Oxylipins associated with colorectal cancer

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Introduction

Colorectal cancer (CRC) is one of the most prevalent cancers in the world. Development of CRC is promoted by the chronic inflammation. Polyunsaturated fatty acids (PUFAs) metabolites are involved in induction and resolution of inflammation. The metabolism of PUFAs via reactions catalyzed by cyclooxygenases (COX), lipoxygenases (LOX) and cytochrome p450 (CYP450) yields a variety of bioactive lipid compounds – oxylipins. Majority of oxylipins derived from n-6 PUFAs have pro-inflammatory and pro-proliferative properties while n-3 PUFAs metabolites have opposite effects.

Materials and Methods

Literature review of current oxylipin research with regards to CRC.

Results

The content of oxylipins in serum from CRC patients is changed in comparison with healthy subjects (Zhang et al., 2017). Among oxylipins in CRC the arachidonic acid (20:4 n-6) derived eicosanoids are the most well studied. Eicosanoids produced by COX-2 that have been implicated in the development and progression of CRC include pro-tumorigenic prostaglandin E₂; prostaglandin D₂, although the opinion on their effects are conflicting (Murata & Maehara, 2016). The elevated levels of thromboxane A₂ may possibly be used as a diagnostic CRC biomarker (Li et al., 2015). COX-2 is overexpressed in CRC tissue during adenoma-carcinoma sequence. LOX-derived leukotrienes can promote formation of harmful reactive oxygen species (Savari, Vinnakota, Zhang, & Sjölander, 2014). Hydroxyeicosatetraenoic acids produced by LOX are altered in CRC and can either promote invasiveness of CRC – 12S-HETE (Stadler et al., 2017) or exhibit anti-inflammatory properties – 15S-HETE (Chen et al., 2003). Many n-3 PUFA oxylipins contribute to resolution of inflammation. Therefore, use of resolvins produced from 20:5 n-3 have been shown to successfully attenuate inflammation *in vivo* and in animal models of CRC (Janakiram, Mohammed, & Rao, 2011).

Discussion

Oxylipins serve as important signaling molecules involved in maintaining inflammation equilibrium. The research on

the levels of specific oxylipins in CRC patients can be useful in identifying new disease biomarkers. Additionally, elucidation of the mechanisms of action of oxylipins is an opportunity for identifying novel therapeutic compounds. Moreover, understanding of pathways of oxylipins formation is necessary to explain links between dietary PUFA intake and health.

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