

Prognostic and predictive potential molecular biomarkers in colon cancer

A. Nastase^{1*}, L. Pâslaru^{2*}, A.M. Niculescu¹, M. Ionescu³, T. Dumitrașcu³, V. Herlea⁴, S. Dima³, C. Gheorghe⁵, V. Lazar⁶, I. Popescu³

¹Molecular biology and biobanking laboratory, Rntech, Bucharest, Romania

²Postgraduated Department of Biochemistry, University of Medicine and Pharmacy Carol Davila, Bucharest, Romania

³Center of General Surgery and Liver Transplantation, Fundeni Clinical Institute, Bucharest, Romania

⁴Department of Pathology, Fundeni Clinical Institute, Bucharest, Romania

⁵Center of Gastroenterology and Hepatology, Fundeni Clinical Institute, Bucharest, Romania

⁶Integrated biology platform, Gustave Roussy Institute of Cancerology, Villejuif, France

Abstract

An important objective in nowadays research is the discovery of new biomarkers that can detect colon tumours in early stages and indicate with accuracy the status of the disease. The aim of our study was to identify potential biomarkers for colon cancer onset and progression. We assessed gene expression profiles of a list of 10 candidate genes (MMP-1, MMP-3, MMP-7, DEFA 1, DEFA-5, DEFA-6, IL-8, CXCL-1, SPP-1, CTHRC-1) by quantitative real time PCR in triplets of colonic mucosa (normal, adenoma, tumoral tissue) collected from the same patient during surgery for a group of 20 patients. Additionally we performed immunohistochemistry for DEFA1-3 and SPP1. We remarked that DEFA5 and DEFA6 are key factors in adenoma formation ($p<0.05$). MMP7 is important in the transition from a benign to a malignant status ($p<0.01$) and further in metastasis being a prognostic indicator for tumor transformation and for the metastatic potential of cancer cells. IL8, irrespective of tumor stage, has a high mRNA level in adenocarcinoma ($p<0.05$). The level of expression for SPP1 is correlated with tumor level. We suggest that high levels of DEFA5, DEFA6 (key elements in adenoma formation), MMP7 (marker of colon cancer onset and progression to metastasis), SPP1 (marker of progression) and IL8 could be used to diagnose an early stage colon cancer and to evaluate the prognostic of progression for colon tumors. Further, if DEFA5 and DEFA6 level of expression are low but MMP7, SPP1 and IL8 level are high we could point out that the transition from adenoma to adenocarcinoma had already occurred. Thus, DEFA5, DEFA6, MMP7, IL8 and SPP1 consist in a valuable panel of biomarkers, whose detection can be used in early detection and progressive disease and also in prognostic of colon cancer.

Key words: colon cancer, biomarkers, qPCR

Corresponding author: Liliana Pâslaru, Professor

Fundeni Ave, no 258, 022328,

Postgraduate Department of Biochemistry, Bucharest, Romania

Tel.: +4-021-318.35.87, +4-021-318.07.04, Fax: +4-021-318 35 89

E-mail: lilianaliviapaslaru@yahoo.fr