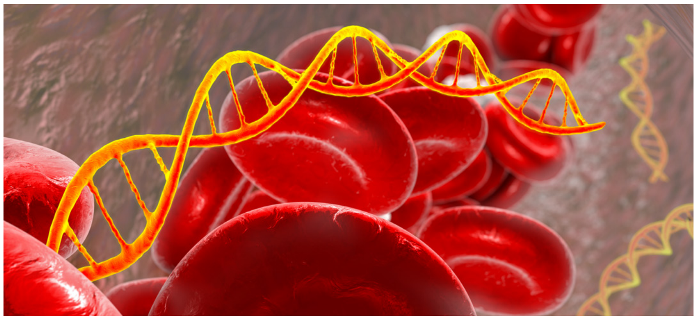
Tech Spotlight
Liquid Biopsy

KAPA EvoPrep for Liquid Biopsy

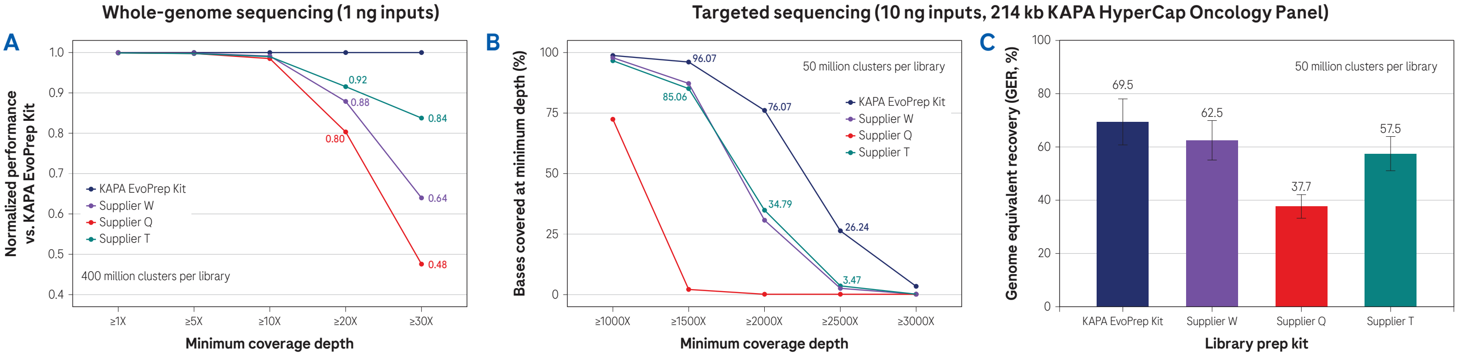
Highly efficient library prep for high-confidence mutation analysis

Liquid biopsy is a simple, non-invasive approach for detecting circulating tumor DNA (ctDNA) fragments for cancer research applications. Compared to traditional tumor biopsies, liquid biopsies typically yield higher quality DNA for molecular analyses and provide a more holistic representation of the tumor.

Next-generation sequencing from cell-free DNA (cfDNA) is **inherently challenging** due to the limiting amounts of DNA from plasma samples. Library preparation efficiency is critical to preserve every unique molecule and enable high-confidence analysis of low-frequency mutations.



Streamlined, high-efficiency library prep translates to superior sequencing metrics and high-confidence mutation analysis


Whole-genome sequencing (1 ng inputs)

Targeted sequencing (10 ng inputs, 214 kb KAPA HyperCap Oncology Panel)

Figure 1. Highly efficient library preparation enables superior sequencing metrics. The KAPA EvoT4 DNA Ligase contained in the KAPA EvoPrep Kit offers exceptional ligation efficiency with only 5 min of ligation time. This recovery of more unique molecules from low-input samples than with competitor kits, translating to improved genome equivalent recovery (GER) and improved base coverage at increasing sequencing depths, in both whole-genome and targeted sequencing applications. **(A)** WGS libraries (*n*=4) were prepared from 1 ng inputs of cfDNA from healthy donors, and libraries for targeted sequencing (*n*=3) from 10 ng inputs. All libraries were prepared according to manufacturers' instructions. **(B, C)** Target enrichment was performed with the KAPA HyperCap cfDNA Evolved Workflow v2.0 and the KAPA HyperCap Oncology Panel (214 kb) which covers 24 SNVs and 12 indels in a commercially available cfDNA sample (Seraseq® ctDNA Mutation Mix v2 AF 0.125%).

Whole-exome sequencing (1 ng inputs)

% reads on target 80.7 ±0.3	**% GER** 28.7 ±0.1
Unique depth 94.7 ±0.5	**Fold 80 base penalty** 1.47 ±0.0

Figure 2. Key WES sequencing metrics. Libraries (*n*=3) were prepared from healthy donor cfDNA and enriched using the KAPA HyperCap cfDNA Evolved Workflow v2.0 with KAPA HyperExome V2 Probes. As in the above examples, the KAPA EvoPrep Kit supported high coverage depth and coverage uniformity, which translates to high-confidence mutation detection and improved sequencing economy.

