



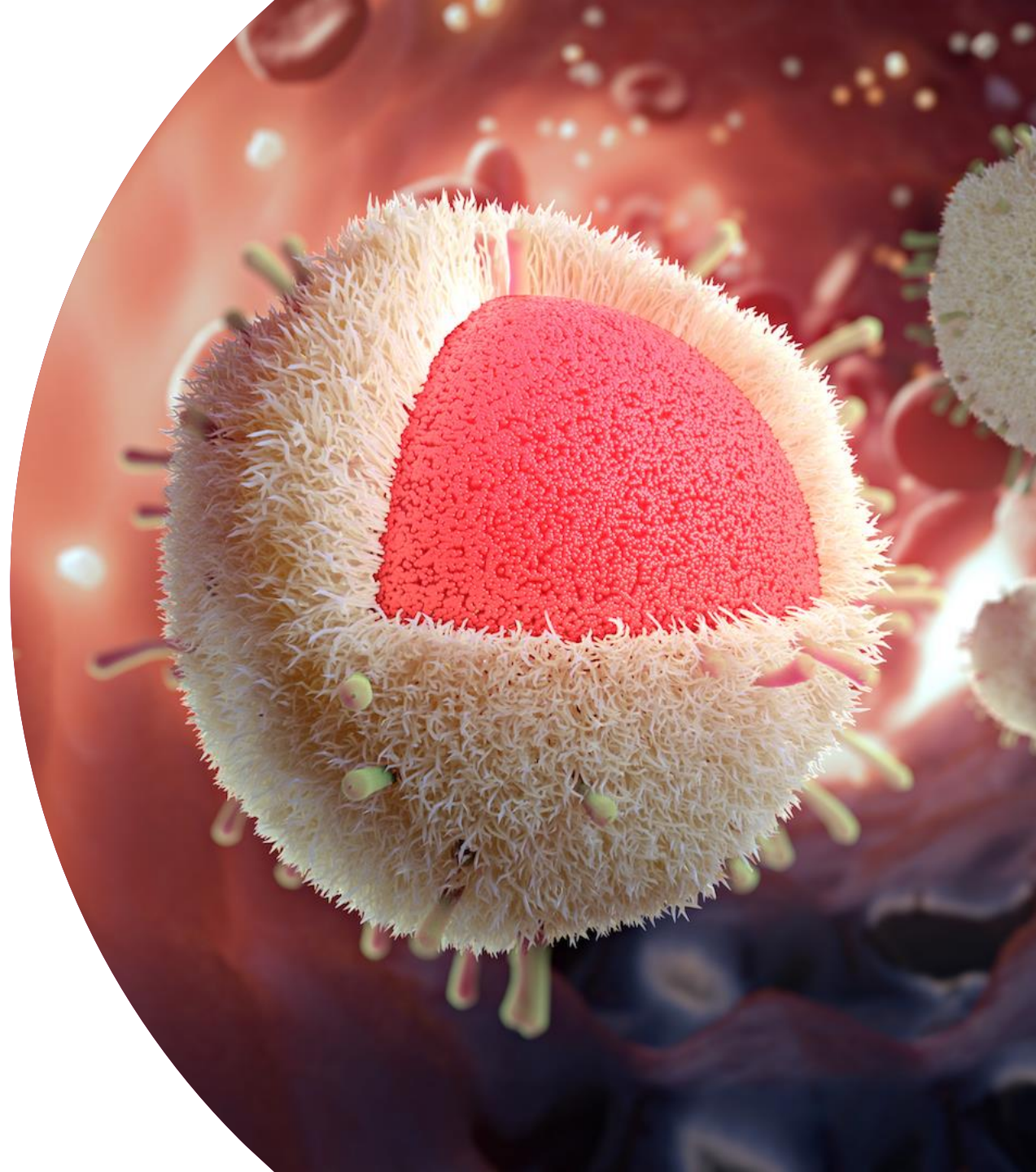
Unveiling the Biological Identity of Lipid Nanoparticles

