Integrating cellular and tissue dynamics with cell fate decisions through computational modeling

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Stellingen

behorende bij het proefschrift

Integrating cellular and tissue dynamics with cell fate decisions through computational modeling

1. Differences among individuals in cellular stress responses can be explained by mimicking biochemical reaction rates by varying the parameters of an ODE model for intracellular protein dynamics (this thesis).

2. DNA damage-induced expression dynamics of p53, MDM2, p21 and BTG2 are specific to the type of DNA damage, but are not sufficient to fully explain cell fate determination (this thesis).

3. GREB1 and PR are essential regulators of cell cycle progression and can be used to predict MCF7 cell cycle progression (this thesis).

4. Cell fate is determined by a complex interplay between extracellular signals, intracellular protein dynamics and cell microenvironment (this thesis).

5. Details and assumptions can make or break a mathematical model and therefore require solid justification (Bodner et al., 2021. *PLOS Computational Biology*).

6. Modeling forces one to formulate an answer to questions that would be obscured or seem of little importance with solely experimental research (Eddy et al., 2015. *Trends in Cell Biology*).

7. Environmental pollution with artificial estrogen disruptive chemicals poses a risk for fetal development and human health, and their production and use should be carefully reconsidered (Zheng et al., 2023. *International Journal of Hygiene and Environmental Health*).

8. High-throughput *in vitro* methods in combination with computational modeling approaches are essential to speed up and improve the efficacy of preclinical testing and could ultimately render animal testing obsolete (Van Norman, 2020. *JACC: Basic to Translational Science*).

9. Mitigating climate change and preventing ecological collapse will save more lives than the development of novel drugs.

10. A doctorate augments the effectivity of work and actions to keep our planet habitable.

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