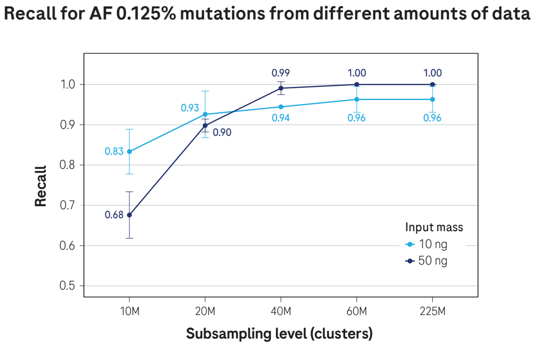

Recall for AF 0.125% mutations from different amounts of data

Figure 3. Superior sequencing metrics translate to high-confidence mutation detection. Libraries (*n*=3) were prepared from 10 ng or 50 ng reference cfDNA (Seraseq® ctDNA Mutation Mix v2 AF 0.125%) with the KAPA EvoPrep Kit. Target enrichment was performed as described above. Even at 10 ng input, >90% recall was achieved for mutations with an allele frequency of 0.125% with only 20 million clusters per library.

Data on file at Roche.

Streamlined workflow supports exceptional performance

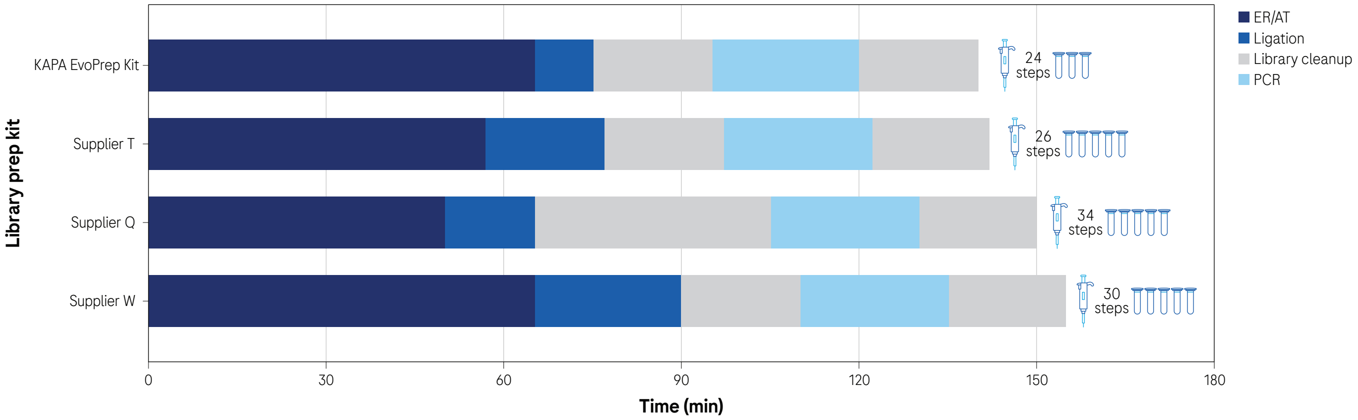


Figure 4. Turnaround time, from DNA input to library (for sequencing or target enrichment) for the KAPA EvoPrep Kit and three competitor kits used in this study. In addition to superior sequencing metrics, the KAPA EvoPrep Kit offers the shortest workflow, fewest pipetting steps, and least amount of plastic waste. Featuring ready-to-use ReadyMixes for every step, the KAPA EvoPrep Kit offers a robust library preparation solution that is compatible with low- and high-throughput pipelines and is easy to automate—especially when the plated kit format is used. Number of tubes depicted represent core reagents only, and exclude accessory reagents such as adapters, PCR primers, and purification beads/buffers.

Summary

KAPA EvoPrep Kits utilize an **evolved ligase**, **ReadyMix formats**, and a **streamlined protocol with minimal handling** to achieve exceptional recovery of unique cfDNA molecules (genome equivalents).

Highly efficient library preparation and amplification with the engineered, high-fidelity KAPA HiFi DNA Polymerase translates to **high coverage depth and uniformity** in both whole-genome, whole-exome, and targeted sequencing of liquid biopsy samples.

Superior sequencing metrics enable **highly sensitive and accurate analysis of low-frequency mutations** and enables improved sequencing economy over competitors.

Learn more...

about the **KAPA EvoPrep Kit** and how it can enable you to prepare the highest quality libraries from liquid biopsy samples.

Click **here** or scan the code below:

Data on file at Roche.
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