

A promising biomarker of early cancer detection: the liquid biopsy

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Circulating tumour Cells (CTCs) analysis, as a 'liquid biopsy', can provide valuable information useful to the personalized medicine both in early diagnostic and in the prognostic cancer phase. The tremendous impact of CTCs on personalized medicine and their relevance on multimodal approaches in oncology practice to improve cancer patients' survival respecting their quality life, reducing overall cost of drug development and increasing more effective healthcare for patients. Since 2007 our laboratory has worked on tumor cells isolated by peripheral blood respecting their heterogeneous composition (1,2,3). We obtain short-time primary cultures of circulating tumor cells from peripheral blood extracted from patients suffering from all types of solid tumors, including glioblastoma, regardless of the stage. We have worked to standardize the procedure also applying it to peripheral blood of both healthy subjects and subjects affected by chronic inflammation. We have grown tumor cells on slides mounting chambers and the resulting slides were used by anatomical pathologist for the diagnosis of disease in clinical cases in which tissue biopsy cannot be performed. Our results showed the correlation between the tissue and liquid biopsy in the same patient and demonstrated is possible to perform exacted diagnosis using the slide produced by our methodology. On this point of view, the use of Circulating Cancer cells recovered on slide offers a novel prospective for the early detection of cancer disease and increasing the chance of personalized cure.

References

1) In vitro expansion of tumour cells derived from blood and tumour tissue is useful to redefine personalized treatment in non-small cell lung cancer patients. Malara NM, Givigliano F, Trunzo V, Macrina L, Raso C, Amodio N, Aprigliano S, Minniti AM, Russo V, Roveda L, Coluccio ML, Fini M, Voci P, Prati U, Di Fabrizio E, Mollace V. *J Biol Regul Homeost Agents*. 2014 Oct-Dec;28(4):717-31.

2) Folic acid functionalized surface highlights 5-methylcytosine-genomic content within circulating tumor cells. Malara N, Coluccio ML, Limongi T, Asande M, Trunzo V, Cojoc G, Raso C, Candeloro P, Perozziello G, Raimondo R, De Vitis S, Roveda L, Renne M, Prati U, Mollace V, Di Fabrizio E. *Small*. 2014 Nov 12;10(21):4324-31. doi: 10.1002/sml.201400498. Epub 2014 Jul 14

3) Protein-carbohydrate complex reveals circulating metastatic cells in a microfluidic assay. Simone G, Malara N, Trunzo V, Perozziello G, Neuzil P, Francardi M, Roveda L, Renne M, Prati U, Mollace V, Manz A, Di Fabrizio E. *Small*. 2013 Jun 24;9(12):2152-61. doi: 10.1002/sml.201202867. Epub 2013 Feb 11.