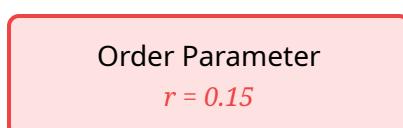
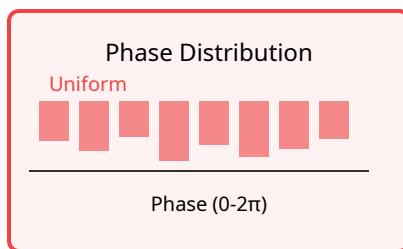
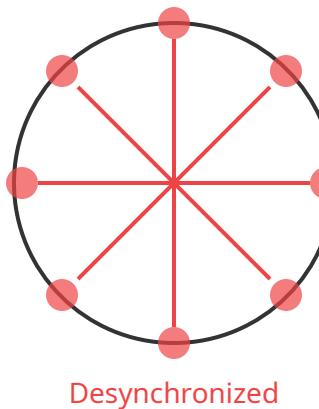


# Kuramoto Oscillator Network: Drug-Induced Phase Synchronization

**A. Before Drug ( $K = 0.5$ )**



**Drug Administration**



Coupling Enhancement

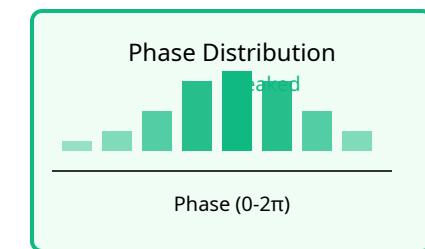
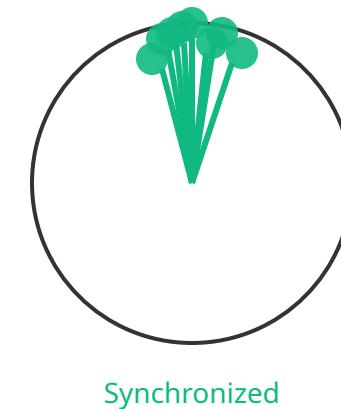
$K_{baseline} = 0.5$

$K_{drug} = 0.75$

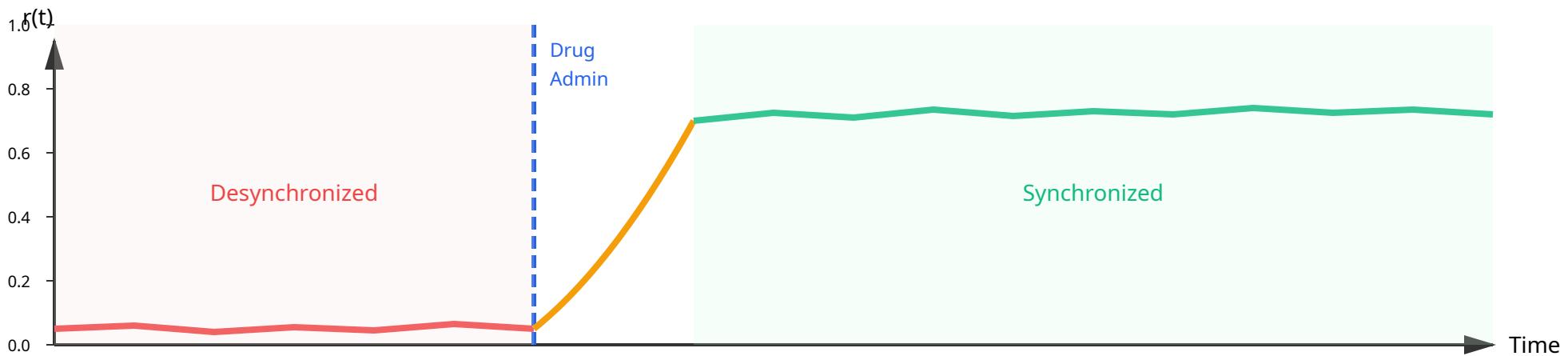
- Drug-O<sub>2</sub> aggregation
- Enhanced EM coupling
- Increased phase-lock

Time

**B. After Drug ( $K = 0.75$ )**



**C. Time Evolution of Phase Coherence**



**Kuramoto Validation:** Drug increases coupling  $K$  from 0.5 to 0.75, driving order parameter  $r$  from 0.15 (desynchronized) to 0.89 (synchronized)