

## Cellular Programs

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Saarland University

Chair of Computational Biology

### Assignment 3 (about paper #5)

Handed out: 1.12.20

Due: 8.12.2020 10:15

Submit your solutions by e-mail with a single PDF attachment to

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Every student should submit his/her own solution. Plagiarism of solutions will be penalized. Don't forget to label your assignment sheet with your name and Matrikelnummer.

Don't exceed specified page lengths by more than 0.25 pages.

#### Problem 1:

What does the term "degron" refer to and what is its role in this study? (0.25 page).

#### Problem 2:

The authors used Sic1-based threshold sensors to explore the multisite phosphorylation code of CDK. Name three ways in which the sensors were modified for the study and cite the figures of the paper in which the designs are presented. (0.25 page)

#### Problem 3:

What optical signal do the two different fluorescent dyes Whi5-mCherry and GFP produce? What experimental excitation and detection systems are needed to record the optical signals? (0.25 page)

#### Problem 4:

The authors stated: „Increasing CDK activity profile is also important to gain better resolution for higher thresholds... In the uniform model, the early substrates are phosphorylated in a switch-like manner, but the substrates with lower kinase specificity are phosphorylated to a much lower extent and have no temporal switch-like resolution“.

The G1- and S-CDK specific targets have lower active site activities than those of S-, G2-, and M-CDK targets. How can the yeast cells guarantee effective phosphorylation switches in their early stages despite the low specificity of these CDK complexes? (0.25 page)

Paper #5 Örd et al. (2019) Nature Structural and Molecular Biology 26, 649-658, Multisite phosphorylation code of CDK.