附件四、技術說明表

手動抽取式微流道裝置

提案人： 趙玲教授
單　位： 國立臺灣大學　化學工程學系/研究所
簡　歷：　學歷:　國立台灣大學　　化工學士　　，2003
　　美國麻省理工學院　化工博士　　，2009
　　美國康乃爾大學　　博士後研究員，2009-2011
實驗室網站: https://sites.google.com/che.ntu.edu.tw/biomembrane/

市場及需求: 基因治療與核酸藥物市場快速增長，對核酸載體奈米顆粒製備技術的需求持續上升。現有設備成本高且製程中容易損失材料，難以滿足早期研究中對微量樣品製備的需求。本技術以低成本、便攜、手動操作的特性，提供高效且低損耗的解決方案，適用於基因治療與疫苗開發等多場景應用，滿足市場對靈活與經濟技術的迫切需求。

技術摘要(含成果): 本技術是一種手動操作的微流道混合裝置，專為製備核酸載體奈米顆粒設計。該裝置能製備出性能與市售微流道設備相當的 mRNA-奈米脂質顆粒 (lipid nanoparticle, LNP)，且能有效提升核酸回收率。

優勢: 該裝置專為微量合成設計，能在製備小量樣品時提升材料回收效率。其操作完全依賴手動，不需要電力，大幅降低了設備成本，且操作時不受環境限制。

競爭產品: NanoAssemblr™ Ignite™ nanoparticle formulation systems

專利現況:
(1) 本技術尚未申請任何專利。
(2) 技術已具備實驗驗證，具潛力申請專利並推向市場。

聯絡方式(請不用填):
臺大產學合作總中心
Tel: 02-3366-9945,　E-mail: ordiac@ntu.edu.tw

Manual-Withdrawal Microfluidic Device

PI： Prof. Ling Chao
Department of Chemical Engineering, National Taiwan U.

Experience:

Education: National Taiwan University, Bachelor's in Chemical Engineering, 2003
Massachusetts Institute of Technology, PhD in Chemical Engineering, 2009
Cornell University, Postdoctoral Researcher, 2009-2011

Lab website: https://sites.google.com/che.ntu.edu.tw/biomembrane

Market Needs: The gene therapy and nucleic acid drug markets are rapidly growing, driving a rising demand for nanoparticle-based carriers for nucleic acid delivery. Existing equipment is expensive and prone to material loss during processing, making it challenging to meet the need for small-scale sample preparation in early-stage research. This technology offers a low-cost, portable, and manually operated solution, providing high efficiency and minimal material loss. It is well-suited for various applications, such as gene therapy and vaccine development, addressing the market's urgent demand for flexible and cost-effective technologies.

Our Technology: This technology is a manually operated microfluidic mixing device designed for the preparation of nucleic acid carrier nanoparticles. The device is capable of producing mRNA-lipid nanoparticles (LNPs) with performance comparable to commercial microfluidic systems, while effectively improving nucleic acid recovery.

Strength: Tailored for small-scale synthesis, the device enhances material recovery efficiency in microliter-scale production. The device operates entirely through manual handling, eliminating the need for electricity, ensuring adaptability across various environments, and significantly reducing equipment costs.

Competing Products: NanoAssemblr™ Ignite™ nanoparticle formulation systems

Intellectual Properties:

(1) This technology has not yet been patented.
(2) The technology has been experimentally validated and has the potential for patent application and market commercialization.

Contact (do not need to fill out):

Center for Industry-Academia Collaboration, NTU
Tel: 02-3366-9945, E-mail: ordiac@ntu.edu.tw