

DOPA Reaction with Vacuum Filtration as a New Method for Diagnosing of Circulating Melanoma Cells and Metastasis

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Cancer research is a priority for medicine and modern society. Melanoma is considered one of the most aggressive forms of cancer, since this tumor has aggressive behavior and it is metastatic. The leading cause of death among melanoma patients is the possible onset of metastatic cascade program. The modern method of identification of the circulating tumor cells provides early detection and appropriate treatment strategy selection, but lack of standardized methods and high cost limit the widespread use of this practice. The main goal of the project was to develop an affordable and effective method for the diagnosis of circulating melanoma tumor cells (CMCs) as a validated technological standard. It has been hypothesized that 3,4-dihydroxy-L-phenylalanine is a good indicative marker for the cytochemical typing of CMC after their epithelial-mesenchymal transition. A specialized vacuum filtration unit was created with a specific polycarbonate membrane filter that is suitable for filtration of the diluted whole venous blood followed by cytochemical typing of the deposited cells using the DOPA reaction method. During laboratory testing of the suggested technology, it was established that it is possible to effectively trap large circulating melanoma cells and identify them on the polycarbonate filter with DOPA reaction test under the action of 3,4-dihydroxy-L-phenylalanine. The advantages of suggested technology are absence of damage to cytological material and high specificity. The cost of one CMCs test using the «Cell Search» method is \$1800, while the costs of a single test according to our methodology is approximately \$22.

Awards Won:

Fourth Award of \$500

National Center Junior Academy of Sciences of Ukraine: UN Sustainable Development Goal Award \$1000.00