Fundamental Biological Processes and Artificial Receptors

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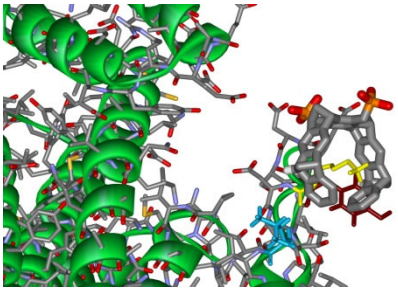
Since the Nobel prizes for Lehn, Cram and Pedersen, Supramolecular Chemistry has gone a long way: the underlying noncovalent interactions are (relatively) well understood, host molecules can be synthesized for almost any given guest and the resulting complexes can be calculated on a high level.

However, applications in biology are still rare, in spite of the fact, that most fundamental biological processes heavily rely on molecular recognition. This lecture presents selected examples how this challenge can be met:



Amphiphilic receptor molecules perform entirely artificial signal transduction across liposome membranes.[1] Monomeric and polymeric molecular tweezers introduce new mechanisms of enzyme inhibition and reversibly shut down proteolytic activities.[2] Oligomeric heterocycles dock onto critical areas of misfolding proteins and revert protein aggregation and neurotoxicity.[3]

Literature:

[1] K. Bernitzki, T. Schrader et al., *Angew. Chem. Int. Ed.* **2009**, *48*, 8001. [2] P. Talbiersky, T. Schrader et al., *Angew. Chem. Int. Ed.* **2009**, *48*, 2886. [3] T. Schrader, G. Bitan et al., in revision for *Nature*.