CRS 2024 AM&E - Poster 286
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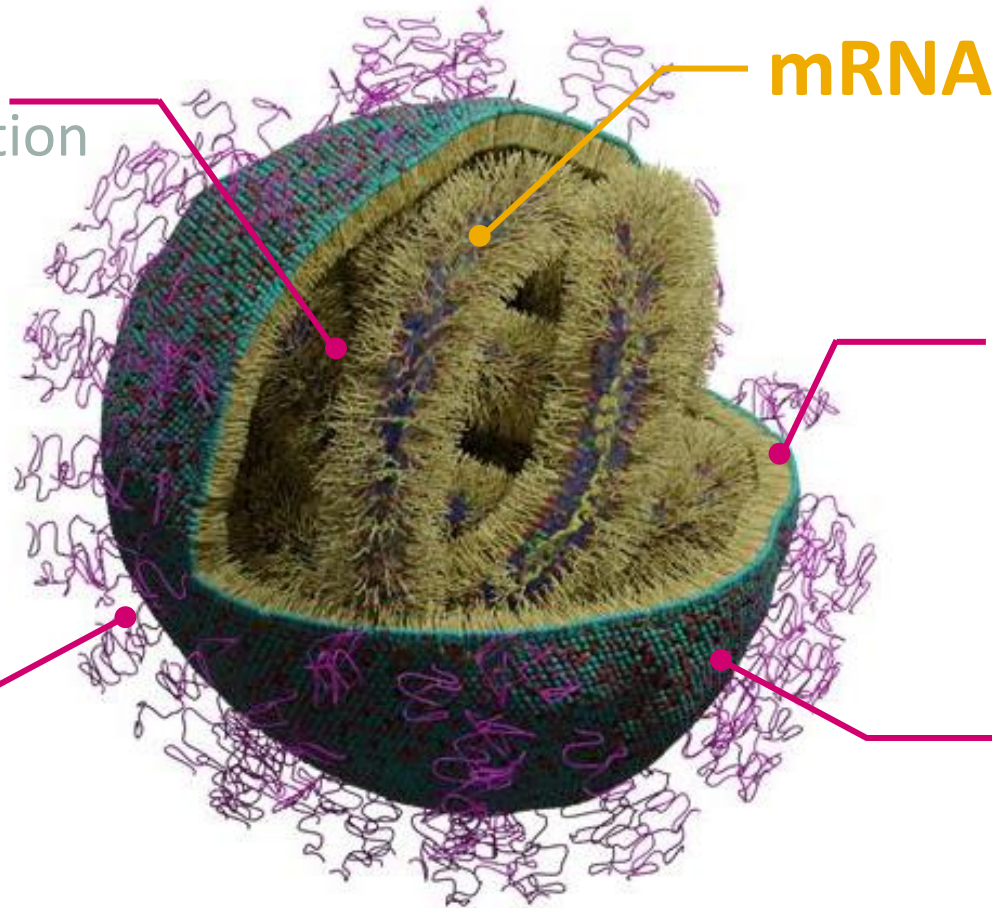
The chemical identity of lipid nanoparticles (LNPs)

