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redox control of major age-related diseases**

COST Action 16112

NutRedOx

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P.30.11. Catechins as epigenetic modulators

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Flavonoids, a group of abundant food polyphenols, support the endogenous antioxidant system and maintenance of redox homeostasis by scavenging reactive oxygen species. This group of flavonoids includes catechins - antioxidants present in green tea, known for providing numerous health benefits. Recently green tea catechins have been reported to affect DNA methylation. Regarding the reversible nature of epigenetic modifications, deeper insight into relationship between cellular redox state and DNA methylation may contribute to a better comprehension of the role of antioxidants in chemoprevention and treatment of chronic diseases

Our previous results have showed that the low (1 μ M) and the high (10 μ M) doses of catechins applied to human colon adenocarcinoma cell line (HT29) induce different changes in the expression of some redox-related genes [1]. Based on this, we aimed at examining the methylation profiles in the promoter areas of the up-regulated HSPA1A and the down-regulated SRXN1 using Methylation-Specific PCR and Methylation-Sensitive High Resolution Melting. The objective of the research was to find out whether the observed dose dependence was caused by epigenetic modulation of gene expression.

In the case of HSPA1A, methylation level within examined CpG island was not significantly affected by catechins, regardless of concentration. Conversely, the methylation level within SRXN1 CpG island was significantly increased when cells were exposed to the high concentration of catechins.

In conclusion, the methylation levels of CpGs located in the promoter area of SRXN1 and HSPA1A can be modulated by catechins exhibiting strong antioxidant activity, therefore the observed modulation seems to be redox-sensitive. Moreover, catechins so far have been considered as inhibitors of methylation, whereas they can also act as methylation inducers. This dual function may derive from their ability to influence cellular redox homeostasis.

References:

[1] Baranowska M. et al. The relationship between standard reduction potentials of catechins and biological activities involved in redox control. Redox Biol. 2018: 17, 355-366

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