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Modulation of drug metabolizing enzymes by dietary doses of sulforaphane; role in its anti-hypertensive and anti-oxidant effect in spontaneously hypertensive rats

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Aim: We have previously demonstrated that exposure of spontaneously hypertensive rats (SHR) to sulforaphane (SF) results in resisting the normal progressive rise in blood. This study aims to investigate the potential effect of these dietary doses of SF on hepatic drug metabolizing enzymes in SHR.

Methods: Rats were treated for eight weeks with SF (20 or 40 mg/kg) added to drinking water. At the end of treatment rats were euthanized, followed by preparation of liver microsomes and cytosols. The activity and/or protein expression of selected cytochrome P450 (CYP) enzymes and microsomal epoxide hydrolase (mEH) were measured in hepatic microsomes. Cytosolic fraction was utilized to measure total glutathione (GSH) level and activity of selected antioxidant enzymes.

Results: At the high dose, SF treatment resulted in a significant reduction of CYP1A2 and CYP2C9 activities that were accompanied by a parallel decline in their apoproteins. Similarly, activities of CYP2B1/2 and mEH were inhibited only by high dose SF treatment. No effect of SF was observed on the rest of the studied phase I enzymes. On the other hand, both low and high doses of SF resulted in a significant induction of both hepatic glutathione level and activities of superoxide dismutase (SOD) and catalase. Only the high dose SF induced the activities of hepatic glutathione-S-transferases (GST), glutathione reductase (GR) and glutathione peroxidase (GPx) to a significant effect.

Conclusion: This study demonstrates that dietary doses SF has the potential to offer chemoprevention through stimulation of the endogenous antioxidants and inhibiting CYP enzymes involved in bioactivation of procarcinogens.

Biography

Fawzy Elbarbry has completed his PhD and Post-doctoral studies from University of Saskatchewan College of Pharmacy (Canada). He joined Pacific University School of Pharmacy in 2008 as an Assistant Professor and in 2012, he was promoted to Associate Professor. He is also a Clinical Pharmacist at a major health-system in Oregon. He has published more than 30 papers and book chapters in reputed journals and more than 50 meeting proceedings and abstracts. He has been serving as an Editorial Board Member and frequent Reviewer for several publishers and granting agencies.

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