



New Potential Lung Cancer Biomarkers Identified

Protea Technology Used for Live Lung Cancer Cell Molecular Profiling

NEW ORLEANS, April 19, 2016 (GLOBE NEWSWIRE) -- Protea Biosciences Group, Inc., (OTCQB:PRGB) announced the use of its [proprietary bioanalytical technology](#) to achieve the molecular profiling of live tumor cells while they are under treatment.

A Team of scientists from Protea and The West Virginia University Cancer Institute presented their results today at the American Association for Cancer Research (AACR) Annual Meeting 2016 currently underway in New Orleans. The presentation, titled "Mass Spectrometry Imaging Determines Biomarkers of Early Adaptive Precision Drug Resistance in Lung Cancer", identifies molecular changes occurring within drug resistant lung cancer cells. The research used the Company's proprietary mass spectrometry imaging (MSI) workflows to rapidly identify molecular changes occurring within residual tumor cells.

"Drug resistance emergence is a common problem that limits long term outcome benefits in the era of precision cancer therapy," commented Erin Seeley, PhD., Clinical Imaging Principal Investigator at Protea. She added, "Today we present the use of our [mass spectrometry imaging \(MSI\) technology](#) to interrogate the biomolecular changes occurring within residual tumor cells under precision treatment with ALK-specific kinase inhibitor treatments."

"Using Protea's MSI technology, our team discovered several metabolites that were changing over a time course of treatment. Peptides were detected that showed differentiation with over 98% accuracy between treated and untreated xenograft tumors (FFPE); also MSI analysis of frozen tumors allowed for detection of the precision therapy drug, as well as lipids that were changing in expression as a result of treatment."

A common problem in the treatment of cancer is that the tumors become resistant to the drug with which they are being treated. The earlier the resistance is detected, the sooner the patient can be switched to a different therapy, thus increasing their chances of treatment success and cure. The research presented by Protea and WVU scientists at the AACR Annual Meeting profiles the biomolecules being expressed (peptides, lipids, metabolites) in a mouse xenograft model and a cell line model of lung cancer that both show resistance to treatment with a particular class of drugs, known as kinase inhibitors. The ability to rapidly identify the specific molecular changes that occur when a tumor becomes resistant to treatment will help guide the development of improved treatment strategies.

Further studies are planned to validate the use of the biomarkers to identify drug resistance in lung cancer. Protea's mass spectrometry imaging (MSI) technology facilitates rapid interrogation of the molecular changes occurring within tumor cells, generating data within minutes on changes in the production of specific molecules in the tumor cells.

About Protea Biosciences

Protea Biosciences Group, Inc. (OTCQB:PRGB) is a molecular information company providing innovative bioanalytical technology to the pharmaceutical and life science industries. "Molecular information" refers to the generation and bioinformatic processing of very large molecular data sets, obtained by applying the Company's proprietary technology to identify and characterize the proteins, metabolites, lipids and other

biomolecules which are the byproducts of all living cells and life forms.

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