

Analyses of tumor cells in peripheral blood of carcinoma patients using RT-PCR

Bertha Gutierrez, Christiane Hollmann, Stefanie Waschütza, Oliver Böcher

AdnaGen AG, Ostpassage 7, 30853 Langenhagen, Germany

Metastatic process of cancer is the most important factor in tumor relapse resulting in the death of patients. Spreading of tumor cells into the blood circulation from either primary tumors or subsequently from a lymphatic origin may be a result of dissemination of the primary tumor or of a secondary event during tumor development. Most of the tumor cells that reach the blood circulation are killed by an individual response of the immune system but the metastatic potential of remaining tumor cells cannot be ruled out.

30-40% of patients with colorectal cancer develop tumor relapse during follow-up which is not detected in time by routine diagnostic methods. Therefore, early detection of tumor cells circulating in peripheral blood is an important tool for identification of micrometastases.

We established a RT-PCR assay with improved specificity for detecting tumor cells in peripheral blood of colorectal carcinoma patients. To achieve this we combined the enrichment of tumor cells using an antibody mixture with RT-PCR techniques for the detection of mRNAs encoding for tumor associated gene expression.

We analysed tumor cells from peripheral blood of more than 50 patients suffering from colon cancer at the time of surgery and during follow-up. The gene expression of four tumor markers was analysed by multiplex RT-PCR. The combination of tumor cell enrichment with the RT-PCR shows that circulating tumor cells of colon cancer patients can be reliably analysed with high specificity and sensitivity (at least 2 tumor cells in 5 ml blood). Preliminary results of this study showed occurrence of tumor cells in blood of carcinoma patients despite resection of primary tumors. There is evidence that this procedure enables us to monitor patients during follow-up with high sensitivity. The relapse free interval can be analysed more accurately than it was possible with currently available methods.

It can be concluded that this procedure offers new possibilities for patient's monitoring and prognosis and may result in an appropriate selection of patients for adjuvant therapy.