

## Tracing tumor evolution by liquid biopsy

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Liquid Biopsy has been defined as the analysis of tumor cells or products released from primary or metastatic tumor tissues into the blood or other body fluids. Tracing tumor evolution by liquid biopsy has been highlighted in the latest Nature Milestone Cancer edition as key discovery of the past 20 years. In particular, circulating tumor cells (CTCs), circulating cell-free DNA fragments derived from tumor tissue (ctDNA) and extracellular vesicles have received enormous attention as new biomarkers and subject of translational research. Liquid biopsy research has opened new avenues for a better understanding of tumor biology in cancer patients, including intra-patient heterogeneity and evolution towards resistance to therapy. Clinical applications include early cancer detection, improved cancer staging, early detection of relapse, real-time monitoring of therapeutic efficacy and detection of therapeutic targets and resistance mechanisms. In particular, interventional clinical studies are required to demonstrate clinical utility of liquid biopsy as an important prerequisite for the introduction of this new diagnostic approach into clinical practice. Moreover, assay harmonization and standardization as conducted by international consortia like the European Liquid Biopsy Society (ELBS; [www.elbs.eu](http://www.elbs.eu)) is essential. Here, I will discuss a conceptual framework of liquid biopsy assays and point out current challenges of liquid biopsy research, which might structure this dynamic field of translational cancer research.