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A Milli-Spinner Thrombectomy Device for Effective and Safe Blood Clot Removal

Stanford scientist have developed a mechanical thrombectomy (MT) technology employing a milli-spinner mechanism to enhance the removal of blood clots. This innovative approach addresses critical medical conditions arising from blood flow blockages, such as ischemic stroke and pulmonary embolism, by effectively reducing clot volume through a unique debulking process.

Current MT procedures, while successful, fail to completely remove clots in 10% to 30% of patients, particularly when dealing with larger clots characterized by high fibrin content. Existing methods often lead to clot fragmentation and potential complications like distal emboli. The new milli-spinner addresses these issues by densifying the fibrin fiber network of clots and discharging red blood cells (RBCs), achieving up to 90% volumetric reduction. This innovative mechanism uses spin-induced compression and shearing, coupled with advanced structural design, to enhance clot removal efficacy across various clot sizes and compositions.

In both in-vitro and in-vivo models, the milli-spinner demonstrates high-fidelity revascularization, paving the way for improved thrombectomy devices tailored for challenging vascular occlusions.

Applications

- Peripheral artery disease treatment
- Ischemic stroke treatment
- Pulmonary embolism management
- Acute myocardial infarction treatment
- Deep vein thrombosis (DVT) managements

Advantages

- Prevent clot fragmentation
- Large clot removal capability
- Can couple with local drug delivery mechanism

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