

Synopsis

講座摘要

Original Studies on The Diagnosis and Treatment of Rheumatic Diseases by Integrating Chinese and Western Medicine 中西醫結合診療風濕病的原創性研究

Academician Liu Liang
劉良院士

Rheumatic diseases represent a common and significant group of chronic illnesses. Statistics indicate that approximately 25% of adults suffer from rheumatic and joint diseases. These diseases are characterised by unclear etiologies, complex pathologies, and persistent, debilitating symptoms. Rheumatoid arthritis, colloquially referred to as "RA", is a classic example of these conditions. In managing RA, two prominent clinical challenges arise: the lack of early diagnosis and precise diagnostic biomarkers, as well as the absence of highly effective, low-toxicity specific drugs. These challenges hinder early diagnosis and treatment, resulting in suboptimal clinical remission rates. Academician Liu and his research team have been devoted to conducting multidisciplinary, innovative research focused on addressing these issues. Their relentless efforts have resulted in numerous groundbreaking achievements in this field, which are outlined below.

1. Tackling the global challenge of low-abundance IgG acidic N-glycans, which plays a significant role in the early and precise diagnosis of rheumatic diseases, Academician Liu and his team pioneered the development of TiO₂-PGC chip technology. This groundbreaking technology significantly improved the sensitivity of IgG N-glycan detection by over a thousand times compared to previous methods, making it the most sensitive quantitative glycomics technology available worldwide. The application of this technology has yielded remarkable outcomes, including the discovery of specific serum biomarkers for molecular diagnosis of rheumatic diseases such as RA, ankylosing spondylitis, and systemic lupus erythematosus, substantially enhancing clinical precision in diagnostics. At the same time, the team unveiled characteristic IgG N-glycan expression profiles in RA patients classified as Cold Syndrome and Dampness Syndrome, according to traditional Chinese medicine body constitution differentiation.
2. Developed the first anti-inflammatory and anti-rheumatic drug, "Zhengqing Fengtongning Prolonged-release Tablets," which targets microsomal prostaglandin E₂ synthase-1 (mPGES-1). This drug has been included in the National Essential Medicines List (NEML) of China and is utilised nationwide. It also bridges the international gap in anti-inflammatory drugs targeting mPGES-1.

3. Introduced novel methodologies, animal models and technical platforms for conducting research in the field of rheumatic diseases and anti-inflammatory immunopharmacology. The world's first rat gut microbiota gene set has been created, enabling the manipulation of gut microbiota for the treatment of RA, and an SD rat adjuvant-induced arthritis model has been developed for the research and development of anti-arthritic drugs. Moreover, new mechanisms underlying the pathogenesis of RA, strategies to overcome drug resistance in RA patients, as well as a new binding site for IKK-beta kinase, have been identified.

This body of work showcases Academician Liu's unwavering dedication to advancing the field of rheumatic disease diagnosis and treatment through innovative and groundbreaking research which integrates Chinese and Western medicine approaches. The research findings have not only enhanced diagnostic accuracy and expanded treatment options, but also paved the way for improved therapies and deeper insights into the pathophysiology of these complex diseases.

風濕病是一種常見的重大慢性病。根據統計，成年人中約有 25% 患有風濕和關節疾病。風濕病的共同特點是發病機制不明，病理複雜，病情纏綿難癒。其中，類風濕關節炎（簡稱「類風關」）便是其典型病種之一。類風關有兩大突出的臨床問題，一是缺乏早期診斷和精準診斷的生物標誌物，二是缺乏高效低毒的藥物，導致早診早治困難，臨床病情緩解率低。劉良院士及其研究團隊聚焦上述問題，開展多學科結合創新性研究，獲得了多項原創性成果。

1. 針對具有風濕病早期診斷和精準診斷意義的低豐度 IgG 酸性 N-糖鏈難以檢測這一世界性難題，研究團隊在國際上首創了 TiO₂-PGC 芯片檢測新技術，對 IgG N-糖鏈的檢測靈敏度比先前的檢測方法提高了逾千倍，成為全球迄今最靈敏的定量糖組學技術。團隊應用該技術時發現了類風關、強直性脊柱炎、系統性紅斑狼瘡等多種風濕病分子診斷的特異性血清生物標誌物，顯著提高了臨床精準診斷水平。同時，團隊還發現了類風關中醫辨證屬寒證和濕證患者的特徵性 IgG N-糖鏈表達譜。
2. 研發首個作用於前列腺素 E₂ 終極合成酶 -1 (m-PGES-1) 的抗炎抗風濕新藥—正清風痛寧緩釋片，成為唯一被納入國家基本藥物目錄的治療風濕病中藥單體化合物藥物，在全國廣泛應用。同時，此藥亦填補了作用於 m-PGES-1 抗炎藥物領域的國際空白。
3. 建立了風濕病及抗炎免疫藥理研究的新方法、新模型和新平台，以及調整腸道微生態治療類風關的新策略；開闢了中醫藥治療的新路徑，包括創建了國際上首個大鼠腸道菌群基因集和 SD 大鼠佐劑性關節炎新模型，發現了類風關的發病和克服耐藥新機制，以及 IKK-beta 激酶的藥物結合新靶位。

上述成果彰顯了劉良院士應用中西醫等多學科結合的創新研究方法，在提高風濕病臨床診療水平作出了重要貢獻，不僅提高風濕病的精準診斷水平，還闡明疾病發生的複雜機理，反映中西醫多學科結合對於提高治療效果，進而改善病患者生活質量的可行性。