附件四、技術說明表

巴金森症候群相關之血漿 PIWI-piRNAs

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簡　歷：(可列出相關連結，例如系所、研究室網頁)
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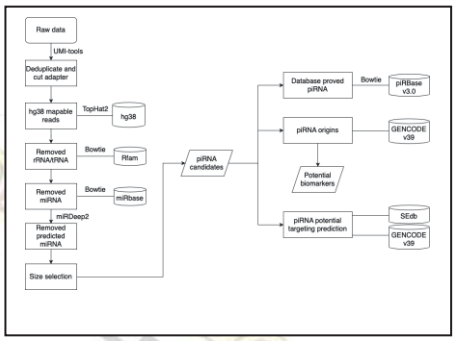

市場及需求:
帕金森氏病是一種常見的不可逆神經退化性疾病，不僅引起運動症狀，還可能伴隨認知障礙和失智症。目前合併失智症的帕金森氏病缺乏生物指標，現有治療藥物效果有限，可能帶來嚴重副作用。因此，區分帕金森氏病是否伴隨認知退化，以及相應的治療方法仍然是未滿足的醫療需求。血漿 PIWI-piRNAs 有望成為早期診斷生物標誌，並發展成商品化檢測套組。我們致力於尋找強有力的生物標誌物，以提高對這類非典型帕金森氏病的精確診斷。

技術摘要(含成果):
依據不同症狀將患者分類，然後進行對患者血漿中 PIWI-piRNAs 表現的分析，以尋找精確治療的生物標誌。在臨床診斷和血漿抽樣方面，我們按照統一的方案將患者分為不同的群體，包括 PDD（帕金森氏病合併失智症）、PD-MCI（帕金森氏病輕度認知障礙）、PDND（帕金森氏病正常認知功能）、MSA-C（多重系統萎縮 C 型）、MSA-P（多重系統萎縮 P 型）和 HC（對照組）。透過高通量小型非編碼 RNA 定序以及對患者血漿中 PIWI-piRNAs 的分析，我們致力於找到候選的生物標誌物，作為這些帕金森氏病（包括帶有認知障礙的 PD）的生物標誌物，以期提供更精確的診斷和針對性的治療。

優勢:
統一病人臨床診斷和血漿抽樣方法的流程，有助於降低操作變異性並確保樣品保存的一致性。透過次世代基因定序技術，對病人的血漿中的 PIWI-piRNAs 進行分析。所得結果可作為生物標誌物與臨床檢測試劑相結合，以滿足巴金森症患者早期診斷的醫療需求。透過生物標誌物的分類，使病人能夠及早接受有針對性的治療。研究結果有望提供巴金森病合併失智症的生物指標，進而實現預防與治療的目標，從而減輕社會的醫療負擔，同時提升我國在這一領域的國際聲譽。

競爭產品:

專利現況:

(1) 本技術已有（申請）相關美國臨時專利，application number 63455952

(2) 吳瑞美醫師在巴金森氏病的臨床遺傳學、認知和病理生理學等研究方面享有盛譽和經驗，與郭明哲醫師致力於神經多重退化症以及神經心理學研究，以發展完整診斷病患之方法，並協助巴金森患者血漿收案。林劭品教授是研究功能性 RNA 和表觀基因組調控、生物資訊學分析以及細胞生物學的專家，於 PIWI-piRNAs 有多年研究經驗;蔡億蒼博士有多年研究神經生物學的經驗及實驗能力，和林教授一同前往日本與專家落谷孝広教授教授進行合作，成功地定序了巴金森氏病合併認知障礙患者和對照組的血漿 RNA。龔品睿為在校博士班學生，為分析候選 PIWI-piRNAs 的主要人員。

(3)其他…

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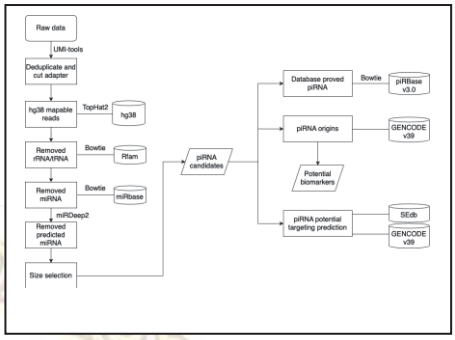
Identification of plasma enriched PIWI-piRNA units from Parkinsonian

PI： Prof. Shau-Ping Lin
Institute of Biotechnology, National Taiwan University.

