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Effect of Panamanian plants on the biochemical targets of obesity, inflammation and metabolic disorders

In search of new biologically active compounds from natural sources, a collection of Panamanian plant extracts from the repository of NCNPR was evaluated through a series of target based cellular assays related to metabolic disorders such as type II diabetes, hypercholesterolemia, inflammation, and obesity. The plants were supplied by ciflorpan under an institutional memorandum of understanding and according to the Nagoya protocol.

The molecular targets selected to evaluate the biological activity of these plant extracts were: peroxisome proliferator-activated receptor (PPAR) isoforms (α and γ), liver X receptors (LXRs), nuclear factor kappa-B (NF-κB), and inducible nitric oxide synthase (iNOS). As a part of inflammatory pathway, activation of NF-κB leads to insulin resistance and by blocking this pathway, insulin resistance and the resultant T2DM can be prevented. In contrast, activators of PPARα and PPARγ are effective in lowering blood lipids and sugar and have been considered useful in the treatment of obesity and diabetes. Like the PPARs, LXR suppresses production of inflammatory mediators in a manner reciprocal to its regulation of lipid metabolism. Due to a close association of metabolic syndrome, with oxidative stress and inflammatory processes, there has been an increased interest in these molecular targets and the drugs affecting them are emerging as important class of therapeutic agents. Reporter gene assays were used to screen the plant extracts for their activity on PPARα, PPARγ, LXR and NF-κB while iNOS inhibition was determined in terms of nitrite levels in cell supernatants. Out of 83 plant extracts, 22 showed activation on PPARα and 15 showed activation of PPARγ. Eleven extracts showed activation of both PPARα and PPARγ. Most of the extracts did not affect the viability of HepG2 cells and were not considered cytotoxic. In the NF-κB assay 17 extracts inhibited NF-κB mediated transcription with IC50 values in the range of 28-65 μg/mL. This shows that the flora of Panama is still an untapped source of bioactive molecules.

Biography

Mahabir Gupta is Emeritus Professor and Director of Center for Research on Panamanian Flora, College of Pharmacy, University of Panama and Executive Director of Interciencia Association. His prizes include Alexander von Humboldt Fellowship, AAAS International Science Cooperation Award, Interciencia Award for Health Sciences, National Research Excellence Award Panama. He is member of Royal Academy of Pharmacy of Spain, Latin – American Academy of Science, and distinguished scientist of SENACYT Panama. He holds honorary degrees from two Latin American universities. He was elected TWAS Fellow in 2011 and Twas Council Member in 2016. He has published over 250 papers in peer-reviewed journals on Chemistry and Pharmacology of Panamanian plants.

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