

Blood Test to Identify People at High Risk for Lung Cancer

(No. T4-1033)

Principal investigator

Zvi Livneh

Faculty of Biochemistry
Department of Biomolecular Sciences

Overview

A novel diagnostic test to identify individuals with increased risk of lung cancer

Background and Unmet Need

Lung cancer is the number one killer among cancers, with 160,000 deaths/year in the USA and 1.6 million/year worldwide. Early detection of lung cancer increases 5-year survival rate from 4% to 54%. Moreover, the National Lung Cancer Trial (NLST) showed that early detection of lung cancer by low-dose CT reduces mortality by at least 20%. Despite recommendations for low-dose CT screening for heavy smokers fulfilling the NLST criteria, compliance is low. In addition, 80 million smokers and ex-smokers in the US who do not fulfil NLST risk criteria have no recommended solution.

The MyRepair test fulfils this unmet medical need by providing a quantitative prediction of lung cancer risk using a simple blood test. The test is based on a personalized measurement of the patient's DNA repair capacity, a mechanism which is highly connected to the onset of cancer. Therefore, the MyRepair technology can potentially increase early detection of lung cancer and thus save lives.

The Solution

Prof. Livneh's novel biomarker, based on DNA repair assays provides a novel tool for risk assessment and early detection of lung cancer

Technology Essence

Based on the strong and well documented connection between impaired capacity for DNA repair and onset of cancer, the Livneh lab invented the MyRepair Test, a method for predicting lung cancer risk, based on measuring activity of 3 DNA repair enzymes. Combining enzyme activities with experimental risk estimates generated MyRepair Score, which measures personalized DNA repair capacity of tested subjects.

An epidemiological/clinical study performed in Israel, further validated in an independent UK study, demonstrated that lung cancer patients have lower MyRepair Score than healthy people. In addition, subjects who test MyRepair-positive have an 85-fold higher risk to develop lung cancer compared to the general population.

Low MyRepair Score is a risk factor independent of smoking, and of comparable magnitude, indicating that it can be a prognostic tool for smokers, ex-smokers, and non-smokers.

Applications and Advantages

- Simplicity – MyRepair is based on a simple, cost-effective blood test.
- Accessibility – Compared to low-dose CT which requires specific equipment, the MyRepair test can be easily integrated in general diagnostic labs and therefore may be more accessible to a larger portion of the population.
- Additional applications – Since the test is based on measuring personalized DNA repair mechanisms, it can be adopted in the future for the diagnosis of additional cancer types and DNA repair-related diseases.
- Was recently shown to predict the response of lung cancer patients to immunotherapy!

The suggested technology has the potential to become the gold standard for the long-sought reliable, accurate, simple, safe, cost-effective diagnostic tool to predict lung cancer, and may enable, for the first time, the effective mass population screening & early diagnostic.

Patent Status

USA Published: Publication Number: 2022-0170939-A1
