Abstract

Recently the use of various food supplements as a part of a healthy lifestyle has been very popular. Although most of them are natural products, their excessive consumption may not always be beneficial for health.

Dietary supplements are usually of a flavonoid character. Flavonoid compounds are found in plants and they have beneficial effects on human health. For their antioxidant, anti-allergy and chemopreventive effects they are extensively studied. However, in recent years the negative impacts of flavonoids have been described, often caused by their excessive consumption. It has been shown that they interact with cytochrome P450, which play an important role in the biotransformation of xenobiotics. The change in the metabolism of xenobiotics (whether drugs or carcinogens) can cause serious health problems, including a tumor growth. Beside cytochrome P450, there is another possible points of intervention, cytochrome b_5 (or NADH:cytochrome b_5 reductase), which effects the catalytic cycle of cytochrome P450.

Another point of potential danger is the elimination of xenobiotics out of the organism. There is a complex system of transporters, in which P-glycoprotein plays a very significant role. P-glycoprotein is involved in transmembrane efflux of xenobiotics, preventing the aggregation of these substances in the cell cytoplasm. Nevertheless, there are inhibitors of these transporters (among them also some flavonoids) that prevent the elimination of harmful substances and may cause serious health complications.

This thesis examines the influence of some flavonoid compounds on the human organism, focusing on their chemopreventive properties. In addition, the influence of flavonoids on cytochrome P450 reaction cycle, cytochrome b_5 (and cytochrome b_5 reductase) functions and on the transport of xenobiotics *via* P-glycoprotein is discussed.

Key words: Cytochrome P450, phase II enzymes, induction, metabolism