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Plants with antidiabetic activity; mechanisms of action

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Diabetes, one of the most common endocrine metabolic disorder (285 million diabetics), affects the eyes, kidney, brain, heart, limbs and the nervous system. Presently available antidiabetic drugs (insulin, sulfonylureas, biguanides, thiazolidinediones, GLP-1 mimetics/analogs, DPP-4 inhibitors, meglitinides, amylin analogs, SGLT2 inhibitor and α-glucosidase/aldolase/reductase/amylase inhibitors) become less effective over time and also have safety and tolerability issues. Worldwide about 800-1200 plants (herbs) reported to be used to treat diabetes, are low cost, readily available, and perceived to be non-toxic. The mechanisms of hypoglycemic action of many of these plants are similar to those of the conventional antidiabetic agents: 1) Insulin-like activity (*Cinnamomum cassia/C. zeylanicum,* etc.); 2) Insulinotropic effect (*Stevia rebaudiana* Bertoni); 3) Insulin sensitization (*Momordica charantia, S. rebaudiana* Bertoni, *Synsepalum dulcificum*); 4) Induction of insulin-like glucose transport into adipocytes (*Lagerstroemia speciosa*); 5) Alpha-glucosidase inhibition {*Acosmium panamense* (Benth.), *M. charantia*]; 6) Aldolase reductase inhibition (*Cecropia obtusifolia* Bertol., *Fructus Arctii*); 7) Alpha-amylase (pancreatic) inhibition (*Azadirachta indica, Eugenia jambolana*); 8) Liver gluconeogenesis inhibition (*M. charantia* and *S. rebaudiana*); 9) Increasing GLP-1 binding to receptor (*Artemisia dracunculus* L.); 10) PPAR-γ agonist (*Punica granatum, Vaccinium angustifolium* Aiton.); 11) Dual-PPAR-α/γ agonist activity (*P. granatum*); 12) Inhibition of sodium-dependent glucose cotransporter-2 (*Nigella sativa* seeds); 13) Inhibition of acetyl-CoA carboxylase (*Persea americana* Mill); 14) Activation of AMP-activated protein kinase (*M. charantia*), etc. Shortcomings of plant medicine include, diagnosis and therapeutic effectiveness mostly based upon symptoms and relief of symptoms, lack of standardization for quality, dosing, and efficacy, and toxicity may ignored or not recognized.

Biography

Zafar H Israili has completed his PhD in Medicinal Chemistry from the University of Kansas and has completed his training in Clinical Pharmacology from Emory University School of Medicine (EUSM). He is an Associate Professor of Medicine at EUSM and an Adjunct Professor of Chemistry at Georgia State University. He is also a Visiting Professor at the University of Fez, Morocco. He has work experience as an Adjunct Professor in Chemistry at the Emory University; Adjunct Professor in Pharmacology at Morehouse School of Medicine and as a Research Pharmacologist at Veterans Administration. He is an Associate Editor of *Journal of Hypertension; Latin American Journal* of *Hypertension* and Guest Editor of *International Journal of Hypertension.* Previously, he was the Editor of *Ethnicity and Disease*, Associate Editor/Editorial Board Member of *Drug Metabolism Reviews and Drug Development Research*. He is a reviewer for more than 60 medical- and scientific journals. He has published 177 research papers, reviews and book chapters.

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