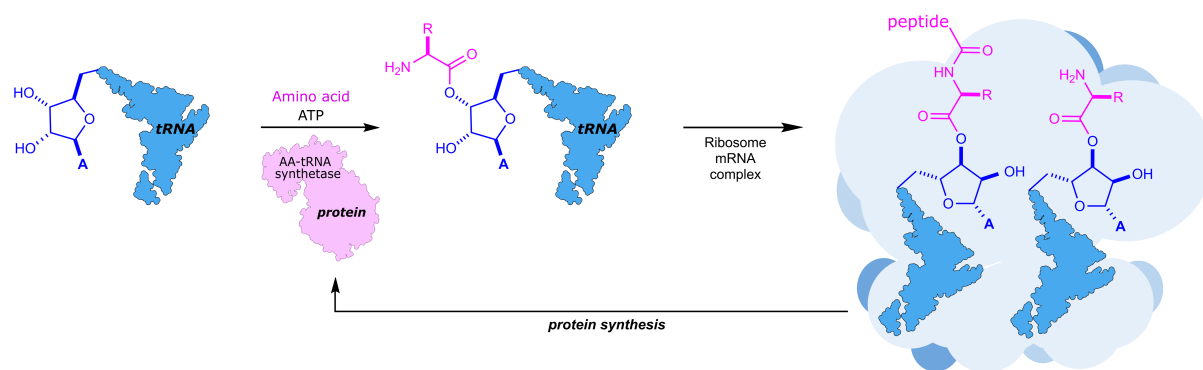


Lost in translation, the origins of life's peptides

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Ribosomal peptide synthesis (RPS) is orchestrated through the aminoacylation of RNAs by aminoacyl-tRNA synthetase enzymes that are produced by RPS. This causal paradox, which was established prior to the evolution of life's last universal common ancestor, obscures the origins of protein biosynthesis. To break this paradox, we set out to build a deterministic model of the minimum reactivity required to initiate peptide biosynthesis.



The chemical unity and antiquity of life's central metabolites provides compelling evidence that a simple set of chemical reactions predated the appearance of life on Earth,^{1,2} and we reasoned that rediscovering such a reaction network, and the rules that control it, would be the key to uncovering the origins of peptide biosynthesis.

In this talk recent advances that suggest life's nucleotides,^{1,3} peptides,³⁻⁷ and cofactors⁸ are predisposed structures will be presented. These results indicate that (biological) thioester activation can direct RNA to intercept peptide synthesis,⁹ which is an essential step towards establishing life's central dogma.

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