

Invited Talk

Encoding evolvability: The hierarchical language of polyketide synthase protein interactions

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Polyketide synthases use an assembly-line mechanism to catalyse the synthesis of antibiotics and other natural products. Each member of a multi-protein complex adds a particular building block to a growing polyketide chain, so the order of the proteins determines the order of the product. In the laboratory, this property has been used to drive combinatorial chemistry; in the bacterial world, polyketide synthase pathways have been repeatedly shuffled in an arms race to generate novel poisons. I will show that the language of polyketide synthase protein interactions has been designed to facilitate this kind of innovation. I will present the interaction code in detail, and emphasize the elements it shares with high-level computer languages, including modularity, hierarchical organization, and abstraction.