LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

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Spatio-temporal tracking of mitochondrial biogenesis

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Background

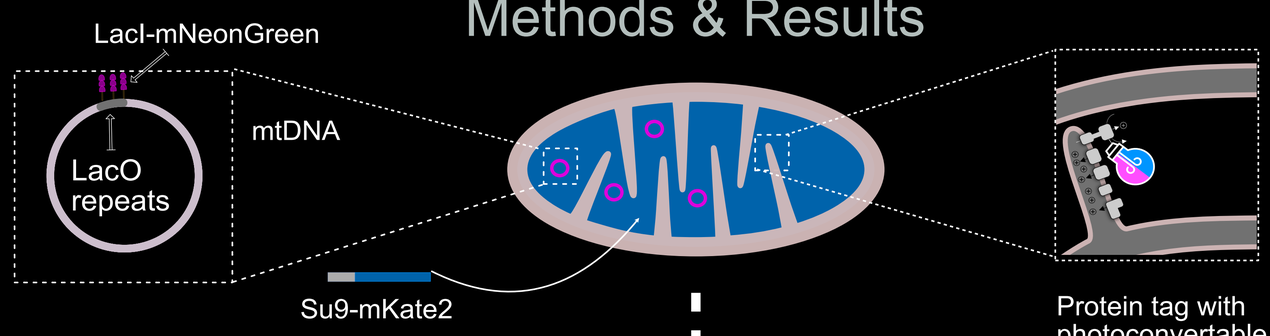
- Mitochondria contain their own DNA (mtDNA) which is present in multiple copies per cell
- In *S. cerevisiae* mtDNA codes for 8 proteins
- As yeast cells age keeping up cellular homeostasis becomes more difficult
- However, every daughter cell produced undergoes a rejuvenation process
- Wheher rejuvenation also involves mitochondrial DNA and their proteins is not known

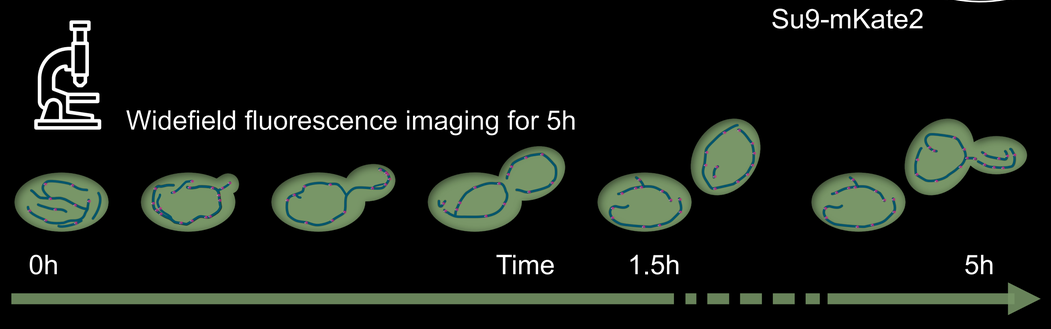
Questions

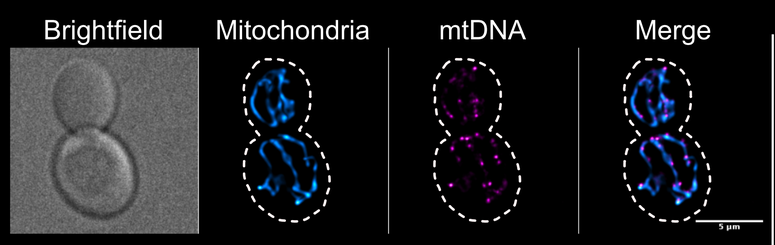
- How much mtDNA gets segregated to the daughter cell during the cell cycle?
- Is there asymmetric biosynthesis of proteins of the respiratory chain complexes?
- Are there differences between nuclear encoded and mtDNA encoded protein biosynthesis-patterns?

