xGen® Exome Research Panel—exceptional uniformity and complete coverage

Independent analysis from a large genome center demonstrates superior performance of the xGen® Exome Research Panel compared to other vendors' panels

- Superior uniformity and on-target performance
- Comprehensive coverage of human coding gene sequences in RefSeq database
- Comprehensive capture of entire exome, including GC-rich regions such as first exons
- Robust and reproducible performance from individually synthesized and quality controlled probes manufactured under GMP standards

Compared to whole genome sequencing, exome sequencing of coding regions within the human genome improves variant calling ability, reduces sequencing costs, and increases sample throughput. Ideal captures deliver interpretable content with maximum efficiency by achieving both high coverage uniformity and on-target mapping with minimal sequencing reads.

The xGen Exome Research Panel consists of 429,826 individually synthesized and quality controlled xGen Lockdown® Probes designed to version hg19 of the human genome assembly. The high quality of these probes, combined with optimized hybridization reagents and protocols, results in a substantial improvement in on-target mapping rate and coverage uniformity compared to other commercially available exome panels. The Exome Research Panel allows variants to be called using fewer reads and, therefore, at lower cost.

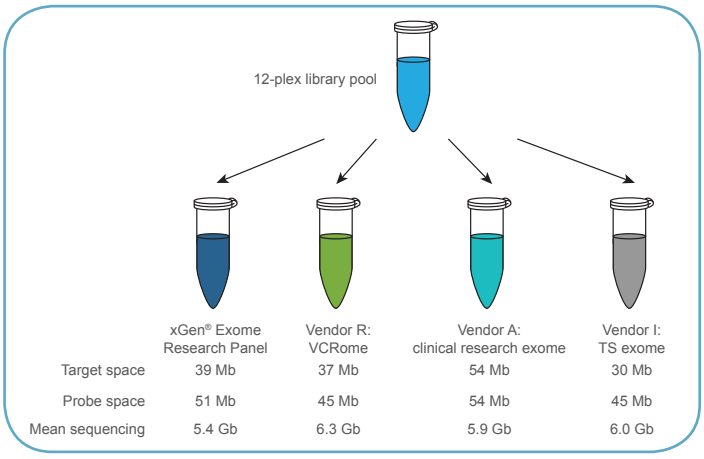

Figure 1. Experimental setup for comparative analysis. Twelve shear ligation libraries were prepared in parallel and pooled, using 500 ng of each library. The 12-plex pool was split into 4 for assessment of each vendor's exome panel and target capture was performed according to each vendor's recommended protocol. Enriched libraries were sequenced on the HiSeq® 2500 (Illumina) in high output mode. **Note:** The exome panel from Vendor I required two capture reactions per sample.

Highest coverage uniformity

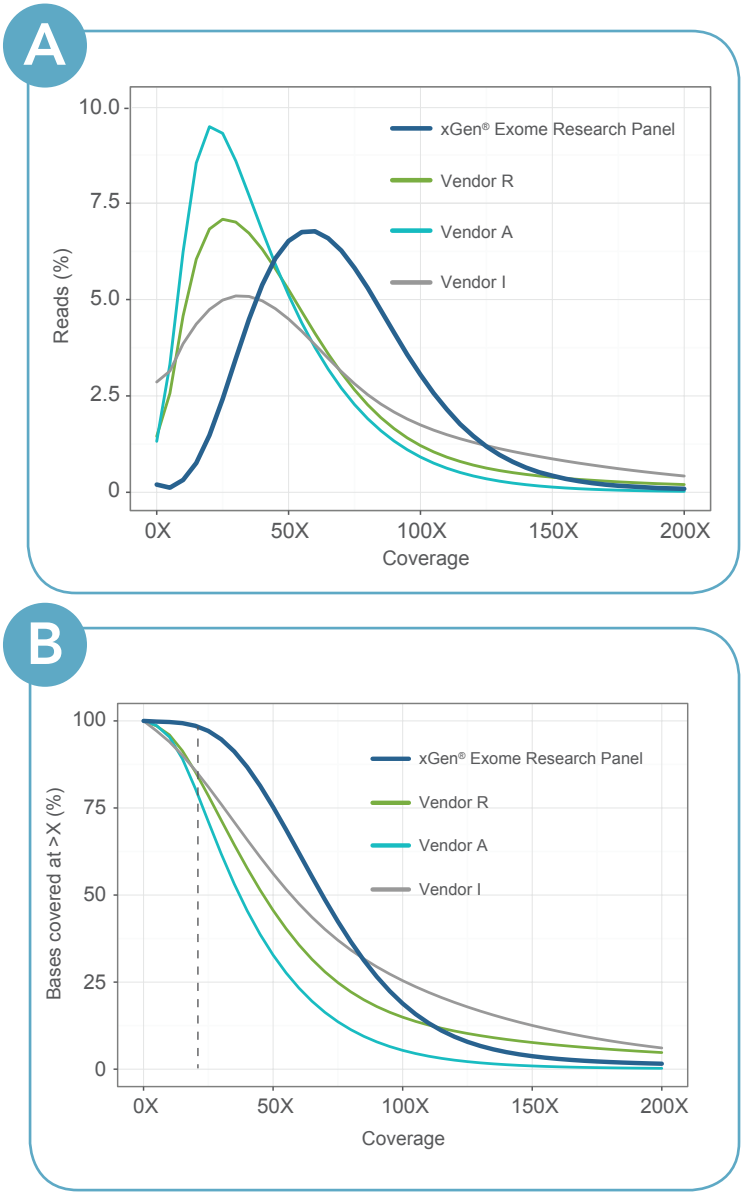

Figure 2. High coverage uniformity from xGen® Exome Research Panel. A focused target space and premium hybridization probes provide highly uniform coverage of the exome. **(A,B)** Uniform coverage enables accurate variant calling with minimal sequencing cost. **(B)** Over 97% of bases in the xGen Exome Research Panel were covered at 20X depth, compared to less than 81% from the other vendors:

