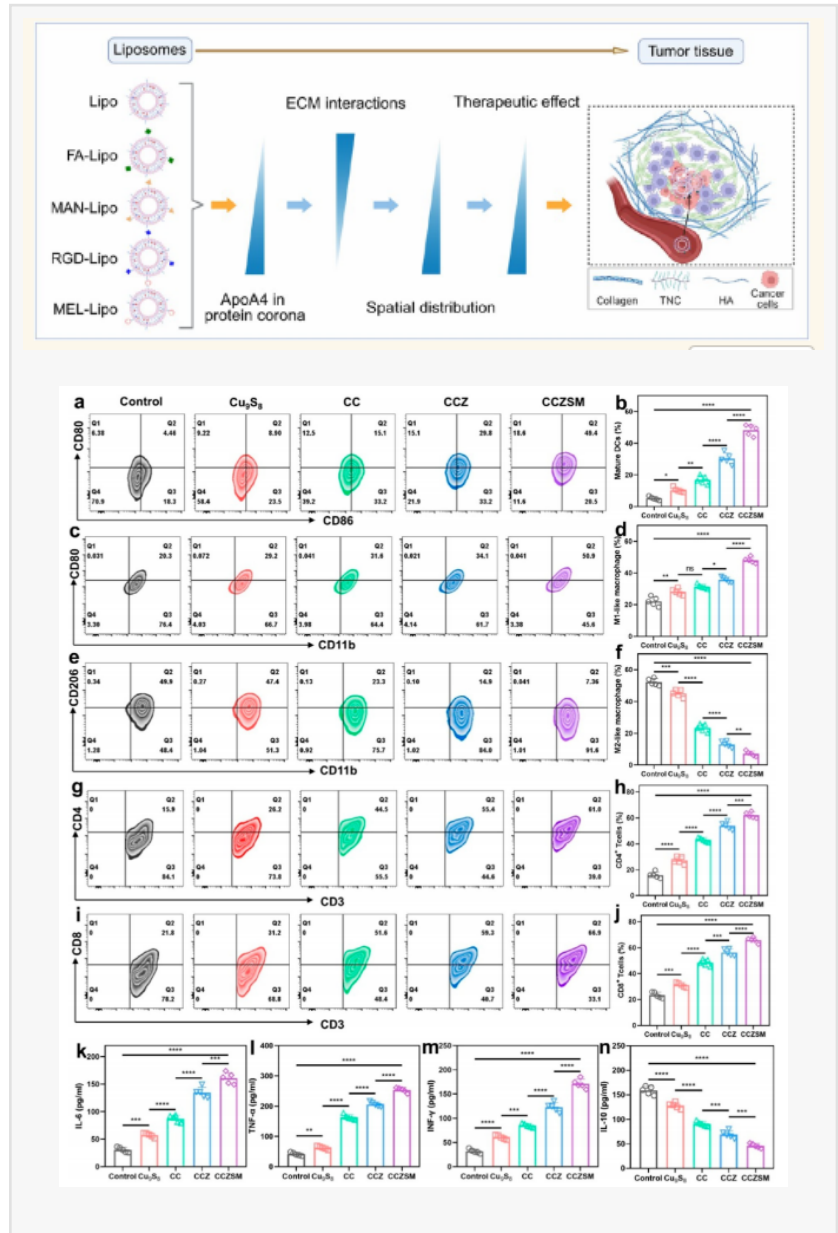


# From Ion Regulation to Nanomedicine Delivery: The Silent Supporting Force Behind Two ACS Nano Studies

*USCN High-Activity Recombinant Proteins & High-Sensitivity ELISA Kits: Underpinning Milestone Research in Two Fields Published in ACS Nano*

HUSTON, TX, UNITED STATES, August 17, 2026 /EINPresswire.com/ -- As a world-leading top journal covering nanomaterials, biomedicine and oncology therapeutics, ACS Nano exclusively publishes cutting-edge research with original innovation, serving as a core benchmark to evaluate the value and novelty of scientific findings in this field. Recently, two elite research teams have consecutively published landmark studies in this journal, achieving pivotal breakthroughs in two distinct directions: targeted delivery mechanisms of nanodrugs and ion metabolism-based immunotherapy for tumors.

Behind these two high-impact studies across separate research disciplines lies the same research reagent brand — USCN, a subsidiary of Wuhan [Cloud-Clone](#). Its recombinant proteins and [ELISA](#) kits deliver precise, reproducible experimental data, providing critical technical support for mechanism validation and conclusive analysis in both projects.



I. Unraveling the Mystery of the [Protein](#) Corona: How One Recombinant Protein Tracks

### The Invisible Coating of Nanomedicines and Its Solution

In early 2026, a research team led by Professor Zhiwen Zhang from the School of Pharmacy, Fudan University, in collaboration with Professor Yongping Li's teams from Shanghai Eighth People's Hospital and Pudong Hospital affiliated to Fudan University, published a landmark paper titled Deciphering Apolipoprotein A4 in the Protein Corona of Ligand-Modified Liposomes for Tumor Targeting and Penetration.

The research addresses a long-standing bottleneck restricting the clinical translation of nanomedicines: ligand modification is designed to enhance the tumor-targeting capacity of nanoparticles. However, upon entering the body, candidate nanodrugs rapidly adsorb abundant circulating proteins to form a surface "protein corona". This invisible coating masks the targeting function of surface ligands, resulting in compromised therapeutic efficacy.

