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

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

Alexandros Papagiannakis

Cover design by Alexandros Papagiannakis

The cover depicts the Canis Major (greater dog), a constellation which contains Sirius, the brightest star in the night sky, also known as the “dog star”. In 1844, Friedrich Wilhelm Bessel observed oscillations in the motion of Sirius, inferring the existence of an unseen “dark companion” exerting gravitational forces. In 2003 an image taken by the Hubble Space Telescope clearly demonstrated Sirius A, 2 times bigger and 25 times brighter than our sun, next to its stellar companion, a white dwarf known as Sirius B. Eventually, Sirius is a system of two stars. This is an example of how the collective synchrony within a system of coupled oscillators may be used to infer the existence of individual components and possibly also their interactions.

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university of
 groningen

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 a scaffold for cellular coherence**

PhD Thesis

to obtain the degree of PhD at the
 University of Groningen
 on the authority of the
 Rector Magnificus Prof. E. Sterken
 and in accordance with
 the decision by the College of Deans

This thesis will be defended in public on
 Monday 15 May 2017 at 16.15 hours

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Contents

Chapter 1: The cell cycle is a higher order function, which emerges from the collective synchrony between metabolic, chromatin remodeling and CDK-activity oscillators	1
Summary	1
Highlights.....	2
Introduction.....	2
The traditional cell cycle view	3
Evidence for external cell cycle regulation	5
Yeast metabolic oscillations.....	9
A direct connection between metabolism and the CDK-machinery.....	14
The cAMP/PKA pathway wires the metabolic oscillator to the cell cycle machinery.....	15
Mitochondrial activity controls the cell cycle via the AMPK pathway.....	18
Epigenetics provide a link between metabolism and the cell cycle.....	22
The cyclin/CDK machinery entrains metabolism.....	26
Discussion	26
Aim of the thesis	30
References.....	31
Chapter 2: Autonomous metabolic oscillations robustly gate the early and the late cell cycle	39
Summary	39
Highlights.....	40
Introduction.....	40
Results.....	41
Metabolic cycles are an intrinsic, growth-condition independent behavior of single cells	41
The metabolic oscillations are not the result of the cell cycle, and thus are autonomous	43
The metabolic oscillator and the cell cycle form a system of coupled oscillators	45
The early and the late cell cycle are separately coupled and in coordination with the metabolic oscillator	50
Discussion.....	53
Experimental Procedures.....	55
Author contributions	57
Acknowledgements	58
References.....	58
Supplemental Information for Chapter 2.....	63
Supplemental Experimental Procedures.....	64
Supplemental Tables	73

Supplemental Text	78
Supplemental Figures.....	80
Supplemental Movies.....	91
Supplemental References	92
Chapter 3: Quantitative characterization of the auxin-inducible degron: a guide for dynamic protein depletion in single yeast cells	95
Summary	95
Highlights.....	96
Introduction.....	96
Results.....	98
Protein depletion dynamics upon the addition of different auxin concentrations.....	98
Auxin causes growth defects when combined with blue light used for GFP excitation.....	101
Protein recovery dynamics upon the removal of auxin	104
Using the AID system to generate growth-related depletion phenotypes.....	107
Using the AID system to deplete essential proteins and generate lethal phenotypes	109
Discussion	112
Experimental Procedures.....	113
References	118
Acknowledgements	122
Author contributions	122
Additional information	123
Supplemental Information for Chapter 3	124
Supplemental Figures.....	125
Supplemental Movie	130
Supplemental Tables	130
Supplemental References	134
Chapter 4: CDK and cAMP/PKA signalling tune the amplitude of the metabolic oscillator, thereby controlling cell cycle initiation or arrest	135
Summary	135
Highlights.....	136
Introduction.....	136
Identification of perturbation targets	138
Means of perturbation and related experiments.....	141
Results.....	142
Results from perturbation experiments on the single cell and population level	142
The metabolic dynamics set a threshold between cell division and cell cycle arrest.....	147

The cAMP/PKA pathway establishes positive feedback to the metabolic dynamics and stabilizes the amplitude of the metabolic oscillations above the critical threshold for cell cycle initiation.....	149
The alpha factor arrests the cell cycle by dampening the metabolic dynamics	151
Discussion	152
Experimental procedures	154
Author contributions	159
Acknowledgments	159
References	159
Supplemental Information for Chapter 4	164
Supplemental Figures	165
Supplemental Tables	167
Supplemental References	169
Conclusions and outlook	170
Academic summary	176
Nederlandse samenvatting	179

