Bioinspired supramolecular assemblies from sequence-defined macromolecules

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Abstract.

Inspired by the exquisite properties of sequence-defined biopolymers such as DNA and proteins, researchers are increasingly developing synthetic macromolecules in which the information at the sequence level imparts specific functions. Notable recent examples of applications of sequenced-defined macromolecules (SDMs) include (bio)recognition, catalysis, and data storage.[1] Our group recently harnessed SDMs with various backbones and lateral units in view of exploring the relationship between 1D sequence, 3D structure, and properties, through a joint modeling and experimental approach. We report two examples: i) the supramolecular self-assembly of complementary SDMs bearing nucleobases, forming a catalytic pocket for the aerobic oxidation of alcohols (Fig. 1);[2] ii) the binding of SDMs bearing recognition units to antibodies, toward an improved avidity in the context of immunotherapy.[3-4] Our results point toward a better understanding of the interactions networks for a rational design of SDMs.

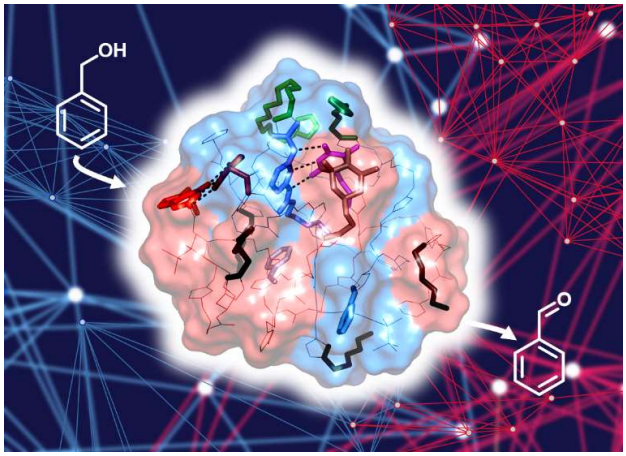

Fig. 1. Sketch of the supramolecular self-assembly of complementary SDMs, forming a catalytic pocket through a network of interactions.

References.

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