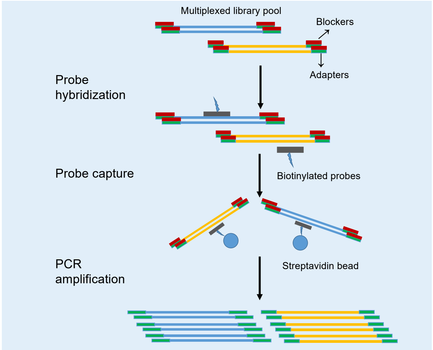
NGS PANEL: HYBRIDIZATION CAPTURE OR AMPLICON SEQUENCING?

CD Genomics
The Genomics Services Company

Next-generation sequencing (NGS) panel is a targeted sequencing that allows us to simultaneously study multiple genes/variants of clinical utility and validity. NGS panels serve as a cost-effective and time-efficient tool for diagnostics and individual patient care. There are several approaches of custom NGS panel, with hybridization capture and amplicon sequencing being the most common.

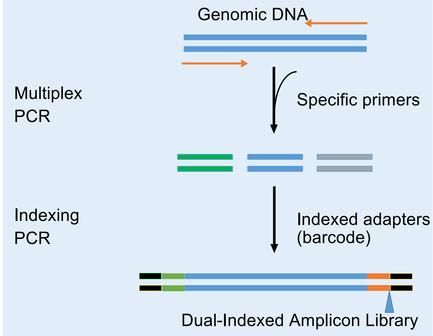
HYBRIDIZATION CAPTURE



Multiplexed sequencing library is constructed and hybridized in solution with a set of biotinylated, specific probes. Target sequences are captured using streptavidin beads. Non-specific molecules are washed away and the RNA is eluted. Eluted library is then subjected to PCR amplification and deep sequencing.

Hybridization capture methods are often used for multigene panels in clinical applications due to their reproducibility, specificity, and scalability.

AMPLICON SEQUENCING



Amplicon sequencing is performed by conducting each PCR experiment and library assessment twice, followed by sequencing. The first PCR experiment amplifies the target sequences with specific probes. After the first quality assessment, the second PCR is performed to ligate adapters and barcodes, followed by the second quality assessment.

Amplicon-based targeted sequencing is a reliable solution for NGS applications focusing on specific genomic regions because of its high specificity and deep coverage.

HYBRIDIZATION CAPTURE VS AMPLICON SEQUENCING

	Hybridization Capture	Amplicon Sequencing
Input amount	Low DNA input (10-100 ng)	> 1 ug DNA
Workflow	Complex and laborious workflow	Simple and fast workflow
Gene content	Larger gene content, typically > 50 genes	Smaller gene content, typically < 50 genes
Numbers of targets per panel	Virtually unlimited by panel size	Fewer than 10,000 amplicons
Sensitivity	Down to 1% without molecular barcodes. PCR cycles are minimized, but not excluded.	Down to 5%, more vulnerable for false positive and negative calls.
Total time	More time	Less time
Cost	Generally higher cost	More affordable
Detect Variants	Comprehensive profiling of all variant types	Ideal for analyzing single nucleotide variants (SNVs) and insertions/deletions (indels)

HYBRIDIZATION CAPTURE OR AMPLICON SEQUENCING

Amplicon sequencing can be completed in the shortest amount of time.

Time

Hybridization capture allows more targets to be enriched and sequenced per panel.

Throughput

Hybridization capture performs better with respect to uniformity and complexity, while amplicon sequencing has higher on-target rates, but at the cost of uniformity.

Target Rate & Uniformity

CD GENOMICS PROVIDES PREDESIGNED & CUSTOM PANELS

CD Genomics has developed a specialized platform for targeted sequencing of disease-related genes to accelerate research on disease pathogenesis, disease identification, biomarker discovery, targeted drug development, *etc*. We offer predesigned NGS panels, which include a designed library of targeted sequencing, as well as custom panels that allow customers to select genes of interest to design their own sequencing panels.

Cancer Panel	Pan-Cancer Panel Hereditary Cancer Panel Lung Cancer Panel Colorectal Cancer Panel Breast Cancer Panel Gynecological Cancer Testing Thyroid Cancer Panel Esophagus Cancer Panel Glioma Panel
Mitochondrial Disease Panel	
Inherited Disease Panel	Genetic Disease Screening Neonatal Genetic Diseases Screening Skeleton System Disease Panel
Pathogens Detection	HPV/EBV/HBV Capture Pathogens Capture Sequencing
Health Related Research	Whole Exome Sequencing Tumor-susceptibility Genes Testing Cardiovascular and Cerebrovascular Test
Pharmacogenomics Testing	Drug Safety for Adult