

Sugars & proteins: towards a synthetic biology

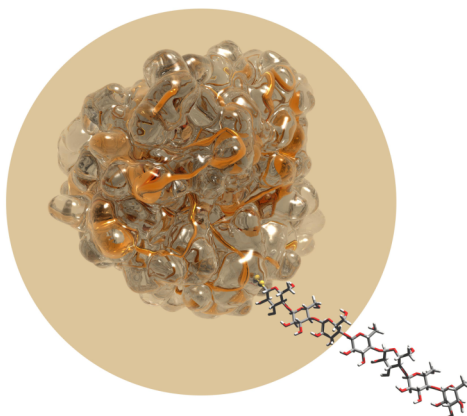
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Sugars and Post-Translational Modifications are critical biological markers that modulate the properties of proteins. Our work studies the interplay of proteins, sugars and modifications. Synthetic Biology's development at the start of this century may be compared with Synthetic Organic Chemistry's expansion at the start of the last; after decades of isolation, identification, analysis and functional confirmation the future logical and free-ranging redesign of biomacromolecules offers tantalizing opportunities. This lecture will cover emerging areas in our group in chemical protein construction with an emphasis on new bond-forming processes compatible with biology:

(i) New methods are required[1-9]: despite 80-years-worth of non-specific, chemical modification of proteins, precise methods in protein chemistry remain rare. The development of efficient, complete, chemo- and regio-selective methods, applied in benign aqueous systems to redesign the structure and function of proteins both in vitro and in vivo[9] will be presented.

(ii) 'Synthetic Biologics' and their applications[3,10-14]: drug delivery; selective protein degradation; nanomolar inhibitors of bacterial interactions; gene delivery vehicles; radio-dose delivery vehicles; probes of in vivo function and non-invasive presymptomatic disease diagnosis.



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