• 系統編號	RN9705-0528
• 計畫中文名稱	左旋肉酸(L-carnitine)對全達素(Gentamicin)造成大鼠腎小管細胞細胞凋亡之抑制效果
• 計畫英文名稱	The Protective Effect of L-Carnitine on Rat Renal Tubular Cells against Gentamicin-Induced Apoptosis
• 主管機關	行政院國家科學委員會
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• 研究人員	蘇裕謀; 陳正憲 Sue, Yuh-Mou
• 中文關鍵字	左旋肉酸; 全達素; 細胞凋亡; 腎小管細胞
• 英文關鍵字	L-carnitine, Gentamicin, Apoptosis, Renal tubular cell; Prostacyclin, Peroxisome proliferator-activated receptor alpha (PPAR)？？
• 中文摘要	左旋肉酸(L-carnitine)是由人體內肝臟及腎臟合成，或是由飲食中所攝取的。其主要的功能是協助長鏈脂肪酸通過粒腺體的內膜，以進行長鏈脂肪酸的代謝。左旋肉酸也是一種強力的抗氧化劑及自由基清除劑。許多報告証實左旋肉酸能降低抗癌藥劑及毒物對細胞所造成的毒害。最新的研究顯示，對懷孕的母天竺鼠施用左旋肉酸，能避免 Gentamicin 對幼鼠所造成的聽力喪失。這些研究成果暗示了左旋肉酸對抗生素所造成的細胞毒害具有一定的治療潛力。Gentamicin 是一種治療革蘭氏陰性菌感染的重要抗生素，然而卻有著腎毒性的副作用，而限制其臨床的使用。Gentamicin 所造成的細胞毒害，細胞凋亡爲其中重要的原因之一，而 Gentamicin 造成腎小管細胞的細胞凋亡也已有報告証實。在本篇研究中，我們將釐清 Gentamicin 在大鼠腎小管細胞中所引發細胞凋亡的分子機制與訊號路徑，再研究左旋肉酸對 Gentamicin 引起之腎小管細胞的細胞凋亡是否具有保護作用及其相關機制。主要的研究要點如下所列：1. 釐清 Gentamicin 在大鼠腎小管細胞中所引發細胞凋亡的分子機制與訊號路徑。2. 評估左旋肉酸對 Gentamicin 所引發的細胞凋亡之保護作用。3. 在經 Gentamicin 處理的腎小管細胞中，研究左旋肉酸對大鼠腎小管細胞的保護作用之訊號傳遞路徑。本研究透過 Gentamicin 所引發的腎小管細胞凋亡之系統中，提供吾人在左旋肉酸對腎小管細胞的保護機制有更多的瞭解，並發展左旋肉酸在人類預防急性腎臟衰竭上的治療潛力。？？
• 英文摘要	Carnitine, the L-beta-hydroxy-gamma-N-trimethylaminobutyric acid, is synthesized primarily in the liver and kidneys from lysine and methionine or obtained from dietary sources. The most important function of this compound is to facilitate the transport of long-chain fatty acids across the innermitochondrial membrane. It has also been shown that carnitine is a powerful antioxidant and free radical scavenger. Many reports revealed that carnitine could protect against the toxicities of several anticancer and toxic agents such as doxorubicin and paraquat. Recently supplementation

of pregnant mothers with L-carnitine has been found to prevent neonatal mortality and sensorineural hearing loss induced by gentamicin in newborn guinea pigs. These data suggest the therapeutic potential of L-carnitine on aminoglycoside-induced cytotoxicity. Gentamicin is an important antibiotic of aminoglycoside for the treatment of Gram-negative bacterial infection. However, nephrotoxicity remains frequent side effect that seriously limits the use of gentamicin. Induction of apoptosis is an important cytotoxic mechanism of gentamicin. The apoptosis of renal tubular cells has been reported in gentamicin-treated rats. Here, we will evaluate the protective effects of L-carnitine on gentamicin-treated rat renal tubular cells. This proposal is aimed to: 1. Determining the molecular mechanism of gentamicin-inducing apoptosis in rat renal tubular cells. 2. Evaluating whether L-carnitine have antiapoptotic effect on gentamicin-inducing apoptosis. 3. Identifying the possible antiapoptosis signal transduction pathway of L-carnitine in renal tubular cells treated with gentamicin. Thus, this study offers us the understanding of the protective mechanism of L-carnitine in rat renal tubular cells treated with gentamicin, and develops therapeutic potential of L-carnitine in human renal diseases.