

## LIPIDS IN COLON CANCER DEVELOPMENT

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Development of colon cancer (CC) is accompanied by typical genetic alterations, which in interaction with environmental factors (life style, diet) deregulate cell proliferation, differentiation and apoptosis and support disease progression. In addition, cancer cell survival and growth are supported by modulation of cellular metabolism. Recently, together with technological progress, the interest in the role of lipids and their metabolism has been increased. Lipids are either obtained from dietary sources or they are synthesized endogenously in the organism. CC development is often characterized by abnormalities in lipid synthesis and metabolism, which may influence energetic balance, structure and function of biological membranes, or production of specific mediators and cell signalling. The changes in lipid profile and metabolism (lipidome) may significantly affect cell behaviour and response to therapy. CC patients often show abnormalities in plasma and red blood cell fatty acid (FA) profiles, and differences in phospholipid, sphingolipid, and FA composition and metabolism between CC tumour and non-tumour tissues were demonstrated and further investigated. CC is also one of the cancer types that could most benefit from the prevention. Some dietary lipids, especially essential polyunsaturated fatty acids (PUFAs) or short-chain FA such as butyrate produced from fibre, can play important supportive or inhibitory role in CC development. During last decade, we defined the effects of dietary PUFAs (such as n-3 docosahexaenoic acid) especially in interaction with butyrate, on a wide range of human colon epithelial cells representing various stages of CC development. Our results showed that PUFAs together with butyrate may specifically alter colon cell FA composition, cell membrane properties, metabolism and intracellular signalling, thus significantly affecting cell behaviour and its response to various exogenous or endogenous stimuli. Recently, our research is focused to the lipid perturbation in CC patients in order to find plasma and tumour biomarkers which may be useful for novel approaches in CC diagnosis and prognosis.

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