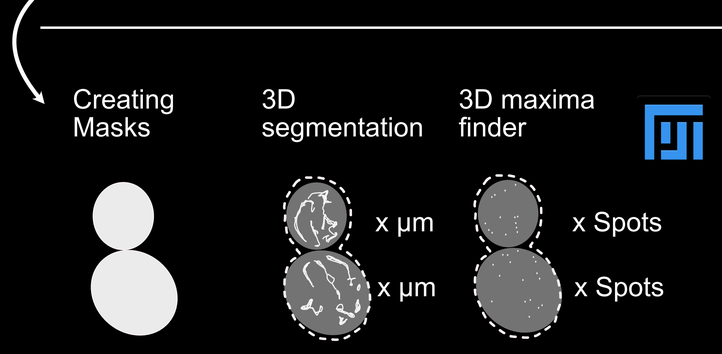
Methods & Results

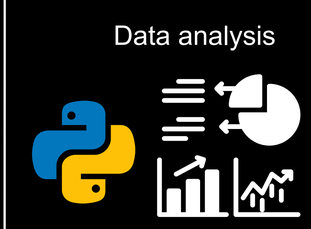
Quantification of mtDNA dynamics

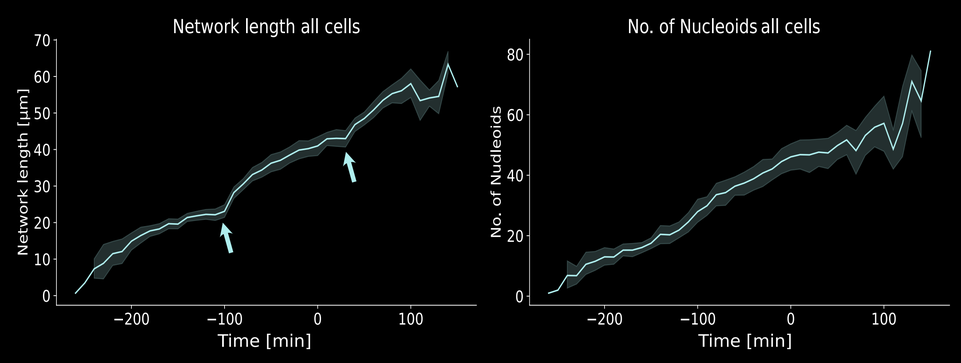


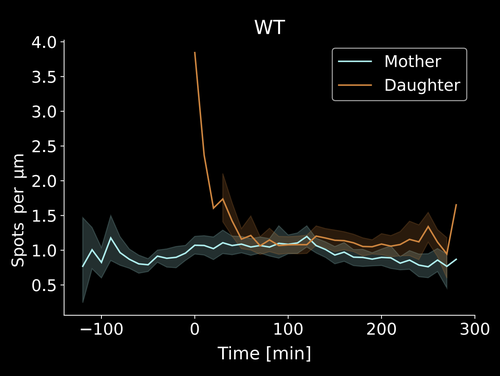




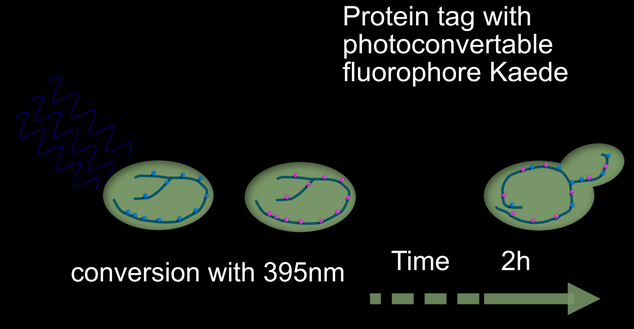


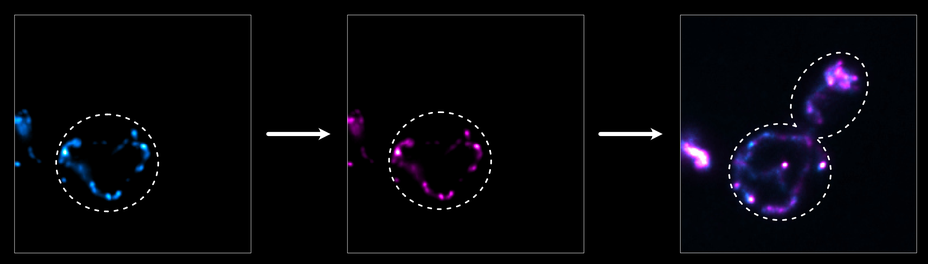


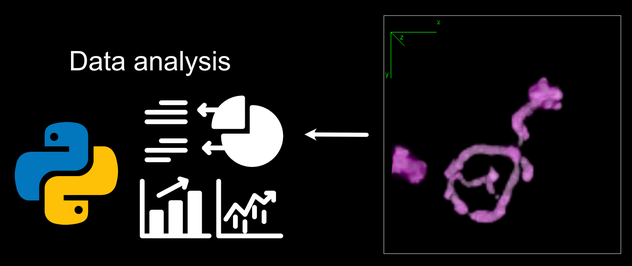


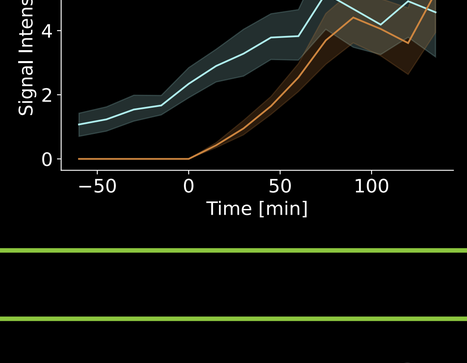


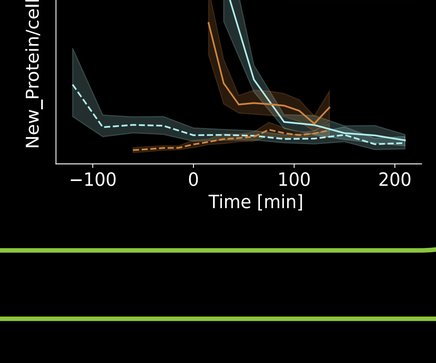
Quantification of protein biosynthesis











Conclusions

- Mitochondrial biogenesis is cell cycle dependent
- mtDNA replication is not coupled to the cell cycle
- The quantity of mtDNA and newly synthesized protein is higher in early buds as comapred to their respective mothers