Noncanonical Functions of Aminoacyl-tRNA Synthetases

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Abstract—Aminoacyl-tRNA synthetases, together with their main function of covalent binding of an amino acid to a corresponding tRNA, also perform many other functions. They take part in regulation of gene transcription, apoptosis, translation, and RNA splicing. Some of them function as cytokines or catalyze different reactions in living cells. Noncanonical functions can be mediated by additional domains of these proteins. On the other hand, some of the noncanonical functions are directly associated with the active center of the aminoacylation reaction. In this review we summarize recent data on the noncanonical functions of aminoacyl-tRNA synthetases and on the mechanisms of their action.

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