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DAPK1 is overexpressed in Colorectal Tumors from obese patients and correlates with poor prognosis

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Introduction: Colorectal cancer (CRC) represents one of the tumor types with the highest incidence in our society, being obesity one of the predisposing factors to the disease. The death-associated protein kinase 1 (DAPK1) has been described as a factor associated with cellular senescence and apoptosis that can act as an oncogene or a tumor suppressor gene depending on the cellular context. Down regulation of *DAPK1* has been reported in relation to various cancer types. Objectives: The main aim of this work was to study the role of *DAPK1* in relation to the prognosis of patients affected by CRC. Moreover, we analyzed the relationship between obesity and predisposition to develop this tumor type. Material and Methods: In order to investigate these purposes, we considered three groups of patients: 1) non obese patients affected by CRC, 2) obese patients affected by CRC, and 3) obese subjects without cancer. We investigated relative gene expression of *DAPK1* by qRT-PCR in the next types of samples: colorectal tumor tissues, non-tumor tissues (considered as controls), adipose omental tissues and adipose subcutaneous tissues. Statistical analyses and survival studies were established with the package SPSS 22. Results: In CRC, our results showed a significant association of *DAPK1* expression with the degree of lymph node invasion ( $P = 0.037$ , U de Mann-Whitney test). Also, the higher *DAPK1* levels were found in tumors that relapsed during the follow-up period of patients ( $P = 0.010$ , U de Mann-Whitney test). Survival studies also indicated a significant association of *DAPK1* with the clinical evolution of patients ( $P = 0.011$ , Kaplan-Meier analyses, Log-Rank test). Specifically, high levels of *DAPK1* expression correlated with tumors which confer an adverse clinical evolution. Moreover, in obese subjects affected by CRC, an overexpression of *DAPK1* was detected with respect to non-obese patients with CRC; statistical analyses showed, in this case, a trend toward association ( $P = 0.1$ , t-Student test). Conclusions: *DAPK1* constitutes a valuable prognosis marker in the CRC population investigated in this work, and represents a factor that could be of interest in establishing possible relationships between obesity and predisposition to the development of this tumor type. Larger numbers of cases will be necessary to establish the role of *DAPK1* as a possible useful target in the diagnosis and treatment of CRC.