

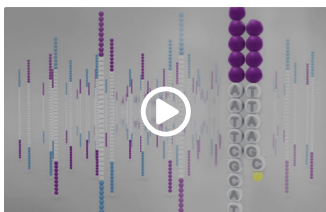
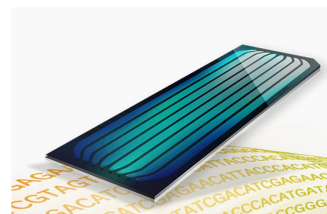
Explore Illumina sequencing technology

Massively parallel sequencing with optimized SBS chemistry

[Science and Education](#) / [Technology](#) / [Next-Generation Sequencing](#)

Introduction to SBS Technology

Illumina sequencing technology, sequencing by synthesis (SBS), is a widely adopted next-generation sequencing (NGS) technology worldwide. Illumina sequencing instruments and reagents support massively parallel sequencing using a proprietary method that detects single bases as they are incorporated into growing DNA strands.



SBS Chemistry

A fluorescently labeled reversible terminator is imaged as each dNTP is added, and then cleaved to allow incorporation of the next base. Since all 4 reversible terminator-bound dNTPs are present during each sequencing cycle, natural competition minimizes incorporation bias.¹

The end result is true base-by-base sequencing that enables accurate data for a broad range of applications. The method virtually eliminates errors and missed calls associated with strings of repeated nucleotides (homopolymers).

Further Advantages of SBS Technology

Illumina sequencing by synthesis technology supports both single-read and paired-end libraries. SBS technology offers a short-insert paired-end capability for high-resolution genome sequencing, as well as long-insert paired-end reads for efficient sequence assembly, *de novo* sequencing, and more.

The combination of short inserts and longer reads increases the ability to fully characterize any genome.

[Learn More About SBS Benefits](#)

Illumina Sequencing Introduction

This overview describes major sequencing technology advances, key methods, the basics of Illumina sequencing chemistry, and more.



Sequencing Instrument Portfolio

Illumina offers innovative sequencing systems that deliver exceptional data quality and accuracy, at the scale you need.

[See All NGS Platforms](#)

SBS Technology Breakthroughs

1-Channel SBS

The Illumina semiconductor sequencing method, also known as 1-channel SBS, couples sequencing by synthesis chemistry with complementary metal-oxide semiconductor (CMOS) technology. This allows for low instrument costs and a small instrument footprint, all while maintaining the high data accuracy of SBS.

[Learn More About Semiconductor Sequencing](#)

2-Channel SBS

Find out how this recent evolution of SBS technology enables faster sequencing than the prior version of Illumina SBS technology, with the same high data accuracy.

[Learn More About 2-Channel SBS](#)



Using SBS Technology to Solve Problems

See how researchers are applying Illumina sequencing technology in these areas:

- [Choosing an NGS Company](#)
- [Cancer Research](#)
- [Microbial Genomics](#)
- [Agrigenomics](#)
- [Complex Disease Genomics](#)
- [Reproductive Health](#)
- [Genetic and Rare Diseases](#)
- [Genomics in Drug Development](#)

Sequencing Techniques

Explore a variety of methods powered by SBS, from whole-genome to RNA sequencing and more. Find comprehensive workflow solutions.



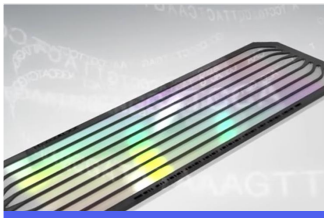
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Sequencing Reagents

Find Illumina instrument-specific sequencing kits, reagents, flow cells, and more.



Maximum Throughput

See how patterned flow cell technology dramatically increases sequencing data throughput.

[View Reagents](#)

[Learn More](#)

References

1. Bentley DR, Balasubramanian S, Swerdlow HP, et al. Accurate Whole Human Genome Sequencing using Reversible Terminator Chemistry. Nature. 2008; 456 (7218): 53–59.



INNOVATIVE TECHNOLOGIES

At Illumina, our goal is to apply innovative technologies to the analysis of genetic variation and function, making studies possible that were not even imaginable just a few years ago. It is mission critical for us to deliver innovative, flexible, and scalable solutions to meet the needs of our customers. As a global company that places high value on collaborative interactions, rapid delivery of solutions, and providing the highest level of quality, we strive to meet this challenge. Illumina innovative sequencing and array technologies are fueling groundbreaking advancements in life science research, translational and consumer genomics, and molecular diagnostics.

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