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## Intrinsic, periodic and tunable metabolic dynamics: a scaffold for cellular coherence

Papagiannakis, Alexandros

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# Propositions

Accompanying the thesis:

## **Intrinsic, periodic and tunable metabolic dynamics: a scaffold for cellular coherence**

Alexandros Papagiannakis, 15 May 2017

Metabolism oscillates in dividing or arrested yeast cells, across different nutrients (shown in Chapter 2).

The metabolic oscillator and the cyclin/CDK machinery form a system of coupled oscillators (shown in Chapter 2).

A minimal metabolic frequency and amplitude threshold is required for cell cycle initiation (shown in Chapters 2 and 4).

The cAMP/PKA pathway tunes metabolic dynamics, for robust cell cycle initiation or arrest (shown in Chapter 4).

The non-essentiality of certain cyclin/CDK components is a sign of added control on top of a primitive, metabolically driven cell cycle (discussed in Chapter 1).

Despite their potential off-target effects, perturbations remain essential for the investigation of dynamic systems (shown in Chapter 3).

The study of biological clocks has become one of the hottest fields in science today. The picture that is emerging suggests that we are like wheels within wheels, hierarchies of living oscillators (Steven Strogatz, *Sync: The Emerging Science of Spontaneous Order*).

Academic journals provide a numerical currency for scientific value, adhering to a modern hyper-rationalistic academia, where what cannot be measured does not exist (experienced during my post-graduate studies).

Τώρα ξαφνικά λέμε, όχι μόνο δεν είμαστε ο 'ένας', αλλά δεν είμαστε καν ο 'άλλος' και είμαστε ο 'άλλος άλλος' (Νίκος Λυγερός, Υπάρχω επειδή υπάρχουν εσύ).

Now we may say, we are not the 'one', we are not even the 'other', we are the 'other other' (Nikos Lygeros, I exist because you exist).