

• 系統編號	RN9408-0529		
• 計畫中文名稱	腫瘤壞死因子對肺靜脈心肌細胞之促心律不整及電生理作用		
• 計畫英文名稱	Effect of Tumor Necrosis Factor- α on the Electrophysiological Characteristics and Arrhythmogenic Activity of Pulmonary Vein Cardiomyocytes		
• 主管機關	行政院國家科學委員會	• 計畫編號	NSC92-2314-B038-054
• 執行機構	臺北醫學大學醫學系		
• 本期期間	9208 ~ 9307		
• 報告頁數	23 頁	• 使用語言	英文
• 研究人員	陳亦仁; 林正一; 陳適安 Chen, Yi-Jen ; Lin, Cheng-I ; Chen, Shih-Ann		
• 中文關鍵字	肺靜脈; 腫瘤壞死因子; 電生理		
• 英文關鍵字	Pulmonary vein; Tumor necrosis factor; Electrophysiology		
• 中文摘要	<p>腫瘤壞死因子乃是一種重要之發炎物質與心血管之致病或心律不整之病理機轉有關。肺靜脈已知是引發心房顫動之重要病灶所在，因此，腫瘤壞死因子或許藉著增加肺靜脈心肌細胞引發心律不整活性而引起心房顫動，本研究之主要目的乃在於探討腫瘤壞死因子對肺靜脈之電生理特性、細胞膜離子電流以及細胞內鈣離子作用。 方法：藉全細胞箝定實驗可以記錄兔肺靜脈心肌細胞之動作電位、離子電流。而細胞內鈣離子乃藉鈣離子螢光偵測加以測量，並比較肺靜脈心肌細胞有無接受腫瘤壞死因子 25ng/ml(6~12 小時)所出現之差異。結果：肺靜脈心肌細胞之對照組與實驗組有相同之自動節律（ 1.9±0.3 Hz 比上 1.8±0.3 Hz），然而，接受腫瘤壞死因子之肺靜脈心肌細胞有較大之動作電位去極化後電位 (5.2±1.6 比上 1.7±0.6 mV)。肺靜脈心肌細胞接受腫瘤壞死因子可以出現較小之 L 型鈣離子流，而有較大之暫時性外向鉀離子流、暫時性離子內流以及鈉鈣交換離子流，再則肺靜脈心肌細胞接受腫瘤壞死因子，有較小之鈣離子流變動，較小之收縮鈣離子。 結論：腫瘤壞死因子可增加肺靜脈心肌引發心律不整活性，這些結果可以解釋發炎合併心房顫動之病理機轉。</p>		
• 英文摘要	<p>Background: Tumor necrosis factor-α (TNF-α), a proinflammatory cytokine, has been implicated in the pathogenesis of cardiovascular diseases and cardiac arrhythmia. Pulmonary veins (PVs) were known to initiate paroxysmal atrial fibrillation. It is known that inflammation plays an important role in the genesis of atrial fibrillation. Therefore, it is possible that TNF-α may increase the PV arrhythmogenic activity to induce atrial fibrillation. The purpose of this study is to investigate the effects of</p>		

TNF- α on PV electrophysiological characteristics, membrane currents and intracellular calcium. Methods: Whole-cell patch clamp were used to investigate the action potentials and ionic currents in isolated rabbit PV single cardiomyocytes with and without (control) incubation of 25 ng/ml TNF- α (6~ 12 hours). The intracellular calcium was measured through the indo 1 fluorimetric ratio technique in both groups. Results: There were similar spontaneous beating rates (1.9 .plmin. 0.3 Hz versus 1.8 .plmin. 0.3 Hz) between control (n=30) and TNF- α group (n=19). However, PV cardiomyocytes with TNF- α had larger amplitudes of delayed afterdepolarization than control cardiomyocytes (5.2 .plmin.1.6 vs. 1.7 .plmin. 0.6 mV, P<0.05). TNF- α group has smaller L-type calcium currents, but has larger transient outward potassium, transient inward, and Na⁺ - Ca²⁺ exchanger than control group. TNF- α group has smaller intracellular calcium transient, smaller intracellular systolic calcium and longer decay portion of calcium transient (Tau). Conclusions: This study demonstrated that TNF- α increases PV arrhythmogenic activity, which may account for the genesis of inflammation related atrial fibrillation.