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Hong Kong develops first-of-its-kind magnetic microcatheter for rapid treatment of acute ischemic strokes

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Advancing stroke treatment with precision and speed

A cross-disciplinary research team from The Chinese University of Hong Kong (CUHK)'s Faculty of Medicine and Faculty of Engineering has developed a first-of-its-kind sub-millimeter Magnetically Actuated Soft Rotatable-tipped Microcatheter (MSRM) for targeted endovascular interventions.

The novel technology demonstrates potential to provide a faster, safer, and more precise solution for treating life-threatening blood vessel blockages in the brain, addressing longstanding limitations of conventional tools in stroke intervention.

Professor Zhang Li from the Department of Mechanical and Automation Engineering at the Faculty of Engineering explained, "The MSRM features a soft, rotatable tip that can be guided wirelessly using external magnetic fields, which enables precise navigation through complex blood vessels. Once it reaches the blockage, the MSRM can directly deliver clot-dissolving drugs, mechanically break down the clots, and safely retrieve clot debris. This all-in-one design eliminates the need for tool exchanges, reduces procedural risks, and significantly enhances treatment efficiency."

Professor Thomas Leung Wai-hong, Lee Quo Wei Professor of Neurology and Head of the Division of Neurology in the Department of Medicine and Therapeutics at CU Medicine, added: "Unlike conventional tools, the MSRM's soft silicone-based tip and low rotation speed (2–8 Hz) minimise trauma to delicate brain vessels. In tests using human placenta blood vessels, which closely resemble cerebral arteries, the MSRM showed minimal cell damage compared to the notable vessel wall damage caused by traditional guidewires. This novel device addresses key limitations in current stroke interventions and offers hope for better stroke treatment."

Stroke remains a leading cause of death and long-term disability worldwide. Research shows that every minute saved between stroke onset and treatment can translate into an extra week of healthy life, making rapid intervention critical.