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Novel antihypertensive agents from nature: Role of arachidonic acid metabolism

Background & Aim: We investigated the effects of several phytochemicals on Arachidonic Acid (AA) metabolism in the kidney and their effect on arterial blood pressure, using Spontaneously Hypertensive Rats (SHR) as models.

Methods: Rats were treated for 8 weeks with either drinking water alone (control) or various concentrations of the phytochemicals added to drinking water. Mean Arterial Pressure (MAP) was measured at 7-day intervals throughout the study. At the end of treatment rats were euthanized and kidneys were harvested to prepare microsomes and measure enzymes involved in regulation of vasoactive metabolites: CYP4A, the key enzyme in the formation of 20-hydroxyeicosatetraenoic acid and the soluble epoxide hydrolase, which is responsible for the degradation of the vasodilator metabolites such as epoxyeicosatetraenoic acids. Effect of tested phytochemicals on kidney expression of CYP4A was investigated by immunoblotting.

Results: We found that treatment with some of the tested phytochemicals leads to significant reductions in both, the expression and activity of renal CYP4A isozymes, as well as the activity of soluble epoxide hydrolase (sEH). Consistent with these data, we have found that treatment with some phytochemicals resisted the progressive rise in MAP in the developing SHR in a dose dependent manner.

Conclusion: This is the first demonstration that exposure to small molecule phytochemicals modulates the metabolism of AA by both P450 enzymes and sEH in SHR rats. This may represent a novel mechanism by which natural products protects SHR rats against the progressive rise in blood pressure.

Biography

Fawzy Elbarbry has completed his PhD and Postdoctoral studies from University of Saskatchewan, Canada. He is the Director of Student Success at Pacific University, a premier institution in the Pacific Northwest of USA and a Clinical Pharmacist at Legacy Health System. He has published more than 50 papers in reputed journals and has been serving as an Editorial Board Member of several journals with high reputation.

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