

Adapters for next generation sequencing

High quality adapters to meet the ever-expanding needs of researchers

Adapters are a key component of the next generation sequencing (NGS) workflow. Whether your project requires a basic adapter or a sophisticated design for higher accuracy, IDT has the products and expertise to deliver the right solution.

Regardless of the NGS instrument or application, IDT has been serving the needs of NGS scientists for over 10 years. We are recognized as the leader in adapters because of our expertise in custom oligo manufacturing and our commitment to quality. Additionally, our NGS customers and partners benefit from:

- Comprehensive adapter offering
- Innovative designs
- Trusted customer support
- Complete customizability

Due to our leadership in NGS adapters, Illumina chose IDT as its partner to develop the next generation of index adapters to improve sample multiplexing. These adapters contain Illumina's unique dual indexes (UDIs) that mitigate sample misassignment due to index hopping. IDT manufactures UDI adapters for Illumina and is also licensed to sell custom adapters containing these UDI sequences. See press release [here](#).

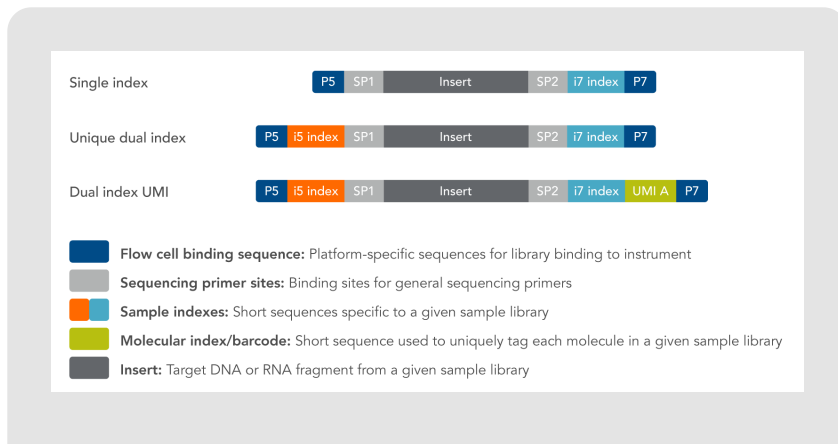


Figure 1. Examples of adapter designs. There is a variety of NGS adapter designs available. Consideration must be given to the intended application, multiplexing needs, accuracy requirements, and analysis methods when choosing adapters.

Considerations when selecting an adapter design

Sequences for specific NGS platforms: During library preparation, adapters are attached (by ligation or PCR) to each sample library. Adapters include platform-specific sequences for fragment recognition by the sequencer: for example, the P5 and P7 sequences (Figure 1) enable library fragments to bind to the flow cells of Illumina platforms. Each NGS instrument provider uses a specific set of sequences for this purpose. IDT manufactures adapters for all major NGS platforms.

Sample indexing: Sample indexes (or indices) enable multiple samples to be sequenced together (i.e., multiplexed) on the same instrument flow cell or chip. Each sample index, typically 6–10 bases, is specific to a given sample library and is used for de-multiplexing during data analysis to assign individual sequence reads to the correct sample. Adapters may contain single or dual sample indexes depending on the number of libraries combined and the level of accuracy desired. Illumina recommends using UDIs as a method to mitigate errors introduced by index-hopping. UDIs are particularly important when using instruments with patterned flow cells, such as the NovaSeq system.

Molecular barcoding: Unique molecular identifiers (UMIs) provide the highest levels of error correction and accuracy. UMIs are short sequences, often with degenerate bases, that incorporate a unique barcode onto each molecule within a given sample library. UMIs have been shown to reduce the rate of false-positive variant calls and increase sensitivity of variant detection. By incorporating individual barcodes on each original DNA fragment, variant alleles present in the original sample (true variants) can be distinguished from errors introduced during library preparation, target enrichment, or sequencing. Any errors identified can be removed by bioinformatics methods before final data analysis. Adapters that contain UMIs, such as the xGen Dual Index UMI adapters, are available with a unique dual sample index design for detection of low-frequency variants.

Adapter manufacturing: Stringent manufacturing methods are critical for producing high quality NGS adapters. Substandard manufacturing practices can lead to

low purity adapters or adapter cross contamination, either of which will negatively impact sequencing results. IDT's proprietary [TruGrade](#) process uses state-of-the-art synthesis and purification methods, designed specifically for NGS adapters. IDT also offers [GMP](#) grade adapter manufacturing for clinical applications.

Key Features	xGen Dual Index UMI Adapters— Tech Access	Custom adapters
Application compatibility	Detection of low frequency variants, genotyping, counting applications, PCR-free	Designs for any application
Unique dual indexes (UDI)	Yes	Available
Illumina-designed* UDIs	Optional	Available
Number of indexes available	Up to 384	1000s
Sample index length	8 bp	Configurable
Unique molecular identifier (UMI)	Yes	Available
Mitigates index hopping	Yes	Available
Full length adapter design	Yes	Available
Requires sample indexing primers	No	Available
Methylation compatible	Optional	Available
Blocker compatibility	xGen Universal Blocker—TS Mix	Various
Product format options	Tubes, plates	Tubes, plates

* IDT is an authorized re-seller of Illumina's unique dual indexes for custom adapter designs

For more information, or to order custom adapters, please contact Customer Care at custcare@idtdna.com.