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Methodological repertoire development to study the effect of dietary supplementation in cancer therapy

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Diet-related bioactive compounds are intensively examined in vitro, although the in vivo and in vitro effects are different, and the mode of actions in in vivo is not yet known in detail. Metals are also important both in the free radical formation and in the antioxidant defence as well as in signal transduction. It is a proven fact that methylation agents have an important role in preventing cancer and improve redox homeostasis. The root of *Beta vulgaris* L. ssp. *esculenta* var. *rubra* (table beet) as a functional food has been used for centuries as a traditional and popular food in many national dishes. Since several bioactive agents e.g. betaine, betanins, betacyanins, betaxanthins, vulgaxanthine, polyphenols, flavonoids, vitamins (thiamine, riboflavine, pyridoxine, ascorbic acid, biotin and folic acid) as well as soluble fibre, pectin and different metal elements (e.g. Al, B, Ba, Ca, Cu, Fe, K, Mg, Mn, Na, Zn) can be found in large quantities in vegetable table beet, therefore a relative simple methodological repertoire to interpret the impact of variety of active substances on the vital function of the metastatic cancerous patients is needed to be developed. It is also required to examine in addition to routine laboratory parameters, values of HbA1c, 9 cytokines and levels of 3 growth factors, the global parameter of redox-homeostasis, few metal elements and levels of free and Zn-protoporphyrins as well as transmethylation, since low transmethylating ability, high free protoporphyrin and Zn-protoporphyrin concentrations and high induced free radical levels of erythrocytes are very important indexes in cancer.

Key words: redox homeostasis, transmethylating, anaemia, table beet

Abbreviations

AP-1 = activated protein-1; COX = cyclooxygenase; CRP = C reactive protein; DNA = deoxy-ribonucleic acid; EGF = epidermal growth factor; ery = erythrocyte; HbA1c = glycated hemoglobin; HCHO = formaldehyde; HIF-1 = hypoxia induced factor; IFNG = interferon-gamma; IL-1 alpha/beta, IL-2, IL-4, IL-6, IL-8, IL-10 = interleukins; JNK = c-Jun N-terminal kinase; MCP-1 = monocyte chemoattractant protein-1; NFAT = nuclear factor of activated cells family; NF-κB = nuclear factor-κB; p38 = mitogen-activated protein kinase; PDGF = platelet-derived growth factor; PSA = prostate-specific antigen; RLU = relative light unit; SOD = superoxide dismutase; TNF-α = tumor necrosis factor-alpha; VEGF = vascular endothelial growth factor

1. Introduction

Data of intensive research verify that life style and nourishment with genetic instability, and mutations are crucial in tumour formation and adaptation to the environment. Multiple gene mutations are usually held responsible for the uncontrolled cell growth. The abnormality of

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