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關鍵字(英)	Polyhydroxyalkanoates blood compatibility bio-polymer Platelet
摘要(中)	聚羥基烷酯類(Polyhydroxyalkanoates, PHAs)為生物可分解性材料之一，物化特性與傳統塑膠相近，具有取代傳統塑膠的潛力，PHA 在本實驗室先前的研究上指出小鼠皮下植入 PHA 薄膜在 6-8 個月之後具有明顯的降解情形，而體外評估 PHA 與細胞株互動和活體植入的結果均顯示，PHA 具有不錯的組織相容性可發展為生醫材料。儘管如此，生醫材料若要運用於循環系統上時，還須具備血液相容性的特質。血液相容性差的生醫材料是指材料與血液接觸時會引起血中細胞與組織物質特性的改變，例如：血清凝血系統蛋白質的活化、血小板的凝集和血栓的形成，因此不易造成血栓的生醫材料即是血液相容性較高的材料。現今有關 PHAs 血

	液相容性的文獻報導仍不多，因此，本研究的目的是利用血球細胞的貼附測定、紅血球溶解分析測定、血小板再鈣化的時間的測定、血小板吸附與凝集反應的測定等方式配合免疫螢光染色和電子顯微鏡的觀察，對 PHB 與 PHBV 高分子做血液相容程度的評估。結果顯示當 PHAs 高分子接觸血漿中蛋白、血小板或血球時會引發血栓生成的一連串反應，因此其血液相容性並不高，其中 PHB 的血液相容性比 PHBV 稍佳，研究中也利用將 PHB 注入尾部靜脈阻斷的小鼠活體實驗來評估 PHB 高分子於活體血液相容性的結果。由活體實驗顯示，未改質的 PHB 懸浮液靜脈注射可引發小鼠尾部尖端血液的栓塞，進而引起小鼠尾部壞死的現象。因此針對 PHB 進行接枝的改質處理，改質後的 PHB 薄膜利用相同技術作評估，並運用改質 PHB 與巨噬細胞或 T 淋巴球體外共同培養方式，評估改質前後 PHB 對血液細胞活性的影響，結果顯示表面經過肝素功能基的接枝改質可提昇 PHB 高分子的血液相容性。綜合以上結果，PHAs 血液相容性較低，但表面經過改質後將可提昇其血液相容的特性。
摘要 (英)	Polyhydroxyalkanoates（PHAs）are bio-degradable materials that possess the similar physical and chemical properties as petrochemical plastics. PHAs have potential to replace the petrochemical plastics. It has been reported that the PHAs implants in animals were starting to degrade on 6-8 months after implantation. It also reveals that PHAs possess high biocompatibility and suit for biomedical materials. Blood-compatibility (also named as hemocompatibility) is major criteria for biomaterials to use in the circulation system of body. The blood-compatibility is defined that the material is nonthrombongenesis and less activities on leukocyte adhesion and activation when materials are interacted with blood, blood vessel, or heart. When the biomaterial is possessed the higher blood-compatibility, it is showed the less serologic and thrombogenic responses after contact with blood components. However, the study on PHA hemocompatibility is quite few, hence, the purpose of this study is evaluated the blood-compatibility on PHA polymers and further developed the methodologies on PHAs' hemocompatibility mordification. In this study, the hemolytic analysis, platelet and leukocyte adhesion assay, platelet aggregation assay, plasma recalcification time measurement were used to estimate PHAs' hemocompatibility. The results of in vitro cultured PHA polymers with leukocytes, platelet, and erythrocytes of blood indicated that PHAs possessed poor blood-compatibility. The PHBV were worse than PHB. Furthermore, the administration of unmodified PHB into mice tail vein induced the outcomes of thrombogenesis and necrosis on the end of mouse tail. However, the blood-compatibility of PHBs were improved by heparin graft on PHB film surface used both Poly-(acrylic acid) and Poly-(glycidyl methacrylate) as linkers. In conclusion, this study suggested that PHA polymers possess poor blood-compatibility, but the hemocompatibility of PHAs can be improved after heparin-graft surface modification.
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