Laser Isolation of Circulating Tumoral Cells in Liquid Biopsy

Carlos Molpeceres[1,*], Sara Lauzurica[1], Andrés Muñoz[2]

[1] Centro Láser. Universidad Politécnica de Madrid. C/ Alan Turing, 1.
[2] 2Medical Oncology Service. Hospital General Universitario Gregorio Marañón. Instituto de Investigación Sanitaria Gregorio Marañón (IiSGM). CiberOnc. Madrid, Spain.
*Corresponding author email: carlos.molpeceres@upm.es

The isolation of circulating tumor cells (CTCs) with high cell viability for further multi-omic analysis and organoid generation is a turning point in modern oncology. In recent years, CTCs and CTC cluster research have completely changed the roadmap of disruptive translational technologies in oncology, mainly because if adequate CTC isolation without cell modification could be achieved in liquid biopsies, this would mean a paradigm shift in clinical and preclinical oncology. In this work, we present a proof of concept of CTCs isolation using Blister Actuated Laser Induced Forward Transfer (BA-LIFT) and demonstrate that the technique is not only valid for isolation and further single cell sequencing for multiomic analysis, but also for CTCs cell culture, which opens the possibility of using them to study tumour biology and generate new patient-derived models.

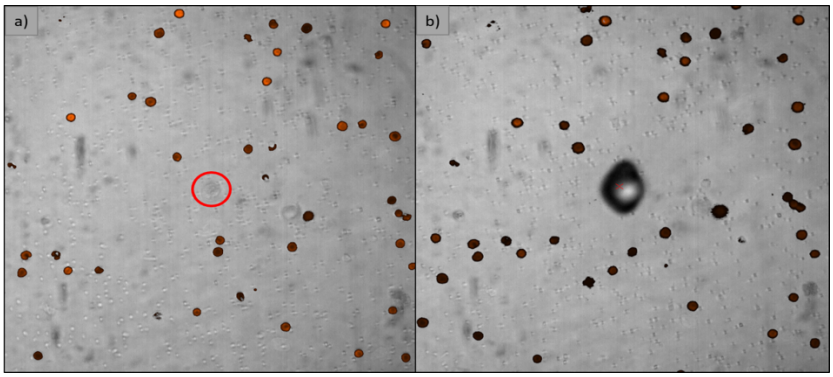

Figure: a) detected non-stained CTC cell, b) Image after laser irradiation: the shadow left is due to blister formation after laser transfer process in the cell location. In both pictures peripheral blood mononuclear cell (PBMCs) appear stained.

Refs.

[1] Marquez A, et al. Fluorescence enhanced BA-LIFT for single cell detection and isolation. BIOFABRICATION. 2020 Feb 26;12(2):025019
[2] Molpeceres C, et al., 2023, Laser transfer for circulating tumor cell isolation in liquid biopsy. Int J Bioprint. https://doi.org/10.18063/ijb.720

Ethics approval and consent to participate
The human study protocol was approved by Comité de Ética de la Investigación con Medicamentos (CEIm), Hospital General Universitario Gregorio Marañón.

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