Analyzing the Stability of Autocatalytic Chemical Reaction Networks Based on their Amplification Rate

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Chemical species diffuse away in open systems such as the natural environment. In such an environment, mechanisms to increase the amount of chemical species such as autocatalysis are necessary to maintain their concentrations. In this study, we have evaluated the stability of autocatalytic networks and show that a higher autocatalytic amplification is necessary for larger networks with more chemical species. This result suggests that the development of new enzymes with higher activity was necessary to expand the size of protometabolic networks.

Keywords: Autocatalysis, Diffusion, Chemical Reaction Network, Protometabolism

