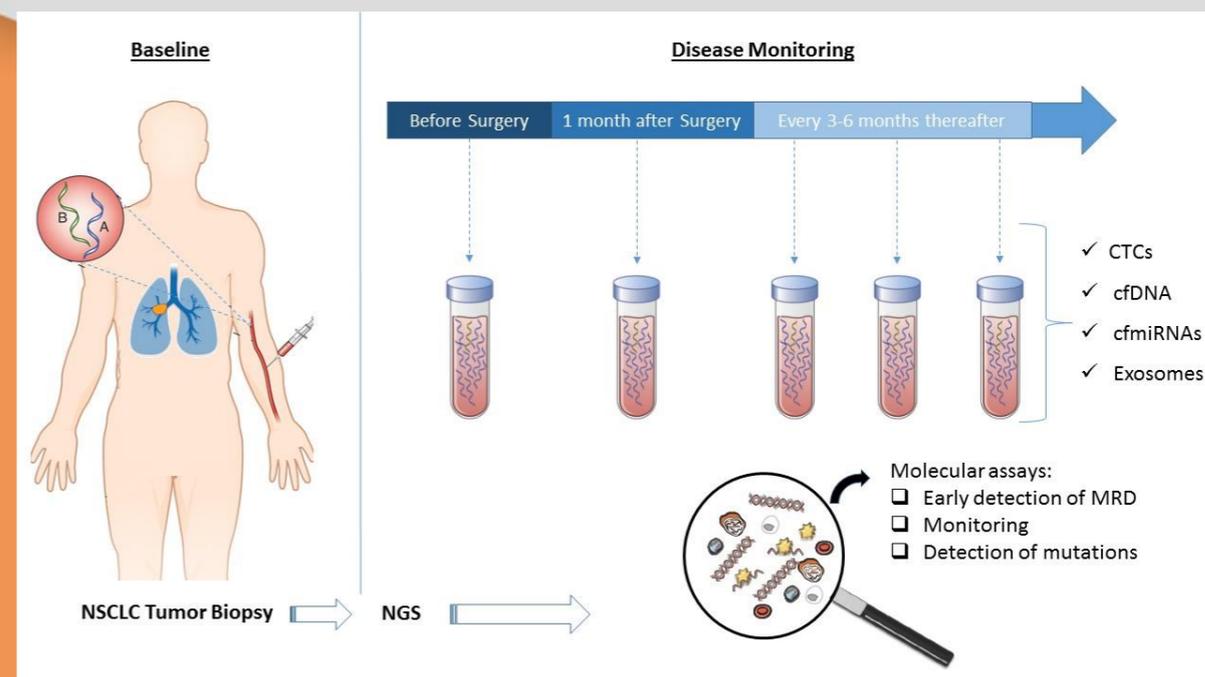




Research Project Title:

**Liquid biopsy for the early
detection of clinical relapse in
patients with operable early
stage non-small cell lung cancer
and evaluation of genetic
heterogeneity**

Principal Investigator:
Athina Markou



Popular Title:
**Liquid biopsy as a tool for early diagnosis
of relapse**

Scientific Field:
Life Sciences

Host Institution:
**National and Kapodistrian
University of Athens, dep. of
Chemistry**

Lung cancer is the most common cause of cancer-related mortality worldwide. However, even after complete primary tumor resection, about 45% of early stage NSCLC patients develop local or distant recurrence within 8-18 months. These distant metastases arise from single migratory tumor cells that, detached from the primary tumor, survive in the circulation and, finally, colonize distant target tissue. The possibility of probing the molecular landscape of solid tumors via a blood draw - termed as 'liquid biopsy'- with major implications for research and patient care, has attracted remarkable interest among the oncology community.

In this proposal, by testing a combined analysis of CTCs, exosomes, cfDNA and cfmiRNAs we aim to: i) monitor MRD during the follow-up of patients with resected NSCLC, and ii) detect disease relapse in advance of established metastatic disease. More specifically, by analysing peripheral blood samples from NSCLC patients that undergo tumor biopsy, we aim to stratify patients in high risk and low risk to develop metastasis. Cancer patients will undergo surgical resection. In the first year, tumor samples will be obtained from two different parts of the resected primary tumor as well as regional lymph nodes in the case that they are involved. We will monitor the presence of crucial oncogenic mutations, detected in the primary tumor, in ctDNA, DNA from isolated CTCs and DNA from exosomes; based on our previous experience we will develop novel molecular assays for the new putative specific markers that will be revealed from NGS analysis.

Comparing the results of liquid biopsy with the results of NGS in tissue biopsy we will identify the blood-based marker combination with the highest sensitivity and specificity for detection high-risk NSCLC patients. Additionally, we will assess whether circulating biomarkers are able to detect MRD through monitoring and we will further initiate follow up evaluations to obtain prognostic information on the tested Liquid biopsy markers.

The potential benefits to cancer patients will be the most important outcome of this project. The possibility of the early detection of metastasis in NSCLC patients would affect severely the quality of life of each individual patient. The possibility to predict the metastasis from patient's peripheral blood in a non-invasive way, even if it does not have any effect on treatment or life expectancy, will improve the quality of life in of even more patients. Moreover, there is a probability to open new ways for the development of new therapeutic approaches. It is important to refer that the results of the present study may have economic impact in the health care sector.

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This funding opens new perspectives on my academic and research career. It is a milestone to exploit my experience and knowledge in the field of liquid biopsy. The opportunity given to me to conduct this program at an experimental and economic level is a huge challenge and a great experience for me. I am sure that the results of this research proposal will make a decisive contribution to the early diagnosis of lung cancer. The evaluation of the results of this project will be a springboard for the search of new funding that will contribute decisively to my future research activity.

*The Principal Investigator,
Athina Markou*

Funding

Amount: **180,000 €**

Duration: **32 months**

Foundation: **H.F.R.I.**





H.F.R.I.
Hellenic Foundation for
Research & Innovation

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