



李香君教授

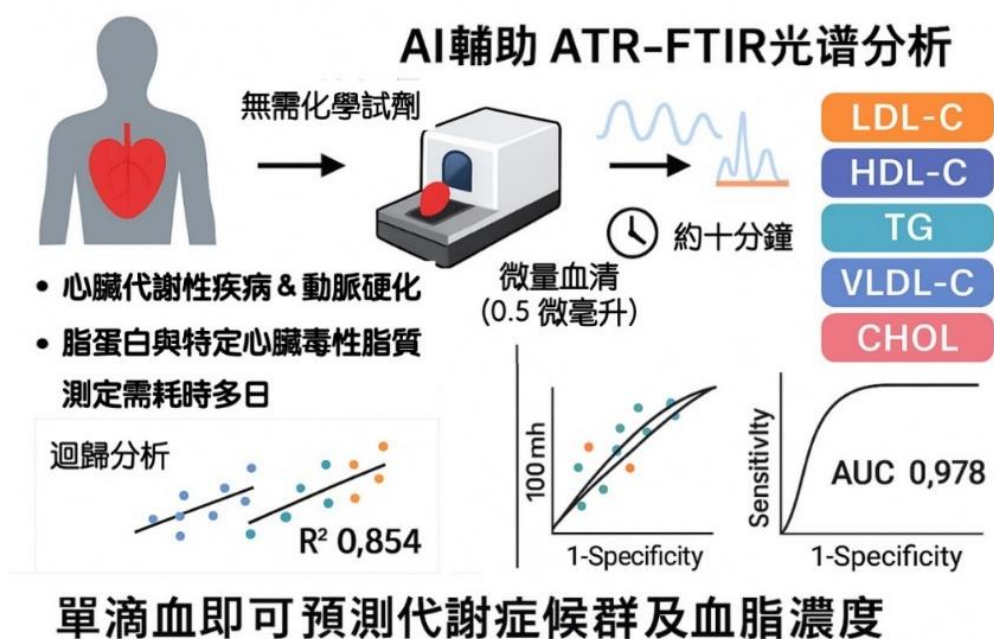
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研究人員開發了一種由人工智慧分析的快速血液測試，只需一滴血液即可檢測代謝症候群並測量關鍵血脂，只需一滴血，無需化學試劑。

代謝症候群是一種影響全球數百萬人的疾病，它大大增加了患心臟病、中風和糖尿病的風險。然而，目前特定血脂成分的臨床檢測往往需要幾天的時間來處理，從而減慢了診斷和治療的速度。

李教授與在新竹的國家同步輻射中心科學家們合作，將人工智能與 ATR-FTIR 光譜技術相結合，創造了一種超快速、準確的代謝健康評估方法。透過分析血液樣本的紅外線「指紋」，系統可以精確估計低密度脂蛋白、高密度脂蛋白、甘油三酯和其他重要脂質的水平。它還可以非常準確地識別一個人是否患有代謝症候群。該方法僅需 0.5 μL 血液，遠低於標準實驗室測試，並在大約 10 分鐘內完成分析。

研究小組表示，這項創新可以使常規健康監測更快、更容易、更容易。它還可能支持治療期間的即時醫療決策或旨在幫助病人建立有助於改善代謝的生活方式，進而預防各種心臟代謝性疾病。



【具體成果】

這項合作研究於 2025 年發表在科學期刊 PLOS ONE 上。

這是第一項報告人工智能輔助 ATR-FTIR 光譜法在預測血液中代謝症候群和心臟毒性的應用研究。



【研究團隊】



團隊成員：內科教授李香君博士；高雄醫學大學岡山醫院主治心臟血管內科資深主治醫師兼內科主任，台灣高雄
李耀昌博士，國家同步輻射研究中心副研究科學家，台灣新竹

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團隊簡介：高雄醫學大學脂質科學與老化研究中心（LSARC），台灣高雄。

代謝症候群和血脂紊亂是中國人十大死因中的幾個根本的病因，包括心血管疾病、腦血管疾病、糖尿病、高血壓、慢性肝病、肝硬化和腎臟疾病。高雄醫學院的核心精神是「樂學至上，研究第一」。LSARC 十多年來致力於對心臟代謝紊亂、衰老相關疾病、非酒精性肝炎相關代謝異常、糖尿病、心血管疾病和腦血管疾病進行高影響力的研究。

