



Schematic illustration of intracellular delivery of guest proteins.

Technology Summary

This innovation crafts MOF nanoparticles, self-assembling in water to encapsulate therapeutic agents like small molecules, DNA, RNA, or proteins. These nanoparticles feature an outer surface comprising an extracellular vesicle membrane (EVM), substantially extending their in vivo circulation half-life. By harnessing EVs from a patient's autologous biological sample, including those from specific tissues and tumors, the invention achieves impressive loading efficiencies of up to 97% and a loading capacity of approximately 41%. In vitro and in vivo studies confirm the ability of these EV-like nanoparticles to shield proteins from protease degradation, evade immune clearance, selectively target tumor sites, facilitate uptake, and autonomously release the encapsulated protein post-internalization.

Application & Market Utility

This biomimetic nanoplatform offers a breakthrough solution for systemic and intracellular protein delivery, exhibiting minimal cytotoxicity. Camouflaging with EVM prevents phagocytosis, while membrane-anchored proteins facilitate targeted endocytosis. Tested in vitro and in vivo, it demonstrates targeted tumor apoptosis with low toxicity to vital organs. Published in JACS, its potential spans therapeutic interventions across various diseases.

<https://pubs.acs.org/doi/10.1021/jacs.8b03584>

Next Steps

Explore clinical trials for diverse therapeutic applications.

TECHNOLOGY READINESS LEVEL

3-5

Seeking

Investment | Licensing | Research

Keywords

- Therapeutic protein delivery
- Nanoparticles
- Extracellular vesicle (EV) coating

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