Cationic/ionizable lipids

- Nucleic acids complexation
- Membrane fusion

“Stealth” PEG lipids

- Hydrophilic surface
- Steric hindrance



Structural helper lipids

- Bilayer support

Non-bilayer forming lipids

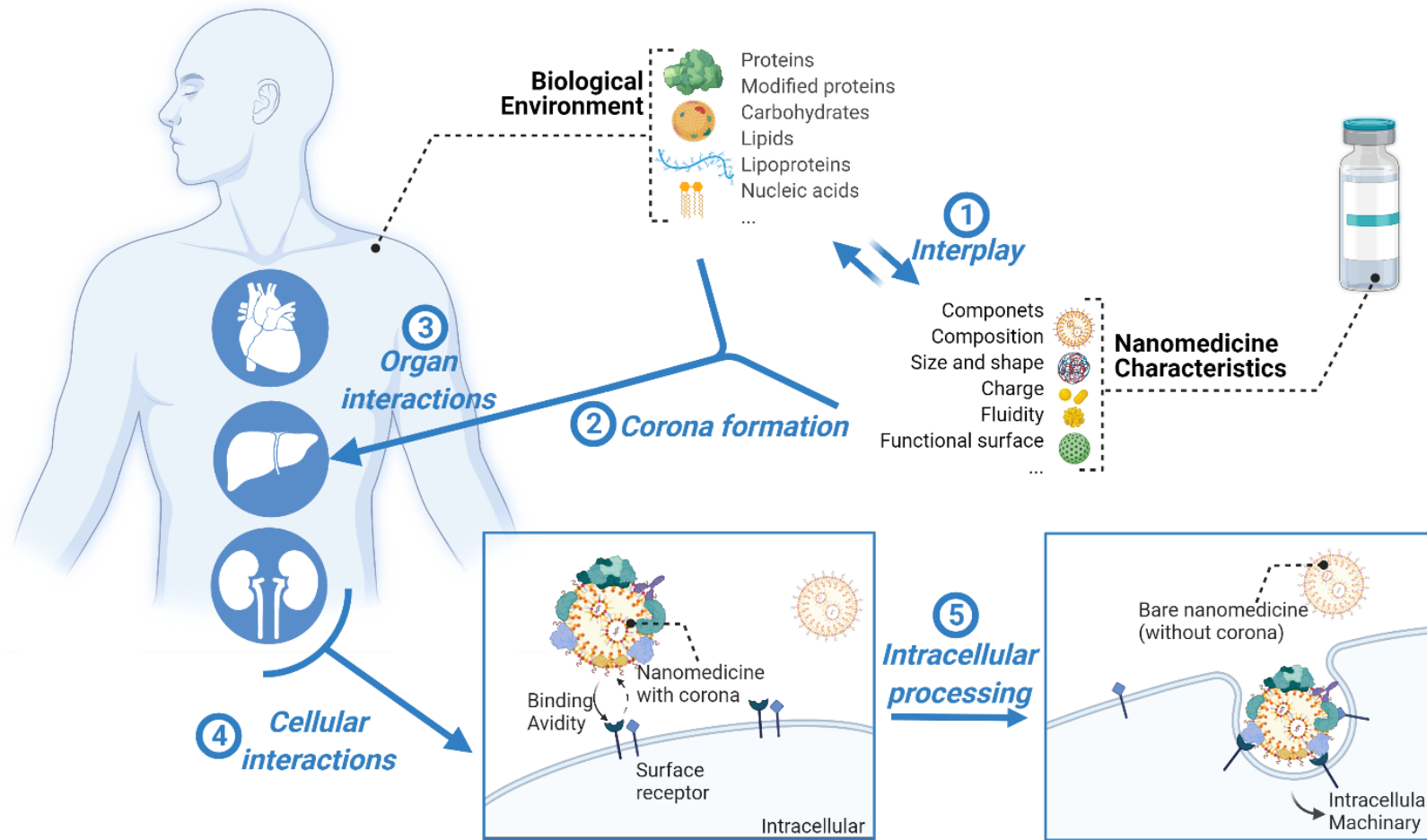
- Endosome destabilization

Cholesterol

- Integrity
- Endosomal release



The biological identity: Biocorona formation



- Targeting
- Tropism
- Internalization
- Efficacy
- Stability
- Toxicity
- Clearance
- Circulation