<https://lsarc.kmu.edu.tw/index.php/zh-tw/>

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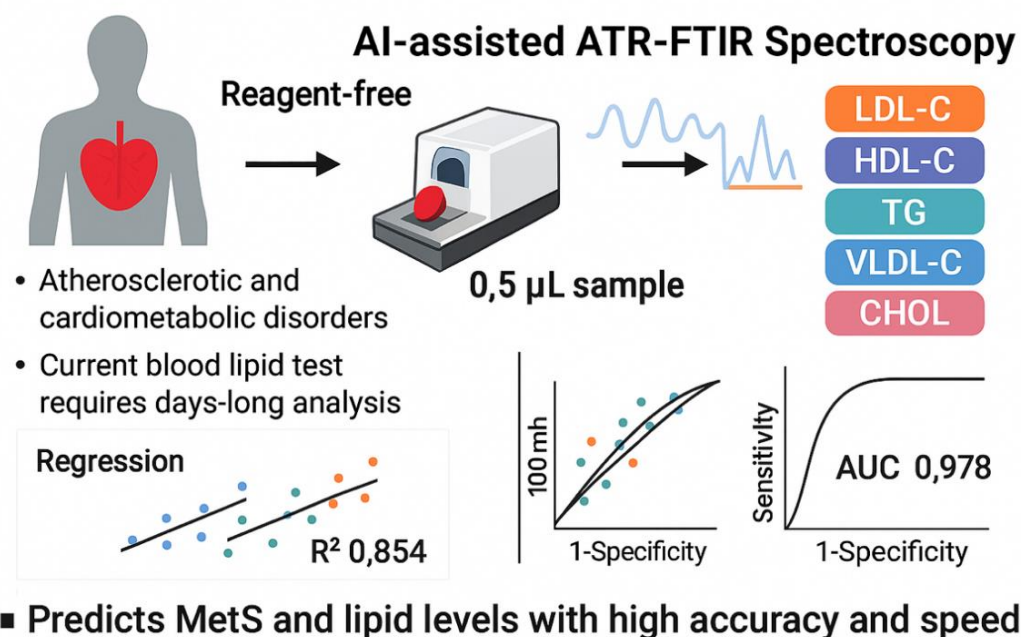
Researchers have developed a rapid, AI-powered blood test that can detect metabolic syndrome and measure key blood fats in just 10 min, using only a tiny drop of blood and no need for chemical reagents.

Metabolic syndrome, a condition that affects millions of people worldwide, greatly increases the risk of heart disease, stroke, and diabetes. However, current clinical tests for cholesterol and other blood lipids often take several days to process, slowing down the diagnosis and treatment.

Prof. Lee collaborated with scientists and combined artificial intelligence with a technology called ATR-FTIR spectroscopy to create an ultrafast, accurate method for assessing metabolic health. By analyzing the infrared “fingerprint” of a blood sample, the system can precisely estimate the levels of LDL, HDL, triglycerides, and other important lipids. It can also identify whether a person has metabolic syndrome with a remarkably high accuracy.

The method requires just 0.5 μL of blood—far less than a standard lab test—and completes the analysis in approximately 10 min.

According to the research team, this innovation can make routine health monitoring faster, easier, and more accessible. It may also support real-time medical decisions during treatment or lifestyle interventions aimed at improving metabolic health.





【Concrete Results】

This collaborative study was published by the Scientific Journal PLOS ONE in 2025. This is the first study to report the application of AI-assisted ATR-FTIR spectrometry for the prediction of metabolic syndrome and cardiotoxicity in the blood.

【Research Team】

Team Member: Dr. Hsiang-Chun Lee, Professor of Internal Medicine; Attending Cardiologist and Chief of Internal Medicine, Kaohsiung Medical University Gangshan Hospital, Kaohsiung, Taiwan

https://www.kmugh.org.tw/web/kmugh/Dept/DoctorPage?PageID=2103&DeptID=0130&DoctorID=0130_01

Dr. Yao-Chang Lee, Associate research scientist Research Scientist National Synchrotron Radiation Research Center, Hsinchu, Taiwan

https://www.nsrcc.org.tw/english/personal.aspx?ID=00169&Dept_UID=47&Type=D

Overview: Lipid Science and Aging Research Center (LSARC), Kaohsiung Medical University, Kaohsiung, Taiwan

Metabolic syndrome and lipid disorders contribute to several of the top ten causes of death among Chinese people, including cardiovascular disease, cerebrovascular disease, diabetes, hypertension, chronic liver disease, cirrhosis, and kidney disease. The central spirit of Kaohsiung Medical College is "Pleasure to learn first, research first." LSARC pursues high-impact research on cardiometabolic disorders, aging-related diseases, non-alcoholic hepatitis-related metabolic abnormalities, diabetes, cardiovascular diseases, and cerebrovascular diseases.

<https://lsarc.kmu.edu.tw/index.php/en-gb/>

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