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Emergence of Information Transmission in a prebiotic RNA Reactor BENEDIKT OBERMAYER, Harvard University, HUBERT KRAMMER, DIETER BRAUN, ULRICH GERLAND, LMU Muenchen — A poorly understood step in the transition from a chemical to a biological world is the emergence of self-replicating molecular systems. We study how a precursor for such a replicator might arise in a hydrothermal RNA reactor, which accumulates longer sequences from unbiased monomer influx and random ligation. In the reactor, intra- and intermolecular base pairing locally protects from random cleavage. Analyzing stochastic simulations, we observe a strong bias towards long sequences with complex secondary structures, which would facilitate the emergence of ribozymes. Further, we find temporal sequence correlations that constitute a signature of information transmission, weaker but of the same form as in a true replicator.

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