

LiquidBiopsy Platform



The analysis of liquid biopsy samples opens up opportunities to conduct research, potentially identify new biomarkers, and develop tests that may, in the future, impact tumor detection and response to therapy.

The Ion Torrent™ LiquidBiopsy™ Platform enables the isolation and molecular analysis of circulating tumor cells (CTCs) and cell-free DNA (cfDNA) from whole-blood samples. Achieving high target cell recovery and exceptional purity, the platform enables downstream molecular characterization of CTCs, cfDNA, and germline DNA from a single blood sample using next-generation sequencing (NGS) on the Ion S5™ System (Figure 1).

Optimized for accurate, reproducible results in your lab

Optimized for translational and clinical research, the automated cfDNA and CTC enrichment protocols, coupled with Ion AmpliSeq™ and Ion Torrent™ technologies, enable:

- Analysis of cfDNA and CTC DNA from a single 7.5 mL blood sample
- Automated cfDNA purification on-platform
- Improved specificity, scalability, and standardization over manual methods

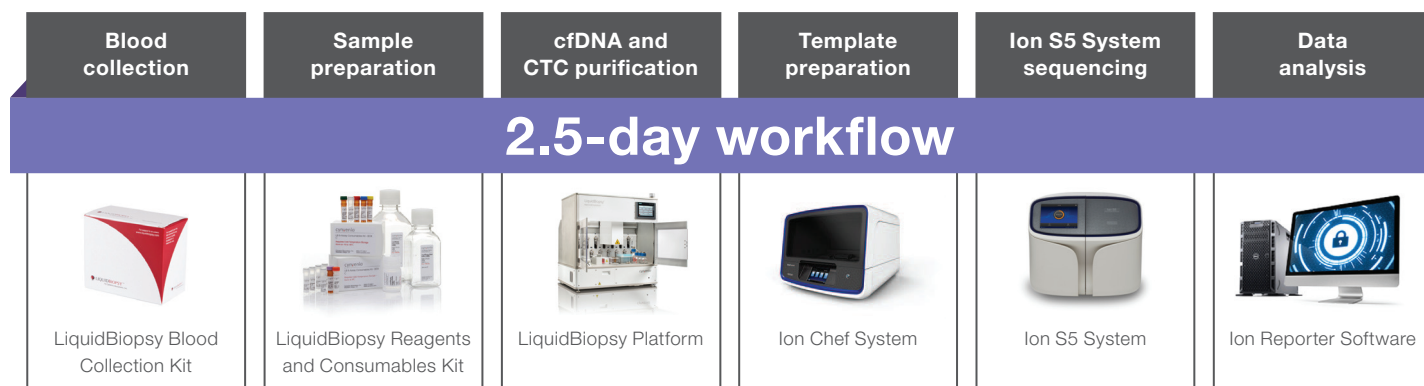


Figure 1. LiquidBiopsy workflow designed to enable analysis of three rare templates from a single blood sample. A single blood sample (10 mL) is fixed using the blood collection kit and remains stable for 96 hours. 0.2 mL is removed and centrifuged to isolate and pellet the white blood cells (WBCs), which are digested with digestion buffer to prepare a WBC germline control library. The remaining sample is centrifuged to separate the plasma for manual or automated cfDNA isolation with the Applied Biosystems™ MagMAX™ Cell-Free DNA Isolation Kit. Automated cfDNA isolation is enabled on the instrument using an optional cfDNA fixture. Remaining sample is tagged with antibodies and magnetic beads, and is processed on the LiquidBiopsy Platform to isolate CTCs. Following automated capture, labelled and stained cells can be optionally imaged for internal quality control and enumeration. Ion AmpliSeq™ libraries are prepared from all three templates. The three libraries are loaded onto one Ion sequencing chip. The results are analyzed with Ion Reporter™ Software to show variants in cfDNA and CTCs from the same sample, while the germline control helps to identify somatic mutations. Optional verification is possible using the Applied Biosystems™ QuantStudio™ 3D Digital PCR System.

- Automated staining and CTC enrichment, enabling enumeration, imaging, and easy sample handling for downstream NGS workflows
- High capture rate and exceptional purity necessary for molecular analysis using NGS (Figure 2)
- Greater confidence in called variants results from a consistent number of captured WBCs, and germline control run with each sample (Figure 3)
- Highly accurate sequencing from low DNA input without whole-genome amplification
- A sensitivity of >95% for $\geq 1\%$ allele frequency for single nucleotide variants (SNVs) and insertion or deletion (indel) variants as part of a predefined workflow
- Multiplexing—supports up to 4 samples at once

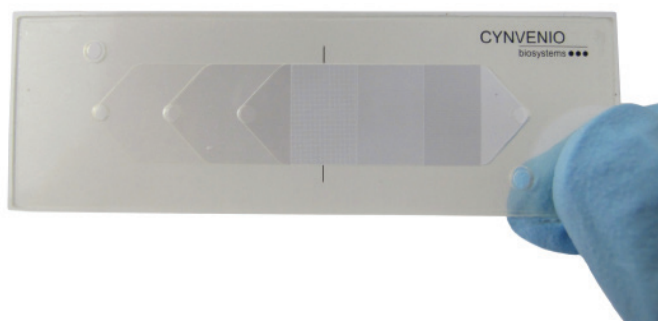


Figure 2. Proprietary flow chip that processes the reagents for the selection and isolation of circulating DNA. The unique design of the chip helps enable a high rate of capture of mutation-bearing circulating DNA while avoiding impurity or the unwanted binding of nontarget content to the surfaces of the separation device. The flow chip has the same form factor as a standard pathology slide and yields high sample purity necessary for molecular research analysis by NGS.

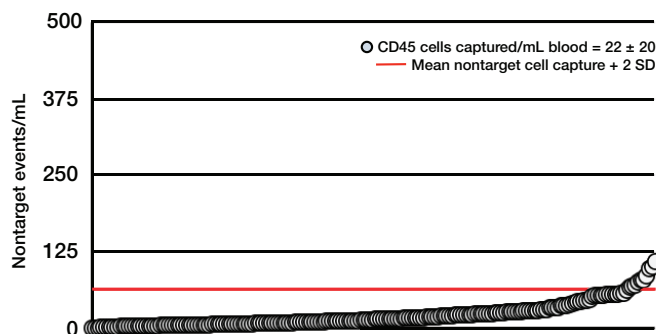


Figure 3. Nontarget cell carryover. The workflow is optimized to hold the number of captured nontarget cells relatively constant. Data from 198 samples show 22 CD45 cells captured per 1 mL blood. By building a sequencing assay that accommodates the ~165-cell background in a 7.5 mL sample, it is possible to mine the background for the specific population of cells of interest.

Ordering information

Product	Cat. No.
LiquidBiopsy Blood Collection Kit	A28171
LiquidBiopsy Reagents and Consumables Plastics Kit	A28186
LiquidBiopsy Reagents and Consumables cfDNA Kit	A32619
LiquidBiopsy cfDNA Fixture	A31833
LiquidBiopsy Reagents and Consumables Combo Kit	A32500
LiquidBiopsy Platform	A28188
Ion Chef System	4484177
Ion 530 Chip Kit	A27764
Ion S5 System	A27212

Find out more about ordering information and workflow components at thermofisher.com/liquidbiopsyplatform