

ロンドレーズ研究室

[DNAでつくる生体分子反応ネットワーク]

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専門分野 生体分子マイクロ工学

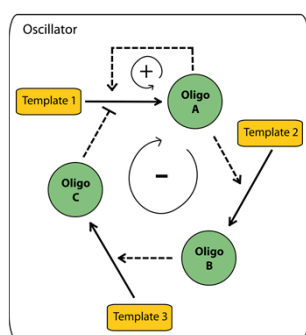
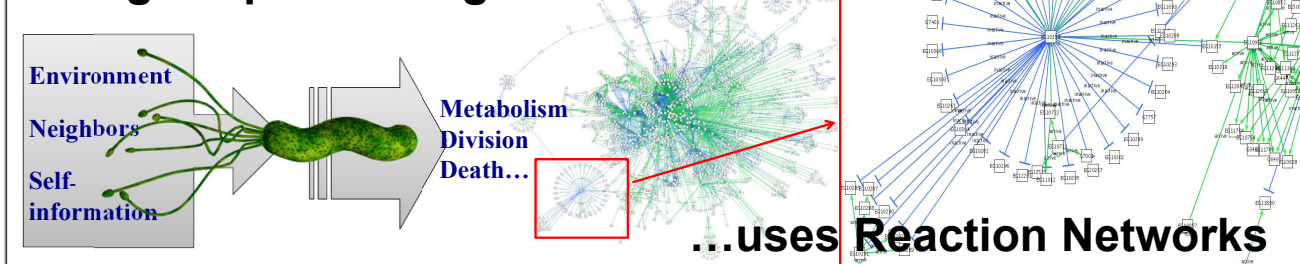
Complex *in vitro* behaviors

生体分子を用いた*in vitro*系での複雑な動的システムの構築

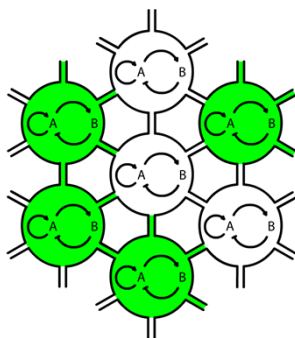
Networks of interacting chemical reactions can lead to very complex behaviors, the ultimate example being life itself. For example, inside live cell Gene Networks can be arranged into switches, gates, memory element or oscillators. We want to build such dynamic systems, but in a artificial (*in vitro*) settings. To do this, we explore both homogeneous systems and more complex setups where diffusion and transport become key factors.

- ◆ DNA等温増幅反応 (DNA isothermal amplification reaction)
- ◆ 分子プログラミング (Molecular programming)
- ◆ 化学振動子と化学マルチスタビリティ (Chemical oscillations and multistability)
- ◆ 分子生態系反応ネットワーク (Molecular ecosystems)
- ◆ 空間的に分布された反応ネットワーク (Spatially distributed systems)

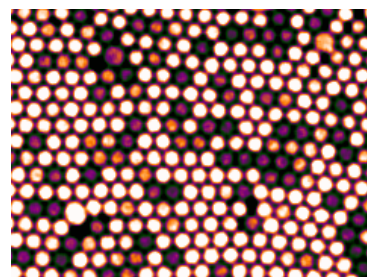
Biological processing of information...



Topology of a biochemical oscillator



Microfluidic network of reaction networks



Array of oscillating droplets