

Vertex Protein Dictates Nanoreactor Shape, Performance

Scientific Achievement

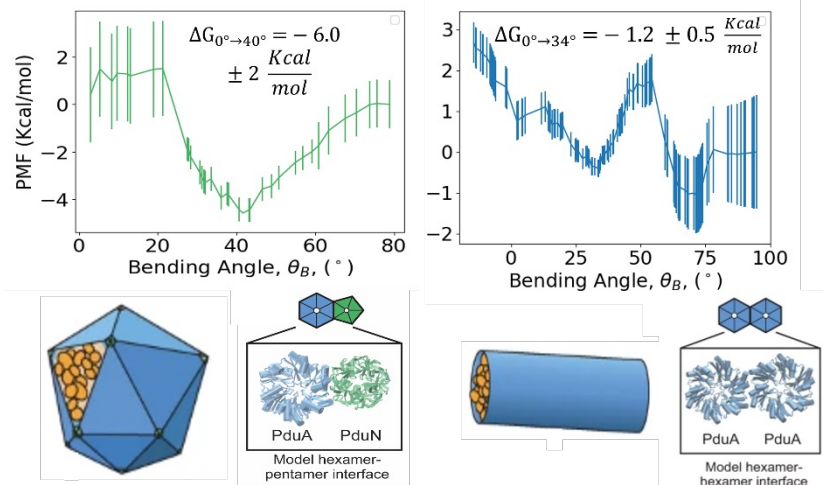
We shift the morphology of the 1,2-propanediol utilization microcompartment (Pdu MCP) protein nanoreactor from polyhedral to tubular by removing vertex protein PduN

Significance and Impact

Provides insights on how to control the shape and thus function of protein nanoreactors that could produce larger quantities of valuable chemical species than current synthetic methods

Research Details

- In bacteria, protein nanoreactors called microcompartments house chemical reactions necessary for the bacteria to survive
- By removing the vertex protein PduN, the polyhedral nanoreactors become tubular, impacting reaction rates
- Multiple types of modeling showed how the unique interactions of PduN dictate shape and how the surface area to volume ratio of the shape shift impacts nanoreactor performance



Simulations show how the unique interactions of vertex protein PduN control shape, leading tubes to form in its absence.

Mills, C.E., Waltmann, C., Archer, A.G., et al.
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Work was performed at Northwestern University