

Evolutionary rules in an experimental landscape of autocatalytic networks

Philippe Nghe

ESPCI Paris (Ecole Supérieure de Physique et Chimie Industrielles de la ville de Paris),
France

Email : philippe.nghe@espci.psl.eu

Ribozymes (RNA enzymes) can self-reproduce by assembling copies of themselves from smaller fragments, and interaction between diverse such species can be varied [1]. We developed a droplet microfluidic technology to screen a large diversity of such networks with diverse topologies [2]. From this we extracted laws of variation and reproduction. Those laws underlie evolutionary processes and may be applied more generally to design Darwinian chemical systems [3].

References

[1] Arsène, S., Ameta, S., Lehman, N., Griffiths, A. D., & Nghe, P. (2018). Coupled catabolism and anabolism in autocatalytic RNA sets. *Nucleic acids research*, 46(18), 9660-9666.

[2] Ameta, S., Arsène, S., Foulon, S., Saudemont, B., Clifton, B. E., Griffiths, A. D., & Nghe, P. (2019). Darwinian properties and their trade-offs in autocatalytic RNA networks. *bioRxiv*, 726497.

[3] Blokhuis A, Lacoste D, Nghe P, Autocatalysis in Chemical Networks: Unifications and Extensions, Chemrxiv, 12317273