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The Study of Sputome: A Need for Sputum as a Rich Source of Protein Biomarkers for the Non-Invasive Diagnosis of Infectious and Chronic Diseases

Norberto A. Guzman
Princeton Biochemicals, Inc., Princeton, New Jersey, USA, guzman@affinityce.com

Summary

Many ailments can be diagnosed while they are asymptomatic, meaning that the patient has no signs or symptoms of a progressing disease. If caught early in their formation, these maladies can be effectively treated, leading to successful chances for curative therapies as it halts the disease from advancing, therefore improving the quality of life, and long-term survival for the patient. However, further improvements in cutting edge precision technologies for early disease detection that are also simple to use, rapid, and affordable are not only necessary, but vital for well-being of people and the future of global public health.

The hallmark of non-invasive approaches has been liquid biopsies based on genomic biomarkers. As such, biological fluids permit any measurable molecular indicator or signature to provide significant information on wellness and disease. Among the bodily secretions used for non-invasive diagnostics is sputum, a complex viscous hydrogel meshwork, that has gained growing recognition as a rich biological source of biomarkers of airway infections, pulmonary diseases, and serves as a determinant to reveal other illnesses.

Respiratory tract diseases are a major problem, and on the rise, due to climate change affecting the health of many individuals around the world, in addition to putting stress on healthcare facilities and services. I therefore highlight the need to use expectorated or induced sputum specimens as a routine sample of valuable protein biomarkers for the diagnosis of these chronic maladies, to predict inflammation and disease progression, as well as to monitor the effectiveness of treatments. I also discuss the need for fast and reliable point-of-care methods for the detection and quantification of crucial protein biomarkers in sputum samples, and some of the limitations and challenges faced when dealing with very complex matrices to identify and characterize their constituents.