Chapter in Book

Emmanuel Adetiba, **Marion Adebiyi**, Surendra Thakur, (2017) "Breathogenomics: A Computational Architecture for Screening, Early Diagnosis and Genotyping of Lung Cancer", International Work-Conference on Bioinformatics and Biomedical Engineering (IWBBIO 2017), Granada, Spain. April 26-28, 2017. Sringer Chams. pp 41-49. ***Impact Factor 0.80 (Indexed in Thomson Reuters and Google Scholar)***
https://link.springer.com/chapter/10.1007/978-3-319-56154-7_5

The genome sequences of some genes have been implicated to carry various mutations that lead to the initiation and advancement of lung cancer. In addition, it has been scientifically established that anytime we breathe out, chemicals called Volatile Organic Compounds (VOCs) are released from the breath. Hundreds of such VOCs have been uniquely identified from samples of breathe collected from lung cancer patients, which make them viable as chemical biomarkers for lung cancer. Based on the foregoing scientific breakthroughs, we developed ***breathogenomics***, a computational architecture for screening, early diagnosis and genotyping of lung cancer victims anchored on the analysis of exhaled breath and mutational profiles of genomic biomarkers. The architecture contains two important sub-modules. At the first sub-module, the exhaled breadths of smokers or persons that are at risk of lung cancer are collected and appropriate computational algorithms are employed to determine the presence of any of the VOC biomarkers. Next, a patient with any VOC biomarker in the exhaled breath proceeds to the second sub-module, which contains appropriate computational models for the detection of mutated genes. Once mutations are detected in any of the biomarker genes found in a given patient, such patient is recommended for targeted therapy to promptly curtail the progression of the mutations to advanced stages. The ***breathogenomics*** architecture serves as a generic template for the development of clinical equipment for breath and genomic based screening, early diagnosis and genotyping of lung cancer. In this paper, we report the preliminary result obtained from the prototype that we are currently developing based on the architecture. Constructing a lung cancer early diagnosis/screening system based on the prototype when fully developed will hopefully minimize the current spate of deaths as a result of late diagnosis of the disease.