Modeling global resource allocation in yeast

Background:
In order to overcome the challenges of earth's limited resources and to mitigate climate change, there is a need for a more sustainable production of fuels and chemicals, with an objective to reduce our petroleum dependency. One option to achieve this is by creating microbial cell factories which can utilize variety of substrates ranging from biomass to industrial byproducts and produce chemicals in need. Our studies are focussed on yeast - the most utilized microorganism in the biotechnology industry to date.

Aim:
Our aim is to understand the general growth laws of microbial cells. Therefore, we aim to create a coarse-grained model to help us to decipher these growth laws and make the cellular growth parameters predictable without the prior need to run experiments.

Work description:

- Redesign and supplementation of a dynamic coarse-grain growth model for yeast (based on Scott et al., 2014).
- Model validation based on the collected proteomics data.
- Construction of publicly available interface for the model.

References:
Scott, M., Klumpp, S., Mateescu, E. M., & Hwa, T. (2014). Emergence of robust growth laws from optimal regulation of ribosome synthesis. Molecular systems biology, 10(8), 747.

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