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# Evaluation of cancer cells mechanical phenotype associated with the resistance to treatment in myeloid leukemia

Camila Martin Cardozo<sup>\*1,2</sup>, Sylvain Lefort<sup>2</sup>, and Magalie Faivre<sup>1</sup>

<sup>1</sup>INL - Dispositifs pour la Santé et l'Environnement – Institut des Nanotechnologies de Lyon, Université Claude Bernard - Lyon I, CPE LYON, Centre National de la Recherche Scientifique - CNRS, Ecole Centrale de Lyon, INSA Lyon, France – France

<sup>2</sup>Centre de Recherche en Cancérologie de Lyon – Centre Léon Bérard [Lyon], Université Claude Bernard Lyon 1, Institut National de la Santé et de la Recherche Médicale, Centre National de la Recherche Scientifique – France

## Abstract

Acute myeloid leukemia (AML) is a cancer of the myeloid line of blood cells, characterized by the abnormal proliferation of leukemia cells (or blasts) that build up in the bone marrow and the blood. These blasts interfere with normal blood cell production due to their inability to differentiate into mature cells. Despite the recent progress in therapies, which consist essentially, despite the emergence of new targeted therapies, in intensive cycles of chemotherapy, most of the AML patients do not recover, having a five-year survival rate of 20%. Preliminary results show different mechanical profile associated with cells that are sensitive and resistant to different types of treatment, these results suggest that there is a correlation between resistance to treatment and cell stiffness.

One of the simplest and widely utilized methods in literature for measuring cellular mechanical properties involves passive microfluidic techniques with high throughput is the monitoring of cell deformations as they flow through microfluidic constricted channels (1). Here we propose an original readout traducing the way the cell perturbs the pressure distribution in the device when flowing through the constriction (2).

This project seeks to evaluate and characterize the mechanical properties of AML cells, aiming to establish a correlation between cell stiffness and their resistance to treatment. In the long term, the goal of this study is to utilize cell stiffness as a predictive factor in determining the likelihood of disease relapse for AML patients, offering valuable insights for personalized treatment strategies.

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(2) Abkarian, M., Faivre, M., & Stone, H. A. (2006). High-speed microfluidic differential manometer for cellular-scale hydrodynamics. *Proceedings of the National Academy of Sciences of the United States of America*, 103(3), 538–542. <https://doi.org/10.1073/pnas.0507171102>

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\*Speaker