TWIST FOR ELEMENT

Trinity Freestyle™ Fast Hyb Workflow

The Twist for Element, Trinity Freestyle Fast Hyb kits provide a user-friendly solution for the enrichment of NGS libraries containing P5 and P7 adapter sequences for sequencing on Element Biosciences' platforms. Element Biosciences' AVITI™ platform offers high-quality sequencing with the advantages of a flexible platform routinely achieving >90% of reads scoring >Q30.[1,2] The AVITI platform offers dual independent flow cells for flexibility in run configuration and throughput to suit the particular needs of any laboratory.

Twist Bioscience offers support for Element Trinity Freestyle workflows with Fast Hybridization buffer systems that reduce hands-on time by eliminating several post-hybridization steps that are automated on the AVITI instrument (**Figure 1**). The Trinity Freestyle workflow is compatible with NGS libraries constructed with Illumina P5 and P7 adapters, enabling compatibility with all of Twist Bioscience's NGS library preparation workflows, including the Enzymatic Fragmentation Kit 2.0 and the FlexPrep™ UHT Library Preparation Kit. The workflow also enables users to customize by adding content to existing exome panels or customizing enrichment entirely with Twist Custom Panels.

KEY BENEFITS

Flexibility without compromise

- Seamlessly compatible with any Twist sequencing library using P5 and P7 adapters
- Preserves AVITI's exceptional data quality across applications
- Dual, independent flow cells deliver adaptable throughput

Streamlined workflow, less hands-on time

- Go from sample to sequencer in as few as 5 hours
- On-flow cell enrichment removes binding, wash, amplification, and pooling steps
- Rapid, 1-hour hybridization time eliminates overnight waits

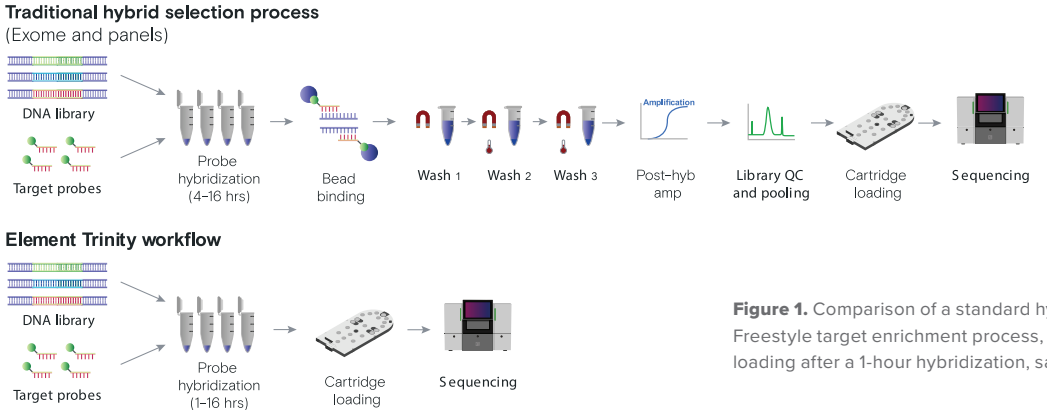

Figure 1. Comparison of a standard hybrid capture process to a Trinity Freestyle target enrichment process, which proceeds directly to cartridge loading after a 1-hour hybridization, saving valuable hands-on time.

Maximize efficiency by using Twist Exome 2.0 Plus Comprehensive Spike-in Panel, Trinity FS Panel with the AVITI platform

Exome sequencing on the AVITI platform's dual independent flow cells offers flexibility in platform output to suit a range of sample throughput needs. Twist Bioscience's expert exome design strategy leverages efficient probe placement against target regions for a high on-target rate without wasting reads. Twist Bioscience's double-stranded probes, which capture both the sense and antisense strands, offer excellent uniformity in target coverage. The pairing of efficient exome capture with the AVITI platform's flexible output allows for the processing of up to 48 exomes per run when utilizing both flow cells and reduces sequencing costs.

