**Ege University Translational Pulmonology Group’s Ongoing Projects and Future Expectations**

**Spin-off projects of CA 15129**

**DETERMINATION OF MOLECULAR ASTHMA ENDOTYPES BY EXHALED VOLATILE ORGANIC COMPOUNDS AND PERIPHERAL BLOOD MICRORNA BIOMARKERS (VOC-MICRO) Initiative**

**TUBITAK (Scientific and Technological Research Council of Turkey)-COST 5155 Connection Project**

**Aim:** Molecular endotyping and biomonitoring of asthmatic patients via molecular biomarkers; enriched VOCs and peripheral blood microRNAs were targeted for this research.

**Method:** After entering detailed data regarding demographic features of patients and clinical presentation of asthma, Enriched Breath Aldehydes (Dimethylheptane) levels, induced sputum inflammatory cell amounts, VOC analyses by GC-MS, matched needle trapped selective absorption systems (NAS) and peripheral blood microRNAs, are going to be assessed in both asthmatic patients (205 patients) and healthy controls (100 controls).

**Funded by:** TUAB (Scientific and Technological Research Council of Turkey)

**Grant:** 130,000 Euro

**Duration:** 3 years

**Ethical approval:** Ege University Ethical Committee (February 2014)

**DEVELOPMENT OF A NONINVASIVE METHOD FOR BIOMARKER DETERMINATION IN HUMAN BREATH FOR EARLY DIAGNOSIS OF LUNG CANCER (VOC-Lung Cancer)**

**Aim:** Lung cancer is the major cause of cancer death in the world. LDACCT screening for early diagnosis has still had some problems due to high rate of false-positive results. There is urgently need to introduce a new, non-invasive biomarker in the early diagnosis of lung cancer. The main objective of this study is to detect role of volatile organic compounds (VOCs) as potential biomarkers in early diagnosis of lung cancer.

**Method:** The thin film of payment were coated electrochemically on a stainless steel wire by using cyclic voltammetry (CV) and following the surface characterization by using several techniques. The films were placed in breath mouth to be exposed to the exhalation into this prospective case control study. Breath samples were collected as lab-made sample collector. From the film surface on the lab-made polyethylene plasma polymer membranes (PPM) films, then, the VOC content was analyzed by inserting into insertion part of gas chromatography coupled with mass detector (GC-MS) analysis.

**Funded by:** TUAB

**Grant:** 130,000 Euro

**Duration:** 3 years

**Ethical approval:** Ege University Ethical Committee (February 2014)

**VOC-Severe Asthma (ERS 2016)**

Defining severe allergic asthma by molecular fingerprints may help developing proper protective measurements and individualized treatments.'Volatile Organic Compounds (VOCs) are the most studied biomarkers in exhaled breath samples today and they are promising for molecular endotyping of asthma.Objective of this study is defining molecular endotyping of severe allergic asthma patients and VOC fingerprint in exhaled air.'Severe allergic asthma patients according to the GINA2012 (bronchial hyperreactivity, forced expiratory volume in 1st second/forced vital capacity ratio ≤ 0.70), and healthy controls were included. The results were interpreted with chromatic approach by using Neural Network classification algorithms (NNC). According to the first results of the statistical study, it is able to significant discriminate between patients with asthma and controls with greater accuracy.

**Funded by:** Ege University Scientific Research Commission

**Grant:** 150,000 Euro

**Duration:** 3 years

**Ethical approval:** Ege University Ethical Committee (October 2016)

**Candidates**

**USAGE OF LIQUID AND VOLATILE BIOPSY IN PERSONALIZED MOLECULAR DIAGNOSIS AND BIOMONITORING OF LUNG CANCER PATIENTS**

Lung Cancer/Liquid and Volatile Biopsy

Under the leadership of EGE Translational Pulmonology Research Group (ERS 2016), we are preparing a new multi-institutional collaborative project proposal to present the Scientific and Technological Research Council of Turkey (TUBITAK). This multi-institutional collaboration group will include 4 universities, 10 departments and 3 institutions (pulmonology, medical and basic oncology, genetics, molecular biology, pathologists, chemists (4 investigators). If the project will be funded as successful in initial evaluation by the TUBITAK, the detailed negotiations will start for final evaluation.

**EXPOSURE TO INDOOR AIR POLLUTANTS AND THEIR EFFECTS ON CHRONIC RESPIRATORY DISEASES**

**Inhaler pollutants and chronic airways diseases**

**Aim:** We aim to investigate the possible causation between exposure to indoor pollen and emerging chronic airways diseases from recently selected homes over 30 m north of any highways of Izmir City (Urban environment monitoring). We also aim to observe possible reflections of these exposure on the patients breath VOCs analysis which will be determined as asthma early diagnosis (EPD) monitoring during the study.

**Method:** Step 1. Observational cross sectional cohort. Participants 220, 221, 243 and 248 have been selected as statistically public flash sample to represent the area. All off these homes are located in Izmir city and consisted about 58 buildings and 388 apartments with 1271 habitats (Population Directorate of Izmir Municipality). At least 388 sampling has been initiated with minimum 243 sampling area. To spend at least 8 hours at day in the same house and bring the resident in this house for at least 1 year the inclusion criteria including subjects into the study.

**Aim:** Indoor environment monitoring for PM2.5, PM10, PM2.5 aerosolic particles, toxic gases, CO2 and selected some common VOCs such as ethane, propylene, 2-butanone, 2,4-dimethylheptane, naphthalene, b-methyl0xirane etc. from bedrooms of homes for at least 4 hours per day and be repeated every 6 months during 3 years.

**Step 2.** A non-invasive method for HIV detections in the patients study population. Demographic variable, comorbidities, indoor environment variables will be recorded. Among subjects further systemic analyses are planned to be used in obtaining long term biomarkers. Within the framework of the study, patients will be divided in non-smoking and smoking groups. In each group, will be included 50 patients including at least 35 patients with chronic respiratory diseases. All patients will be divided into non-smoking and smoking groups. Finally, a non-smoking and smoking group. Either smokers and non smokers will be investigated. LC/MS/MS and LC/MS/MS systems after described in a suitable solvent within small volumes.

**The 3M LMA-7 environmental monitor simultaneously measures particulates, volatile organic compounds (VOCs) with RH, toxic gas, carbon dioxide, relative humidity, temperature, and total volatile.**

**Funded by:** Ege University Scientific Research Commission

**Grant:** 150,000 Euro

**Duration:** 3 years

**Ethical approval:** Ege University Ethical Committee (January 2016)

**DEVELOPMENT OF 96 WELL PLATE THIN FILM EXTRACTION RODS FOR THE DETERMINATION OF SPECIFIC BIOMARKERS PROFILE OF LUNG CANCER PATIENTS**

(Biomarkers and lung cancer)

**Aim:** To develop non-invasive, inexpensive, rapid and highly sensitive thin film micro extraction (TFME) strips for easy screening of different metabolite groups in lung cancer patients.

**Method:** The total of 96 TFME strips will make a plate system which is able to measure several types of metabolites from patients sputum and saliva samples at the same time. The most specific metabolites in patients’ sputum and saliva samples for lung cancer have been chosen from the literature. All protocols of the plate system will be analyzed with LC- GC/TOF and LC/MS systems after described in a suitable solvent within small volumes.

**Funded by:** TUBITAK and Ege University Scientific Research Commission

**Grant:** 150,000 Euro

**Duration:** 3 years

**Ethical approval:** Ege University Ethical Committee (October 2016)