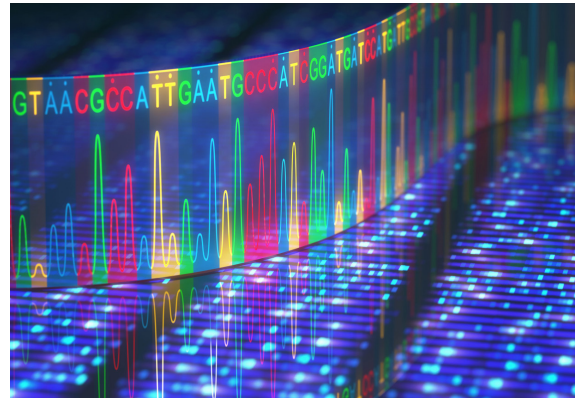


NEXT-GENERATION SEQUENCING

Next-Generation Sequencing (NGS)

has transformed genomic research with its ability to study biological systems faster and at a larger scale than ever before. The technology utilizes parallelized platforms to achieve ultra-high throughput - up to 43 billion short reads per instrument run - allowing labs to tackle increasingly complex research questions with great efficiency.



Diagnostic Applications:

- Microbiome testing
- Forensics
- Infectious disease genotyping
- SARS-CoV-2 mutations
- Biomarker discovery
- Non-invasive prenatal testing

THE NGS WORKFLOW (ILLUMINA):

1

Sample Collection

Biological samples are drawn from subjects via blood, saliva, nasopharyngeal swab, or another medium. The type of sample required depends on the research application and instrumentation used.

Thomas No.	Description
1202V01	Vacutainer® EDTA Blood Tube, 2mL
1148Y50	VACUETTE® Blood Collection Tubes (EDTA), 3mL
1220G00	PAXgene® Blood RNA Tubes
20A00R092	Spectrum Solutions Saliva Collection Kit
20A00G473	NP & OP Specimen Collection Swabs



2

DNA/RNA Extraction

The purpose of the extraction step is to isolate DNA or RNA from captured samples. Common methods include magnetic bead, spin column, and resin, used in conjunction with an extraction kit.

Thomas No.	Description
1154H16	Zymo Quick-DNA/RNA™ Viral MagBead Kit, 1x96
1154H17	Zymo Quick-DNA/RNA™ Viral MagBead Kit, 4x96
C755D29	Omega Bio-tek Mag-Bind® TotalPure NGS, 5mL
C755D30	Omega Bio-tek Mag-Bind® TotalPure NGS, 50mL
C755D31	Omega Bio-tek Mag-Bind® TotalPure NGS, 500mL



3

Library Preparation

DNA/RNA is then fragmented to ensure sequencer compatibility. Adapters are also added to both ends, allowing the DNA/RNA to bind to flow cells. Liquid handling robots & library prep kits are used for automation.

Thomas No.	Description
C754J37	Zymo Quick-16S™ NGS Library Prep Kit, 96 rxns
CHM00B722	Zymo Quick-16S™ NGS Library Prep Kit, 24 prep
C756N97	Zymo Pico Methyl-Seq Library Prep, 10 prep
C756N98	Zymo Pico Methyl-Seq Library Prep, 25 prep



4

Template Preparation

This step creates multiple copies of each amplicon (DNA/RNA fragment) within the prepared libraries so that the signal is strong enough to be detected. This process takes place on the Illumina MiSeq System.

Thomas No.	Description
C756M97	Zymo Human DNA Standards and No Template Control, 1/EA



Contact your Thomas Scientific Molecular Diagnostics specialists for additional Template Prep solutions.

5

DNA/RNA Sequencing

Chemically modified nucleotides bind to the template strand in a process called sequencing by synthesis (SBS). A buffer solution is added to excite the fluorescence signal, which is recorded by optical equipment.



Our specialists can help develop additional DNA/RNA Sequencing solutions. Contact us today!

6

Results and Analysis

Finally, large amounts of data are generated by comparing the new sequence to a reference genome. Software can be used to perform bioinformatics analyses, or, labs can use their own internal pipelines.



Contact your Thomas Scientific Molecular Diagnostics specialists for assistance and guidance on available Results & Analysis solutions.

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