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ARTIDIS enters clinical collaboration to investigate nanomechanical profiling as a novel diagnostic and treatment optimization approach in patients with lung cancer

Basel, Switzerland, May 4, 2021 – ARTIDIS AG, a privately held health-tech company, announces a collaboration with Hospital Clínic de Barcelona and the University of Barcelona to investigate the ARTIDIS AFM technology as a novel diagnostic tool for patients with non-small cell lung carcinoma (NSCLC), the most frequent type of lung cancer. The research partners will identify biomarkers that will enable fast and accurate lung cancer diagnosis in a clinical bedside setting. Based on the combination of results from these novel nanomechanical signatures with additional patient information in the ARTIDISNet platform, a targeted and individualized treatment approach for each patient can be identified.

In this research collaboration, ARTIDIS and teams from the University of Barcelona and Hospital Clínic de Barcelona will perform comparative analyses of nanomechanical profiles of cancer tissue and sub-cellular components, i.e. tumor microenvironments (TME), in human lung biopsies of patients with NSCLC undergoing surgery at the Hospital Clinic of Barcelona. The teams will use the proprietary ARTIDIS technology that provides nanomechanical profiling, based on atomic force microscopy of patient-derived tissues directly at the patient's bedside, and combines it with extensive clinical information to deliver fast diagnosis and optimized treatment plans. This 18-month study aims at identifying distinct nanomechanical signatures of major histological subtypes of NSCLC as well as their genetic and immune phenotype ('hot' and 'cold' tumor). Beyond that, the study aims to show that nanomechanical profiling may be a suitable diagnostic approach in lung cancer with advantages over existing methods, including fast diagnostic assessment, increased accuracy and high specificity with a low proportion of false positives, and could contribute to an early evaluation of the expected treatment response. The results of this collaboration will have a major impact on the information available to help to select the best treatment option for lung cancer patients.

"Physicists and engineers have long used atomic force microscopy to unravel the aberrant mechanobiology of preclinical models of cancer in laboratory settings. Now we bring ARTIDIS' exciting technology to the clinic to investigate and identify novel nanomechanical biomarkers with the ultimate goal of enabling better treatment outcomes through optimized diagnosis and more guided therapeutic selections," said **Dr. Jordi Alcaraz, Associate Professor at the School of Medicine, University of Barcelona (UB) and associate group leader at the Institute for Bioengineering of Catalonia (IBEC)**.

"Although the survival of cancer patients has improved thanks to the introduction of targeted therapies, we still need better tools to predict treatment response. In this collaboration, we expect to define tailor-made therapies by classifying cancer subtypes, based on nanomechanical profiles of tumor cells and their microenvironment established using atomic force microscopy, and merging these findings with the patient's clinical data from his/her own medical history. Ultimately, we aim at providing personalized treatments for cancer patients which will hopefully contribute to better outcomes," added **Dr. Noemi Reguart, Medical Oncologist at the Hospital Clínic de Barcelona (HCB)**.

"Our collaboration with some of Europe's leading research and healthcare centers will provide invaluable insight into the nanomechanical features and the treatment of NSCLC," said **Marija Plodinec, Ph.D., CEO at ARTIDIS**. "It will establish nanomechanical signatures as key biomarkers in lung cancer and will allow to differentiate NSCLC subtypes and immune phenotypes. I am very excited about the perspectives our ARTIDISNet digital platform offers by combining such findings with the patient case history to establish comprehensive personal disease profiles. Our goal is to provide oncologists with a superior diagnostic approach in NSCLC that will guide patient stratification and will support them in making the best choice for successful treatment optimization for each individual patient."

This collaboration is bringing ARTIDIS' unique capabilities for measuring the physical aspects of biological tissue at the molecular level together with the profound expertise of the research group of Dr. Alcaraz at the UB on AFM mechanical measurements of cells and tissues, and that of the clinical group of Dr. Reguart at the HCB on the molecular analysis and diagnosis of lung cancer.

The research builds on previous ARTIDIS data, which has shown that mechanical alterations at the sub-cellular level (in nanoscale resolution) in cancer are potentially suitable markers of cancer aggressiveness and indicators for treatment response [1]. This finding was clinically validated in a prospective study in 545 breast cancer patients, where nanomechanical profiling was used to distinguish subtypes of cancerous lesions with the goal of stratifying high and low risk patients for developing metastases [2]. Moreover, ARTIDIS results suggest that nanomechanical changes in response to treatment may predict responder rate and outcome [2].

Lung cancer is one of the most common cancers and the leading cause of cancer-related death worldwide. Major reasons underlying this high mortality rate are late diagnosis and lacking methods to effectively stratify patients into distinct risk outcome groups, coupled with limited treatment options and very poor prognosis overall. The currently available diagnostic tools in lung cancer include various imaging modalities, histopathological tumor subtyping and molecular profiling of tumor biopsies. Molecular testing at the time of diagnosis also guides therapy selection, and targeted therapies in patients with several actionable genetic alterations (such as *EGFR, ALK, ROS, BRAF, NTRK*) are nowadays part of routine clinical management. Immunotherapy represents one of the most promising therapeutic approaches in lung cancer and evaluation of immune markers such as PD-L1 is also required at diagnosis to identify those NSCLC patients who most benefit from treatment. However, only ≤20% of lung cancer patients will respond overall underscoring the urgent need for improved methods for fast and early detection while supporting personalized treatment approaches.

References:
[1] Plodinec, Loparic et al. Nat Nanotechnol. 2012 Nov;7(11):757-65. Link
[2] Burian et al. AACR Annual Meeting 2020, abstract LB-273. Link

About Hospital Clínic de Barcelona

Hospital Clínic of Barcelona is a public university hospital with a centuries-long history. With 4500 employees, it is one of the leading healthcare centers in Spain and the first in scientific production. The hospital offers quality care, high-level excellence, and competitive biomedical research and a strong teaching commitment to train professionals. All of this is included in an excellent balanced management with the aim of offering society a humanized, cutting-edge medicine. www.hospitalclinic.org

About University of Barcelona

Founded in 1450, the University of Barcelona is the major public university in Catalonia and one of the most prestigious higher education institutions in Spain. The Bosch i Gimpera Foundation (FBG) is the technology transfer and innovation unit of the University of Barcelona. The FBG is responsible for transferring the results of the research carried out at the UB to society through the creation of spin-offs, patent licensing, and contracts with companies and institutions, thus contributing to the competitiveness of the business framework and the improvement of social welfare. In 2020, has developed 720 projects and contracted € 41.93 million. During the period 2018 - 2020, 51 technologies have been licensed and 8 spin-offs created. www.ub.edu

About ARTIDIS

ARTIDIS AG is a clinical stage health-tech company located in Basel, Switzerland, that has developed the first nanomechanical biomarker for cancer diagnosis and treatment optimization. The ARTIDIS nanotechnology platform integrates the mechanical biomarker data and different types of clinical data into the ARTIDISNet digital platform, allowing physicians to significantly shorten bedside biopsy analysis to less than three hours, enabling personalized disease prognosis and aiding with treatment optimization, thereby bringing benefit to both the patient and the healthcare system. Investigated initially in breast, lung, and pancreatic cancer, the ARTIDIS applications are not limited to oncology, and its nanotechnology platform can be used to analyze any kind of living tissue. For more information please visit www.artidis.com.

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