MEDICAL UNIVERSITY OF GDAŃSK
www.mug.edu.pl
58 349 11 11
info@gumed.edu.pl
ul. M. Skłodowskiej-Curie 3a,
80-210 Gdańsk

Method of analysis and classification of biological material in cancer detection

Product description

Liquid biopsy offers minimally invasive sampling, surpassing the traditional primary tumor biopsies currently used in cancer evaluation. Blood is the most commonly material studied in liquid biopsies, which provides a source of platelets (called TEPs, Tumor Educated Platelets) in addition to circulating tumor cells and circulating tumor DNA. Using deep sequencing, platelets collected from patients can be profiled in terms of their transcriptome (RNA). Based on a protocol of platelet isolation, RNA extraction, and subsequent sequencing of this material, it is possible to generate files containing the platelet RNA profile of individual patients. These files are then analyzed using a developed artificial intelligence algorithm. Classification carried out in this manner, for the diagnosis of cancer on the basis of liquid biopsies, is superior to the effectiveness of currently used solutions.

Key words

Liquid biopsy, platelets, transcriptome, cancer diagnosis.

Legal status of the product

Patent Application No. P.435990, dated 17.11.2020. "Method of analysis and classification of biological material in cancer detection". Medical University of Gdańsk the only holder of the invention.

Object of the offer

An object of the invention is a method for analyzing and classifying biological material in detecting cancer and a method for determining the presence of cancer. The developed imPletelet method is based on the hypothesis that cancer progression is reflected by a change in single RNA splicing variants in platelets and/or tissues, which is reflected in a global change in expression involving entire signaling pathways.

Product research funding to date

NCBiR Leader (0059/L-11/2019) "Use of single circulating tumor cell sequencing for analysis of liquid biopsies in ovarian cancer patients".

MEDICAL UNIVERSITY OF GDAŃSK
www.mug.edu.pl
58 349 11 11
info@gumed.edu.pl
ul. M. Skłodowskiej-Curie 3a,
80-210 Gdańsk

Analysis of competition in the market

Commercial diagnostic laboratories offer tests for the CA-125 marker, which is present in the bloodstream of patients with ovarian cancer but also for many benign conditions. However, clinical practice indicates that a test with greater sensitivity, specificity, and dynamics is needed compared to the routinely used CA-125 marker measurement. CA-125 marker levels may remain low despite high tumor stage. Additionally, the half-life of this protein in the blood is many times longer than that of transcriptomically altered platelets. This means that a patient may have high levels of CA-125 even though the disease has gone into remission. Moreover, elevated CA-125 levels and radiological imaging findings may precede symptoms of relapse but do not directly detect minimal residual disease or the development of chemo-resistance, which pose a serious threat to the patient. Thus, the need for more rapid and accurate diagnosis and, in the future, effective monitoring of the disease for the acquisition of resistance to treatment and relapse.

Advantages of the proposed product

Routine diagnostics used today often results in detection of cancer in late stage (3rd or 4th), when the disease process has spread attacking the lymph nodes or even forming distant metastases. Such a cancer does not give hope for a complete cure. Patients, despite an initial good response to first-line treatment, eventually experience increasingly frequent recurrences to the point of acquiring treatment resistance or inability to continue therapy due to poor health, ultimately leading to death. The proposed invention enables the use of innovative analysis and classification of biological material in the detection of malignancies such as lung cancer, ovarian cancer and sarcomas. Platelet transcriptome analysis also has great potential for the diagnosis of other diseases such as ischemic heart disease. The method can also be implemented into data from traditional biopsies sequencing.