# Abstract

Sanguinarine and chelerythrine are quaternary benzo[c]phenanthridine alkaloids. The first step in sanguinarine metabolism is its reduction to dihydrosanguinarin. Antimicrobial and anti-inflammatory activities of these alkaloids are used in dentistry and as feed additives. Sanguinarine and chelerythrine induce apoptosis of cells. Fluorescence of these alkaloids and intercalation into DNA could be utilized to use the alkaloids as supravital DNA probe. Negative effect of sanguinarine and chelerythrine is their genotoxicity.

Cytochrome P450 and peroxidase oxidize ellipticine to detoxication and activation metabolites. Ellipticine is a potent antineoplastic agent exhibiting the multimodal mechanism of its action. Ellipticine intercalates into DNA and inhibits topoisomerase II. Covalent DNA aducts are mediated by CYP or peroxidase oxidation of ellipticine. The anti-tumor activity of ellipticine and its derivatives is caused by a combination mechanism of cell cycle arrest and induction of the apoptotic pathway. Pharmacological efficiencies and geneotoxic side effects of ellipticine is dependent on levels and activities of cytochrome P450 or peroxidase in target tissues.

Aristolactams are the major metabolites of biotransformation of aristolochic acid. Nitroreduction is the crucial step in formation of an AA reactive metabolite, *N*-hydroxyaristolactam. Aristolochic acid is naturally occurring nephrotoxin and carcinogen. Aristolochic acid nephropathy (AAN) is a type of rapidly progression interstitial fibrosis, which is responsible for destructive fibrotic process in the kidney caused by AA. AAN patients also suffer urothelial cancer. Balkan endemic nephropathy is similar type of nephropathy as AAN, being suggest to be developed by AA.

Flavonoids represent a group of phytochemicals with antioxidant properties and ability to modulate several enzymes or cell receptors. Flavonoids are metabolized mainly in the gut by colon microflora. Flavonoids having an anti-estrogenic effect show an anti-cancer activity, especially in relation to hormone-dependent tissues. However, not all flavonoids are beneficial. Some flavonoids have cytotoxic, mutagenic and prooxidant effects. (In Czech)



**Keywords:** Cytochrome P450, peroxidase, NADPH:chinonoxidoreductase, sanguinarine, chelerythrine, apoptosis, aryl hydrocarbon receptor, ellipticine, aristolochic acid, aristolochic acid nephropathy, balkan endemic nephropathy, flavonoids, antioxidant