Vendor	% of bases covered at >20X
IDT (xGen® Exome Research Panel)	97.1
Vendor R	78.5
Vendor A	71.1
Vendor I	81.0

www.idtdna.com

Comprehensive coverage of first exons

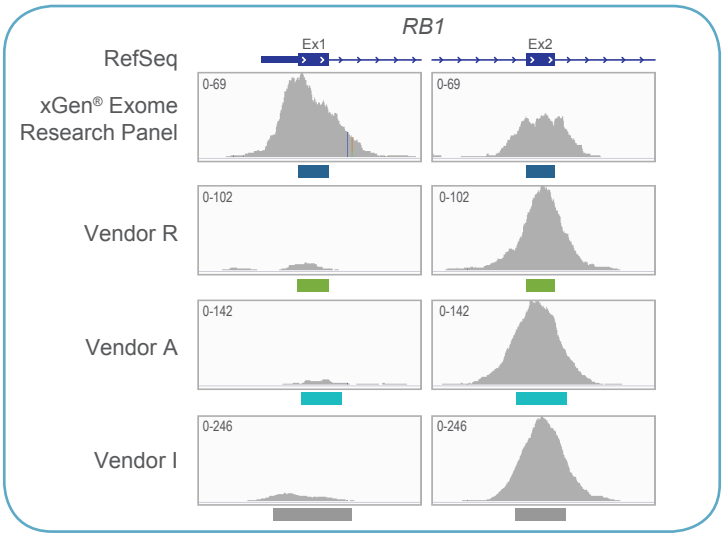

Figure 3. Improved capture of first exons with xGen® Exome Research Panel. The xGen Exome Research Panel provides even coverage across the entire human exome, including regions that are traditionally more difficult to sequence, such as GC-rich first exons, as shown for the *RB1* gene.

Superior on-target performance

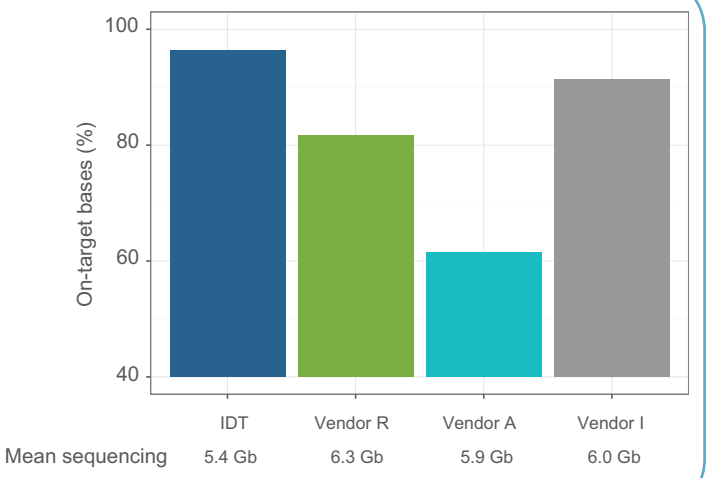

Figure 4. Highest on-target rate delivered by xGen® Exome Research Panel. The percentage of bases on target for each vendor's panel was calculated across a 500 bp flanking region.

Modular technology

The xGen Exome Research Panel, like all xGen Lockdown Panels, is modular. This facilitates easy addition of custom probes or spike-in panels to augment existing content or increase focus on particular regions of interest. Therefore, panel expansion and updating is simple, flexible, and cost-effective. Unlike with other enrichment technologies, no optimization or rebalancing is required. Coverage for spiked-in content can also be "tuned" to a desired coverage depth by simply adjusting the concentration of the spike-in pool relative to the parent panel.

Conclusions

In this study, an independent, large genome center compared the xGen Exome Research Panel to exome panels from other vendors (Figure 1). Results showed that the xGen panel delivered the most uniform coverage (Figures 2 and 3) and highest on-target mapping (Figure 4) of the exome of the panels tested. We attribute these results to our superior manufacturing process, whereby target capture probes are individually synthesized and quality control (QC) tested. Our individual synthesis method puts us in the unique position of being able to perform QC on probes individually, ensuring the final pool contains each probe at the required concentration. Probes that do not pass QC are resynthesized before being added to the pool. Our manufacturing and pooling process also ensures batch-to-batch consistency of the xGen Exome Research Panel. The efficient and comprehensive design of the panel focuses on high coverage of annotated coding regions. Taken together, these data support the ability of the xGen Exome Research Panel to deliver highly accurate variant calls across the human exome with maximum sample multiplexing capabilities to lower overall sequencing costs by up to 55%*.

* Reported by the genome center. Based on the calculated number of reads required to achieve 80% of bases covered at 20X or higher.

Ordering information

Product	Size	Catalog #
xGen® Exome Research Panel	16 rxn	1056114
	96 rxn	1056115