

• 計畫中文名稱	多孔性蠶絲蛋白質/聚麩胺酸電紡薄膜之製程開發與應用		
• 計畫英文名稱	The Processing and Applications of Porous Electrospun Silk Fibroin/Polyglutamic Acid (γ -PGA) Membranes		
• 系統編號	PB9709-0719	• 研究性質	應用研究
• 計畫編號	NSC97-2221-E038-002	• 研究方式	學術補助
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• 執行機構	臺北醫學大學生物醫學材料暨工程研究所		
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• 研究領域	材料科技		
• 研究人員	楊正昌,楊重光		
• 中文關鍵字	蠶絲蛋白質；聚麩胺酸；靜電紡絲		
• 英文關鍵字	silk fibroin；polyglutamic acid (γ -PGA)；electrospinning		
• 中文摘要	在以蠶絲蛋白質備製多孔性海綿結構基材之先期研究中顯示，蠶絲蛋白質之透析純化製程與其溶液之凝膠現象為量產化與加工之瓶頸，因此本研究在構想上係應用蠶絲蛋白質之非透析純化製程與其生物相容性與體內穩定性，透過聚麩胺酸之添加調控蠶絲蛋白質溶液之相變化與可紡絲性，以蠶絲蛋白質/聚麩胺酸混摻系統結合靜電紡絲技術發展出具多孔性之薄膜基材發，期望未來可應用到牙科之牙周組織導引再生領域。本三年期研究計畫，第一年重點在發展以蠶絲蛋白質之溶液相行為及溶液-凝膠相轉變之研究基礎發展出非透析法蠶絲蛋白質分離純化新製程與蠶絲蛋白質/聚麩胺酸混摻之相容性研究。第二年之重點在以蠶絲蛋白質/聚麩胺酸溶液之相行探討為基礎，建立多孔性蠶絲蛋白質/聚麩胺酸靜電紡絲薄膜之製程/結構/物性關係，並以薄膜之體外細胞培養試驗評估其生物相容性。第三年重點在進行蠶絲蛋白質/聚麩胺酸組織導引再生膜之動物試驗評估及體外降解性評估研究，以開發出製程簡化之新多孔性組織導引再生膜。		
• 英文摘要	According to the previous studies in preparing a porous silk fibroin 3-D sponge structure, we find out the dialysis process of silk fibroin (SF) as well as the sol-gel transition of dialyzed silk fibroin solution are the major bottlenecks for mass-production and fabrication processing. A novel non-dialysis process for silk fibroin separation based on the shear-induced phase separation is feasible in our laboratory. The objective of this study is to develop a porous SF/polyglutamic acid (γ-PGA) membrane via electrospinning process to meet the requirement of guided tissue regeneration (GTR) barriers for clinical applications in dental area. A three-year project is proposed. The major task of the first year is to		

integrate the non-dialysis separation processing and sol-gel transition studies for the preparation of silk fibroin. The miscibility and the phase behaviors of SF/ γ -PGA solution will be investigated. In the second year, the electrospinning of SF/ γ -PGA blend will be conducted under various temperatures and composition ratios. Based on the theoretical prediction by Kyu et al., a porous fiber structure under electrospinning process can be obtained. The mechanical properties as well as the in vitro cell culture for elucidating the biocompatibility of porous SF/ γ -PGA membranes will be studied. In the third year, the in vivo animal studies and γ -gamma irradiation effects on porous SF/ γ -PGA GTR barriers will be carried out. It will shed some light on the factors that influence the success of GTR barriers and the future research directions.