Experience:

https://www.iob.ntu.edu.tw/zh_tw/faculty/full/-%E6%9E%97%E5%8A%AD%E5%93%81-68842655



Market Needs:

Parkinson's disease is a common and irreversible neurodegenerative disorder that not only causes motor symptoms but may also be accompanied by cognitive impairment and dementia. Currently, Parkinson's disease with concurrent dementia lacks biological markers, and existing treatment medications have limited effectiveness, potentially leading to serious side effects. Therefore, distinguishing whether Parkinson's disease is associated with cognitive decline and identifying corresponding treatment methods remain unmet medical needs. Plasma PIWI-piRNAs are expected to be early diagnostic biomarkers and could be developed into commercialized testing kits. We are dedicated to identifying robust biomarkers to enhance the accurate diagnosis of such atypical cases of Parkinson's disease.

Our Technology:

Patients are categorized based on different symptoms, followed by an analysis of PIWI-piRNAs expression in the patients' plasma to identify precise treatment biomarkers. In terms of clinical diagnosis and plasma sampling, we classify patients into distinct groups, including PDD (Parkinson's disease with concurrent dementia), PD-MCI (Parkinson's disease with mild cognitive impairment), PDND (Parkinson's disease with normal cognitive function), MSA-C (Multiple System Atrophy - Cerebellar type), MSA-P (Multiple System Atrophy - Parkinsonian type), and HC (Control group). Through high-throughput small non-coding RNA sequencing and analysis of PIWI-piRNAs in patient plasma, we are committed to identifying candidate biomarkers for Parkinson's disease (including PD with cognitive impairment). This effort aims to provide more accurate diagnosis and targeted treatment.

Strength:

Establishing a standardized process for clinical diagnosis and plasma sampling of patients helps reduce operational variability and ensures consistency in sample preservation. Utilizing next-generation gene sequencing technology, we analyze PIWI-piRNAs in the plasma of patients. The results obtained can serve as biomarkers, combined with clinical testing reagents, to meet the medical needs of

early diagnosis for Parkinson's disease patients. Through the classification of biomarkers, patients can receive targeted treatment early on. The research findings are expected to provide biomarkers for Parkinson's disease with concurrent dementia, thereby achieving goals in prevention and treatment, alleviating the societal burden of healthcare, and enhancing our country's international reputation in this field.

Competing Products:

Intellectual Properties:

(1) USA provisional patent, application number 63455952

(2) Dr. Ruey-Meei Wu is highly regarded and experienced in the clinical genetics, cognition, and pathophysiology of Parkinson's disease. Collaborating with Dr. Ming-Che Kuo, they are dedicated to researching neurodegenerative disorders and neuro psychology, aiming to develop comprehensive methods for patient diagnosis and assisting in the collection of plasma from Parkinson's patients. Professor Shau-Ping Lin is an expert in functional RNA, epigenetic gene regulation, bioinformatics analysis, and cell biology. With years of research experience in PIWI-piRNAs, Dr. Yi-Tzang Tsai has expertise in neuroscience and experimental capabilities. Together with Professor Lin, they collaborated with Japanese experts, Professors Takahiro Ochiya, successfully sequencing plasma RNA from Parkinson's patients with cognitive impairment and a control group. Pin-Jui Kung is a doctoral student, playing a key role in analyzing candidate PIWI-piRNAs.

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