Cellular Programs

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Assignment 2

Handed out: 29.04.25

Due: 6.05.2025 10.00 am

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

to ansc00053@uni-saarland.de

AND to: kerstin.gronow-p@bioinformatik.uni-saarland.de

Label your pdf solution as MATRICULATIONNR_YOURNAME.pdf.

Every student should submit his/her own solution. Plagiarism of solutions will be penalized. Indicate whether you used AI tools. Label your assignment sheet with your name and matriculation number. Don't exceed specified page lengths by more than 0.25 pages.

All problems refer to paper #4: Semil Choksi et al. Nature, 630, 214–221 (2024).

Problem 1:

Fig.1) panel d) contains 3 figures. In the left figure, the bottom row is labeled "Cyclin D1", the row above is labeled "MYB", the row above is labeled "CEP43", but the top row is not labeled. What is shown in the top row? What is the message of the top row? (0.1 page).

Problem 2:
Why does Fig. 2d) show the direct relevance of CDK4/6 for differentiation into multiciliated cells? What other cellular protein is involved in initiating this differentiation process? In which figure of this article is this involvement demonstrated? (0.25 page)

Problem 3:
Which experiment tests directly whether multiciliated cells undergo a complete cell cycle and divide? (0.25 page)

Problem 4:
E2F7 is being discussed as drug target for cancer(s), see e.g.
DOI:10.1016/j.heliyon.2024.e34362
Paper #4 described that presence of E2F7 prevents DNA synthesis in S phase. When ignoring its other roles discussed in the above review article, does paper #4 rather suggest (a) to develop small-molecule inhibitors against E2F7, or (b) to downregulate E2F7 expression, or (c) to upregulate E2F7 expression in order to fight tumors? Explain your answer (0.25 page)