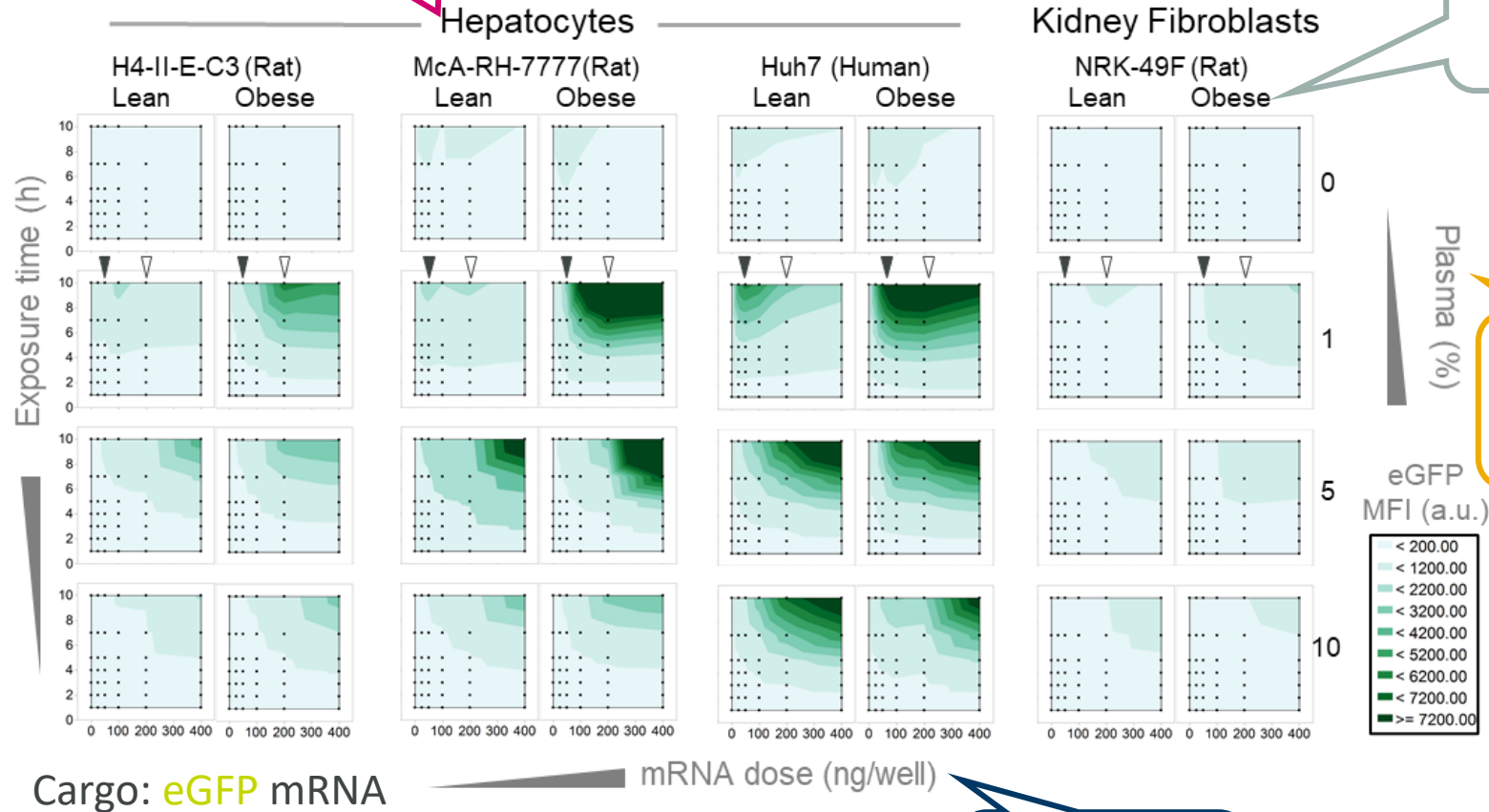
Dogma
Apo-E
dependent



HT imaging reveals larger data space

Cell lines

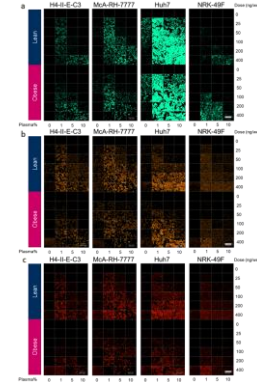
Types of plasma



Amount of LNPs

Amount of ApoE

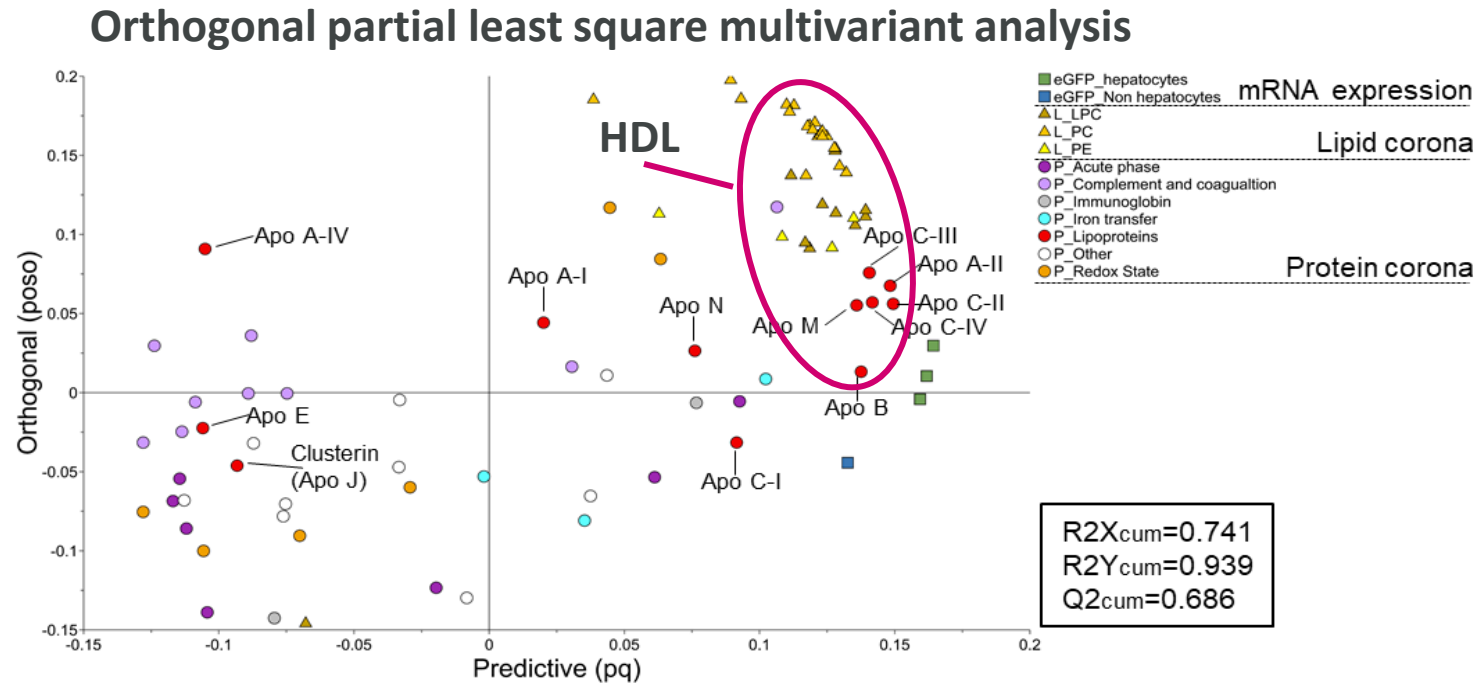
- **Obese Zucker rat:** Higher **ApoE**, **HDL**, **VLDL**
- **Not correlate** to the overall amount of **ApoE** or anabolic effects resulted by plasmas
