



S006 Evolutionary concepts in protein design

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Nature has generated an impressive diversity of proteins using mechanisms such as recombination of smaller, sub-domain sized protein fragments that serve as building blocks in a Lego-like manner. We want to understand how these diverse structures and functions evolved and how we can apply observed mechanism to problems of protein design. So we developed a rational design strategy in which new functional proteins are built from fragments of existing proteins. Using bioinformatics tools we identify possible evolutionary links between protein folds and use this knowledge to construct hybrid proteins from subdomain sized fragments, thereby establishing a new design approach based on fragment recruitment. At the same time, our approach offers a rigorous test for the identification of minimal determinants of protein structure and function and allows us to test our understanding of protein evolution.