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Rapid exome sequencing using Twist workflow kits reduces hands-on time

The Twist for Element Trinity sequencing workflow dramatically simplifies target capture. This novel targeted sequencing workflow can be adapted to any scale. It saves hands-on time by eliminating steps and automating others on the sequencer, allowing a user to go from sample to sequencer in as little as 5 hours (**Figure 2**).

Hybridize your DNA library with a Twist panel for just 1 hour with the Twist for Element, Trinity Freestyle Fast Hybridization Kit, then load it directly onto your AVITI sequencer. This drastically reduces the number of manual steps and the removal of additional amplification results in higher library complexity and lower duplication rates.

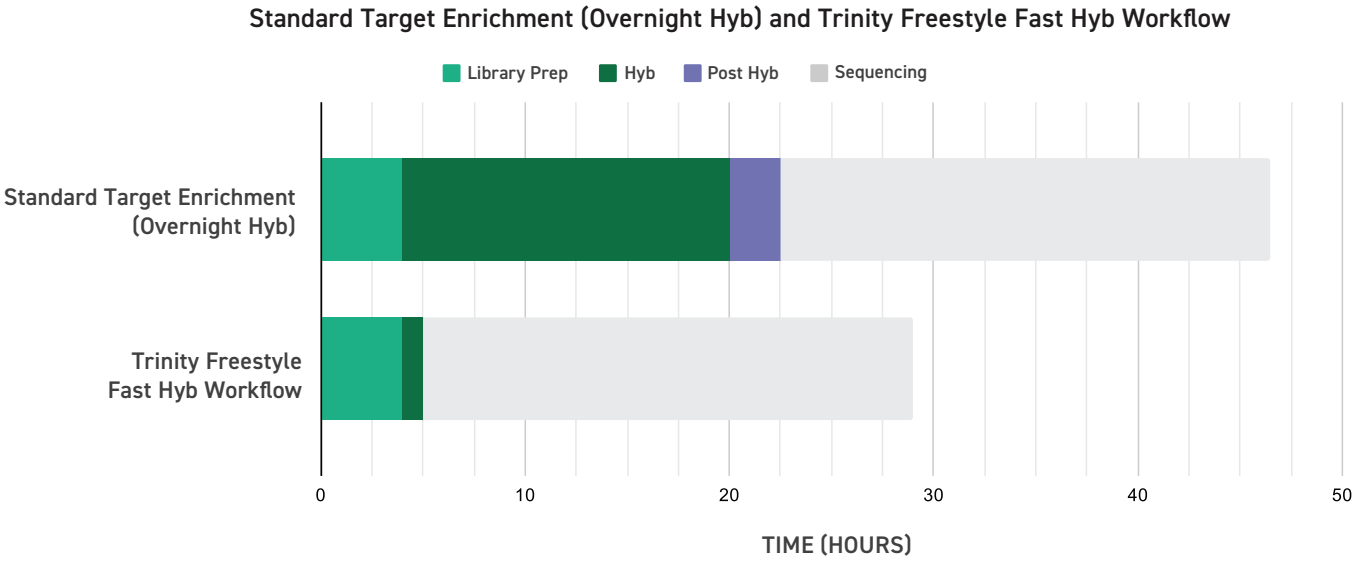

Figure 2. Comparison of the estimated workflow times for Standard Hybridization v2 with a 16-hour overnight hybridization and Trinity Freestyle Fast Hyb workflow with a 1-hour hybridization time. Each workflow produces exome-enriched libraries compatible with AVITI sequencing.

Whole exome and human genotyping panels have high sequencing performance on AVITI

Twist Bioscience offers several complete workflows, such as exome sequencing on the AVITI platform, featuring library preparation with enzymatic fragmentation and target enrichment kits. This workflow can be paired with our Exome 2.0 Plus Comprehensive Spike-in panel, formulated for compatibility with Trinity Freestyle and optimized to offer excellent uniformity of coverage. As a measure of exome sequencing performance on the AVITI platform, the relevant Picard metrics are shown below (**Table 1**), demonstrating high on-target rate, library diversity, and coverage across both high- and low-GC content.

