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• 計畫中文名稱	反脈動式合併心室收縮支持之成大左心室輔助器研發		
• 計畫英文名稱	Left Ventricular Assist Device with Counterpulsation and Ventricular Systolic Support---NCKU-LVAD		
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• 研究人員	楊友任; 林尊湄 Yang, Yu-Jen		
• 中文關鍵字	心室輔功器; 活體實驗; 心臟衰竭		
• 英文關鍵字	Ventricular assist device; in vivo study; Heart failure		
• 中文摘要	機械式循環輔助器包括左心室輔助器是能使重度且末期心衰竭病患生存的療法，今日，許多阻礙長期機械循環輔助療法的困難已被克服，而一些臨床試驗，比如 REMATCH 也證實機械循環輔助器的確有助於心衰竭病人的存活及改善生活品質，因此機械循環輔助器不再僅視為其他療法的暫時性橋樑，而本身也是一種目的療法，甚至不用藉著機械改良，推陳出新，它還有潛力繼續擴充其適用範圍。由國立成功大學人工心臟科學中心研發的左心室輔助器（NCKU-LVAD）就是一種嶄新的設計，它含有幾項特點：第一、單一進、出管路只連接於升主動脈可避免傷及左心室，也避免其他 LVAD 常見的左心室蹋陷及血液滯留主動脈根部引起的主動脈瓣閉鎖不全；第二、由鈦合金製成的三叉導管歧管（已獲專利）除可引導血流方向，也有降低左心室後負荷，維持冠狀動脈循環，及防止血栓形成的作用；第三、脈動式的電動液壓驅動器能夠提供周邊器官更佳的微循環及微血管流量；第四、利用人工類神經網路技術發展出的新型控制台，可產生一種符合生理的主動脈血流，進而提供所需的壓力波及足夠血液灌流。本實驗的目的在藉著活體實驗將系統的設計改良至最符合人體應用，同時，也藉著牛隻的動物實驗模式建立 LVAD 的移植技術，測試 NCKU-LVAD 系統各組成部分在活體中植入可行性及效能耐久性。		
• 英文摘要	Mechanical circulatory support (MCS) including left ventricular assist device (LVAD) is a viable therapy for severe end-stage heart disease. Today, most obstacles to long-term MCS therapy have been overcome, and a number of clnical trials such as REMATCH (Randomized Evaluation of Mechanical Assistance for the Treatment of Congestive Heart Failure) study have shown a definitely positive benefit in terms of survival and improved quality of life. MCS should therefore no longer be considered as simply a temporary bridge to other therapies, but also a destination therapy whose potential could continue to expand through the development of newer devices. NCKU-LVAD designed by the Heart Science Research Center of the National Cheng Kung University (NCKU) is such an innovative device that proposes several unique designs. A single inflow／outflow conduit connected only to the ascending aorta should avoid iatrogenic trauma to LV apex, LV collapse and fluid dynamic-induced aortic regurgitation which are common in other LVADs. A three-way titanium-made conduit manifold leading the direction of blood flow could reduce LV afterload, maintain coronary perfusion and prevent thrombus formation. A pulsatile-type electrohydraulicactuator could provide better microcirculation and capillary flow in end organs. In addition, a novel controller using artificial neural network technologies would produce an physiologic aortic flow to meet a desired pressure waveform and adequate whole body perfusion. The purpose of this study aims to achieve the optimization of the design of the device through in-vivo experiments. Specifically, animal testing is used to develop a technique to implant the LVAD in the bovine model, prepare the surgical team for chronic implant studies, and to test the implantability and performance of the various components of the NCKU LVAD system in vivo.		