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Key talk: Designed Protein Cages: Current State and Potential Medical Applications

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Designed proteins offer us the potential of matching or exceeding the capabilities of nature's own naturally-occurring protein nanomachines which demonstrate a wonderful array of properties. Protein cages are hollow, typically spherical nanoscale protein assemblies which in nature have multiple uses such as materials storage, genome delivery (viruses) and catalysis (enzymes). As such it is attractive to design and produce artificial cages with properties such as multiple antigen display on the exterior for use as vaccines, and the ability to protect and carry therapeutically useful macromolecules in the interior for use as drug delivery systems. Making such systems programmable is a desirable feature and requires finding a way of opening such cages on demand to release cargo when and where required. In this presentation I will give an overview of the field and our own progress in producing a programmable artificial protein cage.^{1,2,3,4,5,6}

References

1. Malay, A. D. et al. An ultra-stable gold-coordinated protein cage displaying reversible assembly. *Nature* 569, 438–442 (2019).
2. Malay, A. D. et al. Gold Nanoparticle-Induced Formation of Artificial Protein Capsids. *Nano Lett.* 12, 2056–2059 (2012).
3. Imamura, M. et al. Probing structural dynamics of an artificial protein cage using high-speed atomic force microscopy. *Nano Lett.* 15, 1331–1335 (2015).
4. Naskalska, A. et al. An artificial protein cage delivers active protein cargoes to cell interior. *Biomacromolecules* 22, 4146–4154 (2021).
5. Stupka, I. et al. Chemically induced protein cage assembly with programmable opening and cargo release. 9424, (2022).
6. Majsterkiewicz, K. et al. Artificial Protein Cage with Unusual Geometry and Regularly Embedded Gold Nanoparticles. *Nano Lett.* 22, 3187–3195 (2022).

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