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Nanopuff: Albumin-coated siRNA-bound polydopamine nanoparticles

Polydopamine-based Nanopuff carriers provide an easy-to-prepare, safe, and versatile systemic delivery system for RNA therapeutics to treat infectious diseases, neurological disorders, and cancer.

Researchers at Purdue University have developed an effective carrier system for RNA drugs. Labeled "Nanopuff," this technology helps deliver RNA therapeutics to target cells via systemic administration to treat cancers, infectious diseases, and neurological disorders. Currently lipid and cationic nanoparticles are used as delivery systems for RNA, but their weaknesses are the limited control of biodistribution and the potential toxicity due to the positive charge. They also require complex preparation procedures.

Unlike the lipid and cationic nanoparticles, Nanopuff is made of polydopamine, which brings no positive charges. Nanopuff promotes ease of preparation and fulfills the unmet need for efficient RNA delivery. The technology alleviates safety concerns attributed to traditional cationic carriers and protects RNA from its harsh physiological environment. Nanopuff also enhances cellular uptake and avoids toxicity. It can be implemented as a simple, efficacious pharmacological treatment in a variety of areas, ranging from infectious diseases to cancer.

Technology Validation:

The optimal condition for siRNA binding to polydopamine was determined. The optimized form of Nanopuff showed a slightly negative charge and a z-average of 100 nm and protected siRNA from the RNase.

Advantages:

- Ease of use

- Enhanced safety profile

- Versatile

Technology ID

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Category

Biotechnology & Life Sciences/Cell & Gene Therapy Platforms

Pharmaceuticals/Drug Discovery & Development

Pharmaceuticals/Drug Delivery & Formulations

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Applications:

- Pharmacology

- Infectious disease

- Neurological and cancer treatments

TRL: 2

Intellectual Property:

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