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題目:
中文題目：桑色素經由 I-3 受體來增加胰島素的分泌
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摘要

番石榴是台灣常見的水果，番石榴內含物桑色素（morin）每天口服攝入 25 毫克/公斤，能降低糖尿病鼠的血糖。同時，也會增加肝臟的糖原合成。番石榴內含物桑色素和臨床使用的藥物(格列本脲)一樣，兩者皆可逆轉這些糖尿病大鼠所減少的肝醣原。另外，它在肝細胞也會抑制肝醣分解為葡萄糖，抑制糖份的新生(葡萄糖的形成)，和一般的胰島素信號相似，關於受體後信號 FOXO1 通路都參與了這個作用。因此，桑色素被認為具有胰島素相似的作用。並且，研究人員也證明，桑色素可降低肝臟的脂質。另一方面，桑色素在糖尿病大鼠會增加血液胰島素，可以顯著降低血糖。然而，可能的機制並未被探討。因此我想研究番石榴內含物桑色素誘發釋放胰島素的作用機制與途徑，桑色素是通過什麼途徑來增強胰島素的分泌。而在文獻查證中發現刀豆氨酸已被證明具有胰島素分泌的功能，並已確認其機轉係經由 I3 受體激活而誘導的胰島素的分泌. 因為 I3 受體可以提高細胞內鈣離子，經由 IP-3 的增加會使 PLC 活化. 和促進 IP-3 而增加細胞內的鈣離子. 進而誘導胰島素的分泌。所以，本研究方法為使用已經具有 I3 受體的細胞測定細胞內鈣離子、在培養的胰島 β 細胞測定胰島素分泌、在大鼠體內測量血糖和胰島素等，了解桑色素和 I3 受體的相關性，然後，驗證桑色素係經由 I3 受體激活誘導胰島素分泌的機制。

關鍵字：芭樂、桑色素、I3 受體，胰島素分泌

Abstract

Guava is a famous fruit in Taiwan and it contained morin has been documented. Morin can lower blood sugar in diabetic rats only and did not modify the blood sugar in normal animals. Meanwhile, this action of morin was produced from 25 mg/kg after oral intake per day and it was produced in a dose-related manner at two weeks later. The action of morin seems related to the increase of glycogen synthesis in liver. Hepatic glycogen was significantly reduced in diabetic rats. Morin and the clinical used drug glibenclamide can reverse the reduced hepatic glycogen in these diabetic rats. Morin can inhibit the gluconeogenesis, the formation of glucose, in liver cells as described in another report. The regular insulin signals are involved in this action of morin regarding post-receptor signals to FOXO1 pathway. Therefore, morin was introduced to show insulin-mimetic action in this report. On the other hand, Chinese researchers demonstrated that morin can lower the lipids in liver. It means morin can decrease lipids in a way similar to guava. Additionally, an increase of blood insulin by morin was also observed in diabetic rats. However, the possible mechanism(s) did not conduct in clear. Therefore, it is of special interesting to find out this unclear point. I wish to investigate the detailed mechanisms for morin-induced release of insulin. It has been demonstrated that canavanine induces insulin secretion through activation of I3 receptors. Additionally, I3 receptors can increase calcium ions through an activation of PLC to increase IP-3, and the IP-3 can promote increased intracellular calcium ions to enhance insulin secretion. Experimental methods will include the use of CHO-cell to transfect the I3 receptor to measure the intracellular calcium induced by morin, and the increase of insulin secretion from cultured pancreatic β cells by morin will be characterized. Plasma insulin increased by morin will also be measured in rats. Then, application of blockade by specific antagonist may show the mediation of I3 receptor in morin-induced actions. Taken together, all data suggest that the morin-induced I3 receptor activation to enhance insulin secretion both in vitro and in vivo.

Keywords: Guava, morin, imidazoline I-3 receptor, insulin secretion

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