Figure 1. Schematic illustration of the mechanism regulating tumor targeting and penetration of liposomes (Image sourced from ACS Nano)

The research group systematically constructed five liposome variants functionalized with different ligands. Proteomic analysis identified apolipoprotein A4 (ApoA4) as the core molecule governing the tumor-targeting and tissue penetration capacity of nanomedicines. Among all formulations, melittin-modified liposomes (MEL-Lipo) adsorbed the highest abundance of ApoA4 within the protein corona, demonstrating superior tumor accumulation and deep penetration performance.

### Core Validation Role of USCN Recombinant Protein

For mechanistic verification throughout the project, USCN recombinant mouse ApoA4 protein (Catalog No. URPB967Mu01) acted as the pivotal research tool to resolve this scientific puzzle. The team utilized this protein to establish standardized reconstituted serum systems. By serially titrating ApoA4 concentrations, researchers accurately quantified the regulatory effect of ApoA4 on the biological behavior of nanoliposomes.

Quantitative data confirmed that graded ApoA4 supplementation in reconstituted serum elevated cellular uptake of MEL-Lipo by 1.40-fold and 2.58-fold respectively, while boosting diffusion capacity through extracellular matrix (ECM) barrier models by 2.22-fold and 3.83-fold. Enabled by the high purity and biological activity of USCN recombinant protein, the study successfully quantified the positive correlation between ApoA4 concentration, liposome diffusion efficiency and cellular internalization rate.

## II. Disrupting Ion Homeostasis: USCN ELISA Kits Visualize the Full Process of Immune Activation

### Research Innovation: Synergistic Copper-Dependent and Iron-Dependent Cell Death

In April 2026, a collaborative research initiative led by the Key Laboratory of New Drug Research

and Clinical Pharmacy at Xuzhou Medical University, together with multiple partner hospitals, reported a groundbreaking study on a novel ion-mediated immunotherapeutic nanoplatform (CCZSM).

The platform adopts an innovative structural design: hollow Cu<sub>2</sub>S nanoparticles serve as delivery carriers loaded with Co<sup>2+</sup>, co-encapsulated Zn<sup>2+</sup> and ATP7A-siRNA. Leveraging homologous tumor membrane targeting, the system achieves multi-stage precise interference against intracellular Cu<sup>2+</sup> and Fe<sup>2+</sup> homeostasis in cancer cells, triggering cascading copper-dependent cell death (cuproptosis) and iron-dependent cell death (ferroptosis).

More importantly, the ion imbalance induced by CCZSM initiates immunogenic cell death (ICD) and activates the cGAS-STING signaling pathway, further facilitating dendritic cell maturation and T lymphocyte activation. This work establishes a complete functional cascade: ion disturbance → tumor cell death → systematic immune activation.

#### Key Data Support from USCN ELISA Kits

The research team deployed a panel of high-sensitivity cytokine ELISA kits from USCN (Catalog Nos. USEA079Mu, USEA056Mu, USEA133Mu, USEA049Mu) to quantify dynamic shifts in immunostimulatory cytokines (IL-6, IL-10, TNF-α, IFN-γ) within mouse serum.

Experimental results revealed that the CCZSM treatment group exhibited the highest serum IL-6 levels, accompanied by drastically elevated secretion of TNF-α and IFN-γ, alongside significantly reduced production of anti-inflammatory IL-10. By quantifying the temporal variation of these four serum cytokines, the team validated that CCZSM treatment remodels immunosuppressive tumor microenvironments, shifting the immune balance from a suppressed state to an activated anti-tumor phenotype.

Figure 2. Assessment of CCZSM-induced reversal of immunosuppressive tumor microenvironment (Image sourced from ACS Nano)

### III. The Low-Profile Enabler of Global Scientific Innovation

The successive publications of these two independent ACS Nano papers reflect the evolving role of advanced research reagents. From high-activity recombinant functional proteins to multiplex cytokine ELISA kits, USCN products under Cloud-Clone deliver consistent performance and reliable experimental readouts, continuously empowering high-level research in cutting-edge fields including oncology biology, nanomedicine and immunopharmacology worldwide.

When benchmarked against imported reagents, USCN products deliver equivalent precision and reproducibility while offering superior cost performance and broad experimental compatibility. This progress represents not merely the growth of a single brand, but the shift of global research tools from secondary alternatives to first-choice laboratory supplies.

Moving forward, as more USCN reagents support breakthrough research published in top-tier international journals, researchers worldwide will gain access to a more comprehensive toolkit

for life science research, laying a solid foundation for original scientific innovation across all continents.

#### About Cloud-Clone Corp.

Cloud-Clone Corp. is dedicated to the development and production of high-quality immunoassay reagents and detection solutions. With a focus on antibody engineering, multiplex assay development, and cross-platform compatibility, the company provides research tools designed to support precision medicine and advanced biomedical investigation globally. Our core products and services include the research and development of proteins, antibodies, ELISA kits, primary cells, and multiplex cytokine assay kits, as well as professional CRO services to fully meet the diverse needs of biomedical research and related fields.

For more information about Cloud-Clone Corp, visit [www.cloud-clone.com](http://www.cloud-clone.com).

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