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主要研究領域

本實驗室目前研究主題包括：

■ 可分解/可吸收之高分子材料

探討可分解/可吸收之高分子材料的設計、合成及特性：透過合成原料的選擇，高分子材料得以快速且安全的分解與吸收。設計的高分子材料特性為可透過酵解作用加速材料分解。

■ 組織工程

組織修復及組織工程是一個目前醫學上極為重要的領域。本實驗室透過合成方法製備具有肝臟機械強度、微製作結構及肝細胞再生能力之可吸收高分子材料，以達成複製具有完整血管系統肝臟之最終目標。

■ 藥物投遞

藥物的開發與應用近年來日新月異，但所面臨的問題往往是無法有效投遞至應受治療的患處，凸顯出對於藥物投遞相關研究的缺乏及需求。現有的治療常需要病人長時間來往於醫院或利用植入物進行藥物投遞，造成治療的不便、免疫系統的排斥以及植入物回收等困擾。本實驗室以可吸收高分子材料製備可完全被吸收的藥物投遞系統，首先將針對可治療耳鳴的內耳植入器進行研究，並進一步設計可以用於其他藥物、病徵以及器官的藥物投遞系統。

Main Research Interests

Current research in my group is focused in the following areas:

■ Bioresorbable and Biodegradable Polymeric Material.

Our research is focused on the design, synthesis and characterization of biodegradable and bioresorbable polymer. Through starting material selection, the degradation products are easily and safely absorbed by the environment or the surrounding tissue. Polymer characterization is centered on accelerated degradation using enzymatic activities.

■ Tissue Engineering.

Tissue regeneration and engineering is an important topic in medicine especially for patients in need of organ transplantation. By synthesizing biodegradable polymer with tissue-grade mechanical strength, specialized micro-fabricated topography, and liver cell culturing capability, liver tissue and functionality is regenerated and tested for liver function. The project aims to ultimately regenerate full liver organ with blood vessels network fully embedded.

■ Drug Delivery.

With many new drugs being produced through advances in pharmaceuticals, the need for effective drug delivery vehicles became more urgent over the past decades. Many current treatments either require repeated and laborious clinic visits by patients or suffer from strong immuno-responses, inflammation and tedious implant retrieving procedures from drug delivery implants. The biodegradable polymer in our lab offers the opportunities to construct fully biodegradable, implantable drug delivery devices. Devices are constructed for drug delivery in the inner ear for treatment of tinnitus using lidocaine. However, they are also applicable for other drugs and targeted conditions, as well as organs other than inner ear.

代表作 (Selected Publications)

- **J. Wang**, K. G. Boutin, L. D. Personnat, R. Langer, C. L. Channick, J. T. Borenstein, "Fabrication of Fully Biodegradable Airway Stents Using Amino Alcohol-based Poly(ester amide) Elastomers", *Adv. Healthcare Mat.*, 2013.
- **J. Wang**, R. Langer, J. T. Borenstein, "Chapter 22: Micro- and Nano-Technology in Tissue Engineering", In: *The Nanobiotechnology Handbook* (Y. Xie ed.). Boca Raton, FL, CRC Press, pp501-518.C.Y., 2012.
- **J. Wang**, C. J. Bettinger, R. S. Langer, J. T. Borenstein, "Biodegradable Microfluidic Scaffolds for Tissue Engineering from Amino Alcohol-based Poly(ester amide) Elastomers", *Organogenesis*, 6:4, 1-5, 2010.
- M. A. Ewing, **J. Wang**, S. A. Sheeley, and J. V. Sweedler, "Detecting D-Amino Acid-Containing Neuropeptides using Selective Enzyme Digestion", *Anal. Chem.*, 80, 2874-2880, 2008.