Cucurbitaceae: From Food, Herb, to Drug Discovery

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Abstract

Objective: Plant family Cucurbitaceae is widely and commonly used as a food ingredient and an ethnomedicinal herb in Asia, Africa, and Latin America. The majority of its ethnomedicinal usage is to prevent or treat hyperglycemia. Previously, we have found a novel insulin receptor-binding protein (IRBP), the likely constituent of Momordica charantia, triggered the insulin signaling transduction pathway via binding to insulin receptor. In this study, we further investigated the potential bioactive compounds of family Cucurbitaceae and their usage in drug discovery by proteomics and docking analysis.

Materials and Methods: The contents of IRBP in family Cucurbitaceae, including Citrullus, Lagenaria, Cucurbita, Luffa, Momordica, Trichosanthes, etc., were identified by proteomics. The interaction between IRBP and insulin receptor was then predicted by docking analysis. Finally, the hypoglycemic or anti-hyperglycemic activity of aqueous extract of family Cucurbitaceae was verified by glucose tolerance test.

Results and Conclusions: Our data showed that all plants tested in this study contained different levels of IRBP. Among the members in family Cucurbitaceae, genera Lagenaria, Momordica, and Trichosanthes contained high levels of IRBP. Moreover, aqueous extracts of Cucurbita, Lagenaria, Momordica, and Trichosanthes exhibited the hypoglycemic potential in mice. In conclusion, the grand biological activities demonstrated by the compounds obtained from plant family Cucurbitaceae further investigation through studies such as drug discovery, and drug delivery.