Editorial

Liquid Biopsy

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The diagnosis of cancer has undergone a paradigm shift. More and more the diagnostic algorithm is supported by immunohistochemical and molecular alterations at the DNA, mRNAs, miRNAs and proteomic level.[1] Recent scientific advances in understanding circulating tumor cells, cell-free DNA/RNA, and exosomes in blood have laid a solid foundation for the development of routine molecular 'liquid biopsies'. This approach produces non-invasive access to genetic information - somatic mutations, epigenetic changes and differential expression - about the physiological condition of body and& diseases, using circulating biomarkers.[2,3] With the rapid development of highly sensitive and accurate technologies such as next generation sequencing, molecular liquid biopsies will quickly become a central piece in the future. The tumuor biomarkers are Cell free DNA (ct DNA), circulating tumor cells (CTCs), Exosomes and micro vesicles. Samples are taken usually obtained from Blood, serum / plasma, urine, CSF, saliva. Circulating Tumor cell enrichment technologies include positive-negative selection, filtration, chip, Ficoll gradient, electric field, single spiral micro channel and analysis. Analysis is done by immunocytological technologies, molecular RNA basad technologies, functional assays and invasion assay.[4] Circulating tumor DNA (ct DNA) has very short half-life ranging from 15 min to several hours and it is stable in plasma at 800c, so after blood collection in EDTA tubes plasma has to isolated and stored at 800 c within one hour of collection. Preservative tubes can be used to stabilize the ct DNA in blood for up to 4 days at room temperature. Sample is extracted on the same day as the downstream process set up due to ct DNA instability. Ct DNA is extracted from the plasma using the QIA amp circulating nucleic acid on the QIAVac system. Then disease is diagnosed. A new addition in liquid biopsy is tumor educated platelet, which are present in the tumor micro-environment releasing into the blood stream.[5] The biology behind this new diagnostic role of tumor educated platelets (TEPs) is the well-known interaction between blood products and tumor cells. Liquid biopsy is done to monitor residual disease in patients with known mutations in the primary tumor, monitor treatment efficacy in patients, monitor disease progression and tumor evolution (i.e. development of tumor resistance), help the physician explore other options of treatment when the patient is resistant to current therapies, provide an alternative method for biopsy when tissue is difficult to obtain or not available or when the primary site of metastatic disease is unknown, provides an alternative method for biopsy when the quantity of tissue obtained in a biopsy sample is limited and also provide prognostic information.[1,4,5] At the moment, liquid biopsy is recommended, when a tissue biopsy is difficult, such as in case of lung cancer, or when the original site of the disease is unknown. Liquid biopsies have a powerful role in helping patients get to the right treatment. Molecular analysis of cancer is required to optimize patient treatment. New method such as next generation sequencing show immense promise for the future. Liquid biopsy is coming of age and will change practice which will enable oncologists to use drugs intelligently to combat changes in individual cancers as they happen.

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