- Different biomolecular **corona**



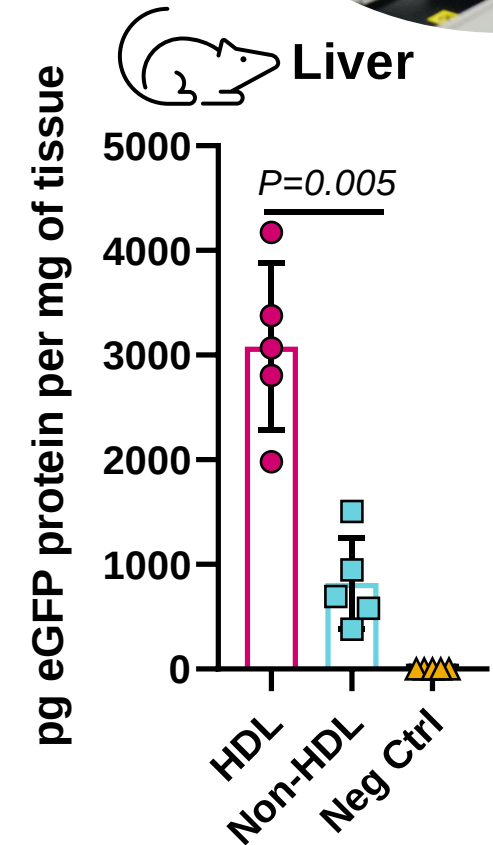
Combinatorial design



High-density lipoprotein modulated performance



- Corona compositions **do not reflect** plasma
- Slightly **reduced ApoE** in obese corona
- A cluster of HDL proteins and lipids highly correlates to performance**



