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Hong Kong develops world-first nasal spray as prehospital emergency aid for ischemic stroke

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Reducing brain damage by over 80% and protecting neurological and motor functions



A research team from Department of Pharmacology and Pharmacy at the LKS Faculty of Medicine, the University of Hong Kong (HKUMed), in collaboration with the InnoHK Advanced Biomedical Instrumentation Centre (ABIC), has developed the world's first 'NanoPowder nasal spray'. This innovation successfully overcomes the challenge of crossing the blood-brain barrier (BBB), enabling the delivery of medication to the brain without the need for injections or surgery.

When used promptly at the early onset of stroke, the nasal spray provides prehospital emergency treatment, helping to save time, thus protecting brain cells and reducing complications. In the long term, it has the potential to become a community-based emergency rescue tool.

This innovative prehospital emergency strategy is expected to substantially increase stroke survival rates and neurological recovery, representing a significant advancement in the treatment of brain diseases globally. The research team spent over a decade developing the 'Nano-in-Micron' technology platform and subsequently used it to create the 'NanoPowder nasal spray'.

The nasal spray operates through four key steps: inhalation, deposition, de-agglomeration and delivery. The micron-sized powder is inhaled into the nasal cavity, where it effectively deposits in the target area. Upon contact with nasal mucus, the powders rapidly de-agglomerate into nanoparticles, which then travel along the nose-to-brain pathway, bypassing the BBB to deliver the drug directly to the brain. This design significantly enhances drug delivery efficiency and onset speed, offering a breakthrough solution for prehospital emergency treatment of ischemic stroke.

The 'Nano-in-Micron' technology platform can also be applied to deliver small molecule drugs, traditional Chinese medicine and biologics. Additionally, it has the potential to treat a range of neurodegenerative disorders, such as Alzheimer's disease, motor neuron diseases, and cerebral infectious diseases such as meningitis.