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Title: Bionic Chemistry - Adopting molecular concepts from nature: From site-specifically encoded posttranslational modification pattern, membrane proteins & biomimetic membranes to designer organelles

Abstract: Utilizing a complementary approach combining synthetic biology & synthetic chemistry with nanobiotechnological aspects, we expand & redesign nature's molecular concepts to address questions in complex systems. Specifically functionalized biomacromolecules and defined bioinspired and biomimetic systems are important components in this quest. Examples comprise the redesign of the translational network to genetically encode new functionalities via unnatural amino acids and their use to selectively introduce posttranslational modifications allowing for biointeraction studies. Biomimetic systems are currently expanded from biosensing devices for potential dependant membrane proteins and carriers towards spatiotemporal signalling platforms. The necessary chemical tools are implemented in all of these areas, to study protein-protein interactions e.g. for system wide screens which are currently under development as well as new approaches to design & genetically encode complex systems intracellularly.