As another example of Trinity Freestyle, we validated the performance of our FlexPrep UHT Library Preparation Kit and the Twist Genotyping - Human 600k Panel, which is a broad SNP panel for human population genetics research. The combination of Trinity Freestyle's speed, paired with this workflow's performance and throughput, highlights its advantages over more established technologies such as microarrays. In both cases, Trinity shows excellent performance when pairing Twist library preparation kits with our Trinity Freestyle compatible Fast Hyb kit.

KIT	PANEL	% ON TARGET	ESTIMATED LIBRARY SIZE	MEAN TARGET COVERAGE	% ZERO COVERAGE	% DUPLICATES	FOLD-80 BASE PENALTY	% 30X COVERAGE	AT DROPOUT	GC DROPOUT
Twist for Element Trinity (Native Kit)	Exome 2.0 + Comp Spike-In	88.2% ± 0.8%	804M ± 28M	59.95 ± 0.86	1.3% ± 0.02%	1.36 % ± 0.09%	1.28 ± 0.01	95.46% ± 0.39	1.04 ± 0.69	1.36 ± 0.83
Twist for Element Trinity Freestyle Kit	Exome 2.0 + Comp Spike-In	89.5% ± 1.2%	1094M ± 55M	64.9 ± 1.1	1.1% ± 0.02%	0.11% ± 0.01%	1.32 ± 0.02	95.2% ± 0.3%	0.25 ± 0.21	4.69 ± 1.54
Twist FlexPrep UHT	Human 600K	91.6% ± 0.48%	336M ± 53M	5.84 ± 0.98	2.1% ± 0.8%	1.27% ± 0.14%	1.82 ± 0.19	N/A	0.72 ± 0.14	0.002 ± 0.001

Table 1. Performance comparison of the native Trinity Fast Hyb workflow and the new Trinity Freestyle workflow paired with Twist Exome 2.0 plus Comprehensive Spike-in. There were 24 exomes sequenced on an AVITI and downsampled to 25 million reads. We also demonstrate the performance of Twist's FlexPrep UHT paired with Twist Genotyping Human 600k panel for high-throughput genotyping of human samples. There were 120 samples sequenced on an AVITI24, reaching 13 to 28 million reads per sample. Values shown are averages ± standard deviation based on Picard metrics.

REFERENCES

1. Ashby, M. Whole Exome Sequencing 101: Cost-effective DNA sequencing to understand genetic disease. Element Biosciences https://www.elementbiosciences.com/blog/whole-exome-sequencing-101-cost-effective-dna-sequencing-to-understand-genetic-disease (2022).

2. Arslan, S., Garcia, F.J., Guo, M. et al. Sequencing by avidity enables high accuracy with low reagent consumption. Nat Biotechnol 42, 132–138 https://doi.org/10.1038/s41587-023-01750-7 (2024).

LEARN MORE

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PRODUCT SKU LIST

Trinity Freestyle Workflow Kits*

127554: Twist Trinity Freestyle Fast Hybridization Kit, 96 Samples
(Includes materials for 12 Hyb reactions and Trinity Freestyle binding reagent)

126792: Twist Adapter System - Trinity Freestyle, 96 Samples Plate 1
(Includes UDI primers for Trinity Freestyle and Universal Adapters)

126776: Trinity Freestyle Fast Hyb Binding Reagent, 12 Hyb reactions

126855: Twist Exome 2.0 + Comp. Spike-in, Trinity FS, 96 Samples

**All AVITI-compatible reagents are available for individual purchase.*

Quality and scale come without compromise when you partner with Twist Bioscience.

We work in the service of customers who are changing the world for the better. In fields such as medicine, agriculture, industrial chemicals, and data storage, by using our synthetic DNA tools, our customers are developing ways to better lives and improve the sustainability of the planet.

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