• 系統編號	RG10011-0228		
• 計畫中文名稱	利用奈米水膠載體攜帶自體幹細胞與蛋白質促進豬心肌再生的轉譯研究		
• 計畫英文名稱	--		
• 主管機關	財團法人國家衛生研究院	• 計畫編號	NHRI-EX100-10026SI
• 執行機構	國立成功大學醫學系內科學科		
• 本期期間	10001 ~ 10012		
• 報告頁數	20 頁	• 使用語言	中文
• 研究人員	陳志鴻；謝清河；蔡達慶；張明曜；； CHEN, JYH-HONG；Hsieh, Patrick C.H.；Tsai, Ta-Ching；Chang, Min-Yao；；		
• 中文關鍵字	自組裝胜？奈米纖維；奈米水膠；自體幹細胞；心肌梗塞；；；；		
• 英文關鍵字	self-assembling peptide nanofibers；nanogel；autologous stem cells；Myocardial infarction；；；；		
• 中文摘要	心血管疾病在台灣高居十大死因的第二位，其主因是冠狀動脈阻塞而導致心肌細胞缺血與壞死，因此若能減低心肌細胞的死亡，或是利用自體幹細胞移植來取代壞死心肌細胞，則不僅可以減少心臟衰竭的產生，甚至能夠促進心肌的再生。 心臟幹細胞治療(cardiac stem cell therapy)是一門整合生物、醫學、與工程等多重領域的新科學，其目的在促進人體心臟組織的修復、維持、與功能的提升。在我們之前研究報告利用自組裝胜肽奈米纖維(self-assembling peptide nanofibers)形成的奈米水膠(nanogel)發現直接將其與自體骨隨幹細胞移植注入缺氧的豬心內，可以達到保護心肌、增進心臟功能、減少壞死面積並且幫助心臟血管新生。然而，這項技術只被測試於立即缺氧的豬心，此與臨床實際情形並不相符，因此本研究想探討不同時間點注入自組裝奈米纖維與自體骨髓幹細胞是否有相同治療效果。 初步結果，我們發現在心肌梗塞後一天打入自組裝胜肽奈米纖維混合自體骨髓幹細胞改善了心臟功能；此外，心肌壞死評估發現術後 1 天接受治療在 scar length ratio 與 scar area ratio 明顯都低於術後 4 天與 7 天(如附件)。這代表著急性心肌梗塞後 24hr 是一個黃金治療時間點。		
• 英文摘要	The dominant cause of heart failure is regional loss of myocardium due to coronary artery disease. In the ischemic region, cardiomyocytes undergo necrosis, apoptosis and autophagy, and are not adequately replaced, leading to scar formation and ultimately, loss of ventricular function. Myocardial regeneration aims at protecting cardiomyocyte death and regrowing new cardiomyocytes to improve performance. However, this enthusiasm is frequently challenged by the fact that the mammalian heart, a terminally differentiated organ, has limited capability of spontaneous regeneration. We have previously shown that intra-myocardial injection of self-assembling peptide nanofibers, a unique nanobiomaterials support cell adhesion, growth and differentiation, with platelet-derived growth factor or insulin-like growth factor (IGF) may protect cardiomyocyte death and improve cardiac function after infarction. However, this approach is limited by the incapability of growing new cardiac cells or a viable tissue, particularly in the infarcted area. Therefore, in the current study we propose to test if nanofiber hydrogel injection with autologous bone marrow stem cells, with or without IGF, may protect infarcted myocardium, or regenerate the dead tissue, or both, using a pig model of experimental myocardial infarction. During the past year of project, we have successfully developed a delayed treatment protocol for myocardial infarction in pigs. This is, we apply the injection of peptide nanogels with autologous bone marrow cells at 1, 4 and 7 days after coronary ligation. The initial results showed promising, but further experimentation is required to conclude the results and to explore the molecular and cellular mechanisms underling the therapeutic benefits.		