTROL
STOCKHOLM, SWEDEN

With three sequencing chips to choose from, you can select the amount of sequencing throughput required for your specific application—saving you time and money.



314
Ion 314™ Chip
1 million wells
60 to 100 Mb output
for 400-base sequencing

316
Ion 316™ Chip
6 million wells
600 Mb to 1 Gb output
for 400-base sequencing



318
Ion 318™ Chip
11 million wells
1.2 to 2 Gb output
for 400-base sequencing

MICROBIAL SEQUENCING

SINGLE-DAY WORKFLOWS

Streamlined sample preparation and application-specific data analysis solutions have further simplified microbial sequencing, leading to significant breakthroughs across all areas of microbiology research.

Ion Torrent™ offers a full solution for *de novo* sequencing of microorganisms as well as a solution for bacterial and viral typing. These workflows speed your time-to-results with automated template preparation, fast sequencing runs, and data analysis packages optimized for your microbiology research. Our 400-base sequencing kit provides you with long, accurate reads, giving you the best assembly metrics.

CONSTRUCT LIBRARY

PREPARE TEMPLATE

RUN SEQUENCE

ANALYZE DATA

APPLICATION	CONSTRUCT LIBRARY	PREPARE TEMPLATE	RUN SEQUENCE	ANALYZE DATA
Discovery and Characterization	Ion Xpress™ Plus Fragment Library Kit (50–100 ng or 1 µg of DNA) OR Thermo Scientific® MuSeek™ Library Preparation Kit (50 ng DNA)	Ion Chef™ System* for automated template prep and chip loading OR Ion OneTouch™ 2 System with Ion PGM™ Template OT2 400 Kit	Ion PGM™ Sequencer Ion PGM™ Sequencing 400 Kit	Torrent Suite™ Software DNASTAR® SeqMan® NGen® Software
Metagenomics				Torrent Suite™ Software Third Party Software
Bacterial Typing				Torrent Suite™ Software MIRA Assembler Ridom™ SeqSphere+™ Software
Viral Typing	PathAmp™ FluA Reagents as input Ion Xpress™ Plus Fragment Library Kit OR Thermo Scientific® MuSeek™ Library Preparation Kit	Ion Chef™ System* OR Ion OneTouch™ 2 System and Ion PGM™ Template OT2 200 Kit	Ion PGM™ Sequencer Ion PGM™ Sequencing 200 Kit	Torrent Suite™ Software Pathogen Analyzer Plugin

MICROBIAL SEQUENCING SOLUTIONS WITH THE ION PGM™ SYSTEM

Proven:
Over 80 peer-reviewed publications focused on microbiology alone

Scalable:
Sequence a single *E. coli* genome or multiplex thousands of viruses in a single run

Simple:
Simplify your MLST and PFGE with a single workflow—get more answers faster

Fast:
Ideal for everyday microbial sequencing, essential for outbreak investigation

"We chose the PGM™ System because it is ideal for microbial sequencing. It provides us with the throughput flexibility, read length and data output that fits our needs for both basic and urgent projects."

SONG NIAN HU, MD
RESEARCHER, PHD SUPERVISOR
BEIJING INSTITUTE OF GENOMICS,
CHINESE ACADEMY OF SCIENCES
BEIJING, CHINA

Learn more about microbiology research using the Ion PGM™ System at lifetechnologies.com/ionmicrobial

life technologies™

*The content provided herein may relate to products that have not been officially released and is subject to change without notice.