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• 計畫中文名稱	全靜脈營養輸入不同脂肪乳劑對糖尿病老鼠肝臟藥物代謝酵素系統之影響
• 計畫英文名稱	Effects of Different Fat Emulsions on Hepatic drug Metabolism in Diabetic Rats Receiving Total Parenteral Nutrition
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• 中文關鍵字	脂肪乳劑；全靜脈營養；糖尿病；藥物代謝；酵素；黃豆油；魚油
• 英文關鍵字	Fat emulsion；Total parenteral nutrition；Diabetes mellitus；Drug metabolism；Enzyme；Soybean oil；Fish oil
• 中文摘要	本研究在探討糖尿病鼠以全靜脈營養(TPN)輸入不同脂肪乳劑後對肝臟微粒體 P450 酵素系統之影響,並比較 TPN 鼠及糖尿病 TPN 鼠與正常老鼠在 P450 酵素系統活性上之差異性。實驗以 Wistar 公鼠爲對象分成五組:一組正常控制組,四組實驗組分別爲正常-TPN 魚油輸入組、正常-TPN 黃豆油輸入組、糖尿病-TPN 魚油輸入組、糖尿病-TPN 黃豆油輸入組。糖尿病是以尾靜脈注入 Streptozotocin 引致,TPN 組所輸入之營養素除了油脂種類不同外,其餘完全相同。TPN 溶液中葡萄糖、胺基酸、脂質之熱量百分比分別爲 50:20:30,熱量輸入爲 30kcal/100g 體重,TPN 共輸入一星期,實驗期滿取出肝臟做 P450 酵素活性定量,共測定 Benzo(a)pyrene hydroxylase、Pentoxyresorufin o-deethylase 及 Aniline hydroxylase 三種酵素之活性,並以電泳及免疫轉印法定量 1A1、2B1 及 2E1 之蛋白質量,結果顯示與正常控制組相較,正常-TPN 黃豆油組 Benzo(a) pyrene hydroxylase、Aniline hydroxylase 之活性均顯著較低,正常-TPN 魚油組則此兩酵素活性與控制組無差異,但 Pentoxyresorufin o-deethylase 之活性則上升,糖尿病-TPN 黃豆油組各酵素活性與控制組無差異,但糖尿病-TPN 魚油組則 Benzo(a)pyrine hydroxylase 及 Pentoxyresorufin o-deethylase 之活性均顯著較控制組爲高,而以抗體定量微粒體蛋白質後,各組所測得之酵素活性與 P450 之同型酵素呈同步反應,此結果顯示,以 TPN 輸入不同脂肪乳劑後,其肝微粒體酵素系統之活性的確會有所差異,而不論 TPN 老鼠是否有糖尿病,魚油輸入之酵素活性及 P450 同型酵素均未下降,糖尿病-TPN 魚油組 1A1、2B1 均較正常控制組顯著上升,似顯示對糖尿病-TPN 老鼠而言,魚油輸入後肝臟對藥物代謝的能力較黃豆油輸入爲佳。
• 英文摘要	This study was designed to investigate the effects of different fat emulsion on hepatic microsomal drug metabolism in rats with or

without diabetes mellitus when total parenteral nutrition (TPN) was administered. Male Wistar rats were divided into 5 groups: one normal group (NC) with normal rats fed with chow, and 4 experimental groups which were normal TPN rats with fish oil infusion (NF), normal TPN rats with soybean oil (NS), DM-TPN rats with fish oil (DF), and DM-TPN rats with soybean oil (DS). DM was induced by injecting streptozotocin into the tail vein of the rats. The basal TPN solution were identical except for the fat emulsions which was made of soybean oil or fish oil. The experimental period was 7 days. After TPN stopped overnight, livers were excised and microsomal enzyme activities were analyzed. Three enzymes benzo(a) pyrene hydroxylase, pentoxyresorufin o-deethylase and aniline hydroxylase were included. After the enzymes were measured, cytochrome p-450 isoforms which corresponding to these enzymes were identified by electrophoresis and immunoblotting. The results demonstrated that compared with NC group, NS group had lower benzo(a)pyrene hydroxylase and aniline hydroxylase activities, whereas DS group had no differences in the 3 enzyme activities from those of the NC group. On the other hand, pentoxyresorufin o-deethylase activity was significantly higher in NF and DF groups, and benzo(a)pyrene hydroxylase activity was also higher in DF group than in NC group. The amount of cytochrome p450 isoforms corresponding to these enzyme activities which are 1A1, 2B1 and 2E1 had paralleled response when measured by immunoblot assay. These results revealed that different fat emulsions infused by TPN resulted in the differences in hepatic microsomal enzyme activities. TPN with fish oil did not reduce the enzyme activity as well as cytochrome p450 isoforms, some enzyme activities were even enhanced in fish oil groups, regardless the rats were diabetes or not. On the other hand, some enzyme activities in soybean oil infusion groups were reduced in this study. This results suggest that hepatic drug metabolism may be enhanced when fish oil was administered, and fish oil can be used as a favorable fat source for TPN or DM-TPN patients.