

Nucleotidyltransferases: Evolution, Reaction Mechanisms and Applications

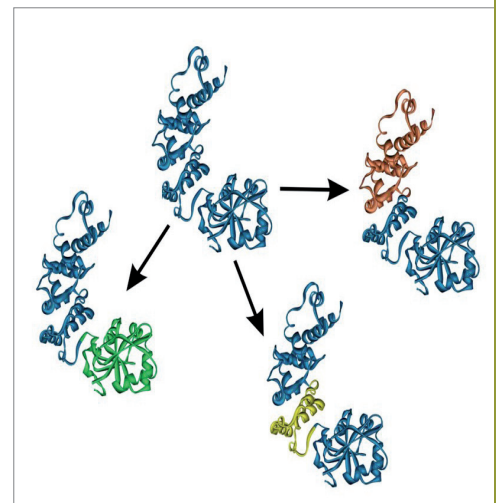
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Keywords

- tRNA nucleotidyltransferases
- poly(A) polymerases
- evolution
- modular composition of enzymes
- combinatorial analysis

The group is interested in the structure/function relation of specific RNA polymerases in all kingdoms of life, with a focus on the identification of individual structural modules that dictate and modulate the function of these enzymes. As a very successful strategy for this purpose, individual enzyme regions are transplanted into other nucleotidyltransferases, leading to chimeric proteins with altered activities. A second approach in this direction is based on combinatorial analyses of enzyme and substrate composition. Furthermore, nucleotidyltransferases acting on tRNAs are investigated as possible tools for the specific introduction of non-natural amino acids in enzymes to expand their catalytic activities.

In addition, phylogenetic analyses are used in order to clarify the evolution of nucleotidyltransferases with similar sequence composition but different activities and functions. Highly variable sequences within the corresponding genes are used to develop tools for diagnostic phylotyping.



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