



7 - PROFILE OF DNA METHYLATION BY HYDROXYTYROSOL

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Resumen

Introduction: The Mediterranean diet is very healthy. Extra virgin olive oil (EVOO) is the main source of fat in this diet and attracts the attention of researchers because one of its most important components is phenolic alcohols, e.g., hydroxytyrosol (HT). Several studies show that consumption of EVOO and its phenolic compounds (OOPCs), especially HT, has healthful effects on the cardiovascular system. Neuroprotective and chemopreventive actions have also been proposed. Yet, the molecular bases of these activities are largely unknown. Recent evidence suggests that HT can induce its beneficial effects through epigenetic mechanisms, including DNA methylation and modulation of small noncoding RNAs. In particular, previous studies suggest that HT induces changes in both global DNA methylation and the methylation of specific genes.

Methods: As a complete elucidation of the epigenetic effects of EVOO and its OOPCs may contribute to the development of different pharma-nutritional strategies that exploit them as epigenetic agents, our objective was to analyze the effect of HT treatment on DNA methylation, in a line of colorectal cancer. To this end, we performed MTT cell viability analysis, global methylation analysis, and methylation analysis of specific CpGs by the EPIC BeadChip.

Results: We observed that HT at nutritionally relevant doses does not affect cell viability and proliferation. Furthermore, we observed an increase in global DNA methylation after treatment of Caco-2 cells with HT. Finally, we recorded 17,920 hypermethylated and hypomethylated 14,222 CpGs after HT supplementation. We performed several bioinformatic analyses, compared our data with those obtained in previous studies, and found novel targets of HT.

Conclusions: Our data show that the chemopreventive actions of HT are in part recapitulated by epigenetic activities.