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Fund “Nauka” Project № 11004 Resume

“Study of the effects of biologically active substances of plant origin in an animal model of inflammatory bowel disease”

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Crohn’s disease is a chronic inflammatory bowel disease. Tissue injury is largely due to the compromised immune system and reactive oxygen species that are produced and released by the immune cells. The approved treatment strategy aims at reduction of oxidative stress, as well as control of the expression of pro-inflammatory mediators and neutralization of their function.

Anethole and eugenol are biologically active substances present in the leaves, flowers and fruits of many medicinal plants, some of which are a permanent component of the human diet as spices: fennel, anise, cloves, basil, rosemary, oregano, thyme, etc.

The aim is to investigate the effects of anethole and eugenol in a rat model of Crohn's disease by monitoring biochemical parameters of inflammation and oxidative stress, as well as by histopathological examination of the bowel.

The model of 2,4,6-trinitrobenzenesulfonic acid (TNBS)-induced colon inflammation resembles the clinical and morphological features of Crohn's disease and is used for the study of the pathogenesis of this disease, and for the investigation of new therapies. Experimental colitis is induced by TNBS after the method of Morris et al. (1989). After the induction of colitis, each of the experimental substances (anethole and eugenol) is administered daily orally at three different doses. At the end of the experimental period the severity of inflammation is assessed macroscopically and histopathologically. Biochemical studies are performed in serum and colon homogenates. Thiobarbituric acid reactive substances serve as a marker of lipid peroxidation. Pro-inflammatory cytokines (TNF-α, IL-6), as well as the anti-inflammatory cytokine IL-10 are determined by ELISA kits in the colon homogenate.

All procedures concerning animal treatment and experimentation are conducted on the basis of authorization for the use of animals in experiments issued by the Bulgarian Food Safety Agency, and are in accordance with international guidelines that have been adopted in Bulgaria (European Economic Community EEC Council Directive 86/609).

For the first time, studies on the effects of anethole and eugenol in a model of inflammatory bowel disease will be carried out. These effects will be monitored histopathologically as well as by oxidative stress indices and markers of inflammation.

Publications:

Marinov V, Georgieva A, Eftimov M, Zhelyazkova-Savova M, Vulcheva-Kuzmanova S (2014) Models of inflammatory bowel diseases in experimental pharmacology. Science Pharmacology 2: 42-46 (in Bulgarian).