

The Role of Nervous Elements in Colorectal Cancer

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Colorectal cancer (CRC) is one of the most frequent types of cancer in the world, the highest rates for this type of cancer are in North America, Western Europe, New Zealand and Australia [1]. Although, in what the screening of this disease or surgical and medical methods are concerned, important progress was made, CRC is responsible of 11.6% of the deaths caused by cancer in 2012 in Europe in men and 13.0% in women [2]. Moreover, 25% of the patients initially diagnosed with colorectal cancer also have metastases and over 50% of all the patients with CRC will develop metastases [2].

Colorectal carcinogenesis is a complex, stage process which involves a cascade of events such as the accumulation of genetic abnormalities, that allow the development of the malignant phenotype that associates proliferation, migration and neovascularization [1,3]. Despite the progresses made in the field of molecular biology of the cancerous cells, the colorectal neoplasm's pathogenesis still remains incompletely elucidated and so future studies are needed in order to totally decipher the mechanisms underlying this process. In this category the research, in what the influence of the nervous elements on the colorectal carcinogenesis is concerned, is also included.

The first who observed a bond between the nervous elements and cancer was the Greek doctor Galen more than 2000 years ago [4]. Recent studies sustain this hypothesis by highlighting the interrelationships between nervous cells, their mediators, the receptors for these mediators and cancer cells [5-7]. An example is represented by the role of beta-2 adrenoreceptors in colorectal carcinogenesis. This type of receptors are part of the family of receptors coupled with G proteins, their activation finally leads to plenty intracellular signaling pathways, that can be responsible for the initiation, proliferation and metastasis of the neoplastic cells [8]. A recent study in what the selective toxicity, caused by the blocking of beta-2 adrenoreceptors in different neoplastic cellular lines from the CRC, is concerned showed a suppression of these cells' viability [9].

The authors of this study showed that the selective blocking of beta-2 adrenoreceptors may cause via downregulation of EGFR (epidermal growth factor receptor)/Akt (protein kinase B) /ERK (extracellular signal-regulated kinases) signaling, prin G I – phase arrest and also by other mechanisms the apoptosis of the neoplastic cells [9]. In a previously published study we showed that the expression of the beta-2 adrenoreceptors increases with the tumor grading [7]. Moreover, similar results were found for the M3 muscarinic receptors for acetylcholine [7].

In conclusion, the research in the field of the interrelationships between the nervous elements and cancer seems to represent an important stage in understanding the neurobiology of the colorectal cancer, having important implications in establishing new molecular targeted therapies, in order to improve the life quality of the patients suffering from this type of cancer, leading to the increase of their survival and even causing the healing of this type of cancer.

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