

Cleveland Clinic and MeCo Diagnostics publish first-ever study of mechanical conditioning in circulating tumor cells

Pioneering study bolsters rationale for targeted antifibrotic therapy in early breast cancer, reaffirming drug repositioning strategies across pharma

SAN DIEGO, CA, UNITED STATES, June 26, 2025 /EINPresswire.com/ -- A multinational breast cancer study has revealed surprising insights into an aggressive cancer phenotype driven by tumor fibrosis—a phenomenon known as mechanical conditioning—which affects nearly half of all breast tumors. The unexpected discovery emboldens drug repositioning and label expansion strategies for second-generation antifibrotics under development at leading pharma companies.



The publication marks the culmination of a multi-year collaboration between MeCo Diagnostics and several prominent research institutes, including Cleveland Clinic and University Hospital Zürich, which are [ranked globally by Newsweek as #2 and #10](#), respectively, in World's Best Hospitals 2025. Additional support was provided by the University of Arizona Cancer Center and the USC Norris Comprehensive Cancer Center.

The report, "Mechanical Conditioning (MeCo) Score Progressively Increases Through the Metastatic Cascade in Breast Cancer via Circulating Tumor Cells," appears in the journal [Cancers](#). The study was led by senior author Dr. Julie E. Lang, Chief of Breast Surgery at Cleveland Clinic. It demonstrates that mechanical conditioning intensifies throughout cancer progression, challenging the conventional understanding of the phenomenon.

The study was enabled by the MeCo Score, a first-in-class biomarker that quantifies mechanical conditioning. The MeCo Score now boasts three clinical successes; earlier studies demonstrated that High MeCo Scores predicted poor survival in patients unless they received antifibrotic therapy, which dramatically reduced their risk of recurrence. Given that ~50% of breast tumors



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*Dr. Adam Watson, CEO at
MeCo Diagnostics*

are classified as High MeCo Score, these three studies collectively suggest a profound opportunity to improve long-term survival among patients.

Researchers analyzed patient-matched tumor samples—comparing solid vs. liquid biopsies—from patients with either early- or late-stage disease, thereby producing the first comprehensive analysis of mechanical conditioning throughout disease progression: MeCo Scores were significantly higher in circulating tumor cells (CTCs) compared to matched primary tumors in stage II-III

patients ($p = 0.026$); and MeCo Scores were significantly higher in distant metastatic tumor sites compared to matched CTCs in stage IV patients ($p = 0.0004$). This striking pattern also provides compelling support for the fascinating theory of [mechanical memory](#) in cancer biology.

“These findings help explain why targeted antifibrotic therapy was previously shown to be remarkably effective for High MeCo Score patients,” explained Dr. Adam Watson, CEO of MeCo Diagnostics and lead inventor of its technology.

The MeCo Score was specifically designed to be drug-agnostic, pathway-agnostic, and even mechanism-of-action-agnostic, thus maximizing its forward compatibility as a companion diagnostic test for antifibrotic therapy, with broad potential in oncology. Breast cancer alone represents a ~6X larger market than idiopathic pulmonary fibrosis (IPF), the proposed indication for many antifibrotic drug candidates.

About MeCo Diagnostics:

MeCo Diagnostics Holdings, Inc. is a seed-stage medtech company based in San Diego, CA, commercializing first-in-class predictive diagnostic tests to match cancer patients with antifibrotic therapy.

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