Synthetic Structural Biology: Building Bespoke Protein and DNA Nanostructures
合成構造生物学: オーダーメードでタンパク質とDNAのナノ構造を作る

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Jonathan G. Heddle, Ph.D.
Bionanoscience and Biochemistry Laboratory
Malopolska Center of Biotechnology
Jagiellonian University, The Republic of Poland

Protein cages are potentially useful, particularly for medical applications: Their external surfaces can be modified to give targeting capabilities while potentially fragile cargoes can be protected in their internal cavity. Designing and building artificial cages allows us to control their properties but includes several challenges including limitations of geometry; complexity of protein-protein interactions and the challenge of programmable disassembly. We have solved several of these problems with TRAP-cage1-3, a 2.2 MDa artificial protein cage where the protein building blocks are held together by gold ion bridges rather than classical protein-protein interactions. This allows for simplicity of construction and also reversible, triggerable assembly/disassembly. In this presentation I will give an overview of our work with TRAP-cage including its design, construction and unusual characteristics and consider future developments and progress towards cargo delivery.