

HIGH SENSITIVITY DETECTION OF TUMOR CELLS IN PERIPHERAL BLOOD OF CARCINOMA PATIENTS BY A REVERSE TRANSCRIPTION PCR METHOD

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Abstract

Occurrence of tumor cells in the peripheral blood of individuals suffering from cancer may serve as an early indication that the primary tumor has evaded from its tissue of origin. Despite defence mechanisms of the organism individual cancer cells may attach in distant regions and form colonies as an initial step of metastasis formation. Blood-borne distant metastases are the leading cause of cancer-related deaths.

Hence, early detection of metastatic potential can be assessed by detecting tumor cells in the blood circulation. Sensitivity and specificity are the main objectives of any method applied for this purpose. Most highly sensitive techniques described, however, encounter an increasing problem of specificity due to background signalling from illegitimate transcription.

A method of tumor cell selection and their specific identification and analysis with a sensitivity of 2 tumor cells in 5 mL blood was developed. To achieve this a combination of enrichment of tumor cells - using a specifically designed antibody mixture coupled to magnetic beads - with a RT-multiplex PCR - for the detection of mRNAs encoding for tumor associated markers - was established. Clinical pilot studies showed occurrence of tumor cells in blood of carcinoma patients indicating a potential tumor relapse, in some cases several months prior to an elevation of serum tumor markers.

In conclusion, a sensitive and specific method to detect disseminated tumor cells in peripheral blood of breast and colorectal carcinoma patients is provided. This innovative method is an option for clinicians as a predictive tool with respect to metastasis formation and may result in an appropriate selection of patients for adjuvant therapy.