Acknowledgements | Q&A Poster 286

AZ Postdoc Collaboration

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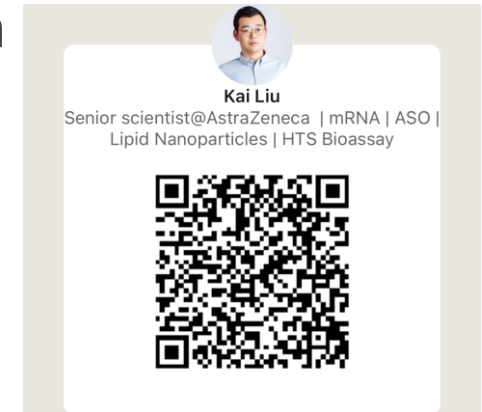
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Publications



nature communications



Article

<https://doi.org/10.1038/s41467-023-39768-9>

Multomics analysis of naturally efficacious lipid nanoparticle coronas reveals high-density lipoprotein is necessary for their function



Nanoscale



REVIEW



Cite this: *Nanoscale*, 2022, 14, 2136

Physiology, pathology and the biomolecular corona: the confounding factors in nanomedicine design



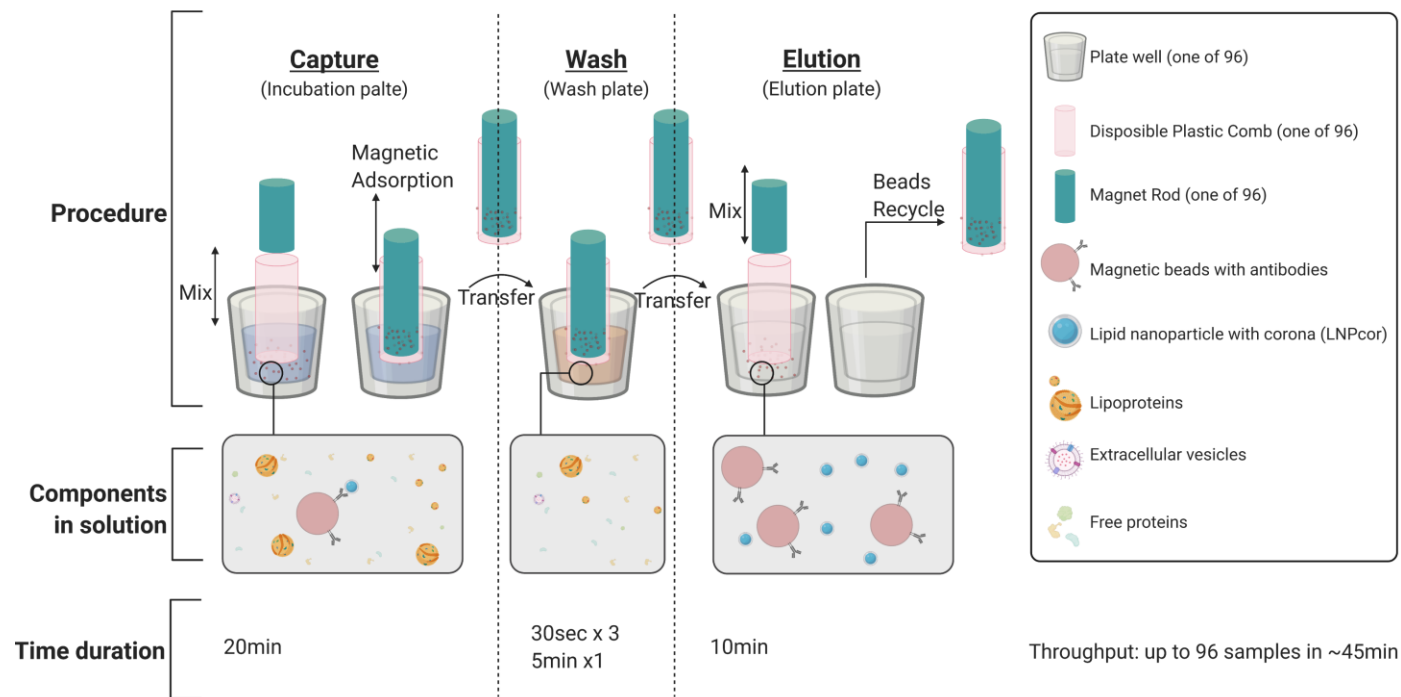
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The NanoFisher Assay

The development of affinity based magnetic isolation of LNP-corona complexes



- High-throughput (~100x faster)
- High recovery, purity and reproducibility
- Low hands-on time and material consumption
- Functional intact
- Screen compatible
- Personalized/stratification

