Proteasome dynamics during quiescence in *Schizosaccharomyces pombe*

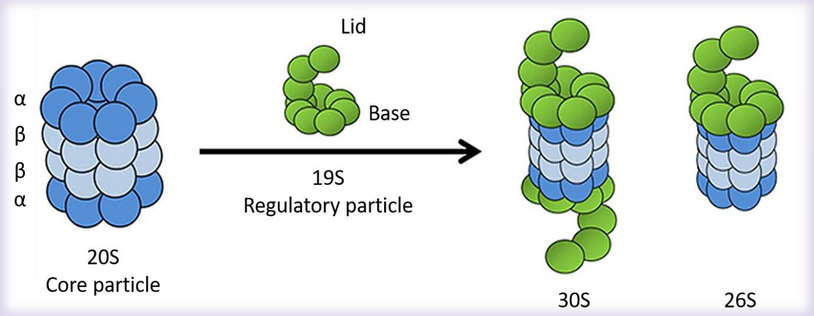
Yosu Odriozola Gil, *Gabriel Ruiz Romero, Silvia Salas Pino and Rafael Rodríguez Daga*

Centro Andaluz de Biología del Desarrollo

Introduction

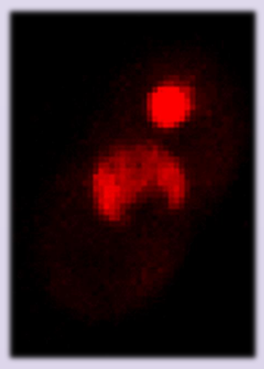
The proteasome

The Proteasome is one of the largest protein complexes present in eukaryotic cells and it is responsible for 90% of total protein degradation. Thus, proteasome availability and correct function are key elements in eukaryotic cells from yeast to human to deal with unfolded or unwanted proteins.



Proteasome Storage Granules (PSGs)

When the concentration of cells in culture increases, cells initiate a metabolic reprogramming in order to become quiescent. The proteasome is sequestered in cytoplasmic granules, so they are readily available when those cells resume growth.

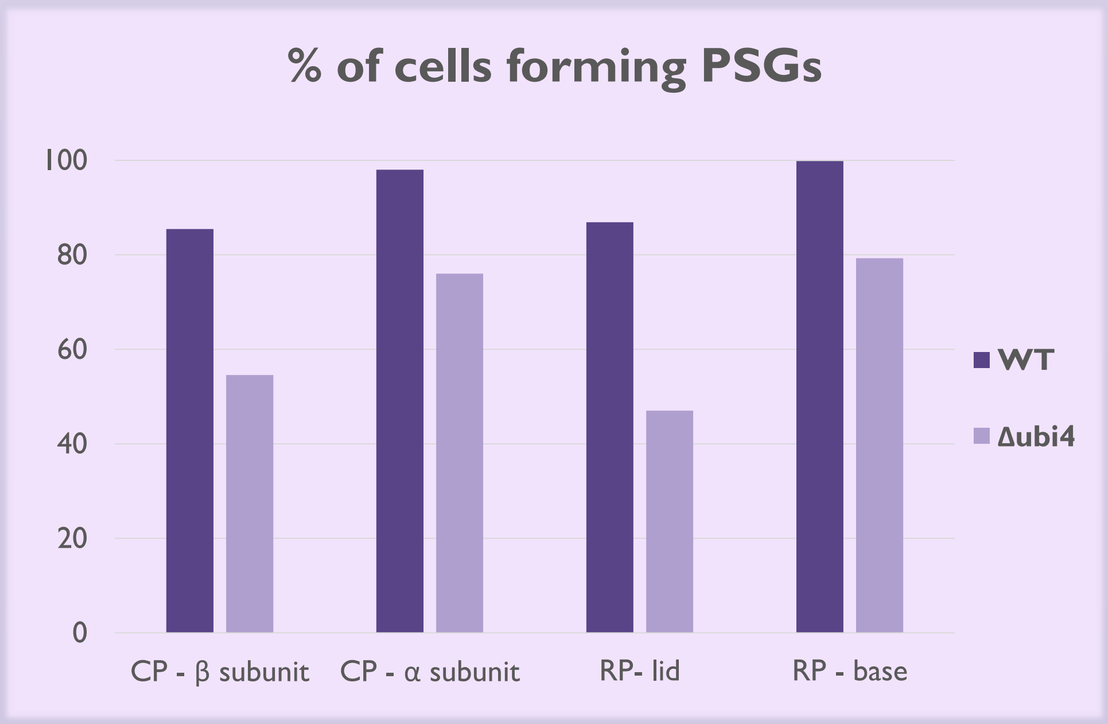


Aim of this project

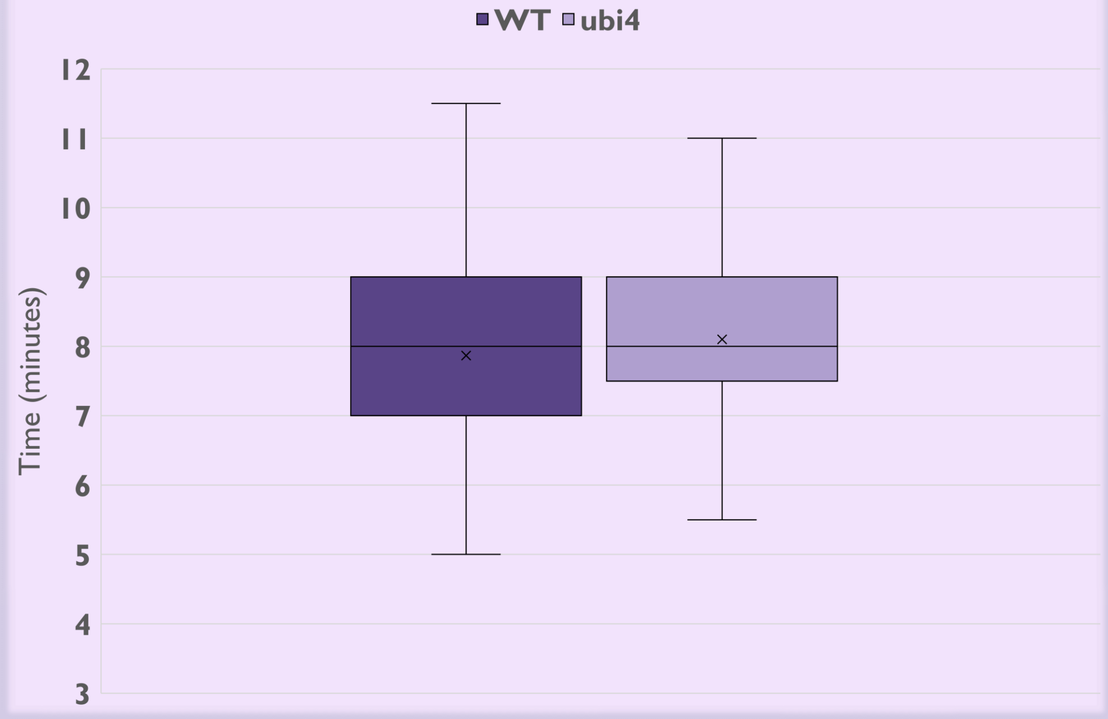
To characterize PSG formation, composition and dissolution during quiescence induced by low glucose in S.pombe and to study the consequences for cell survival of impairment of PSG formation.

Δubi4 mutants show defects in PSGs formation

Dubi4 mutant defective in ubiquitination shows a severe reduction of cells able to form PSGs. Also, this reduction of PSG formation affects all proteasome subunits, the lid of the regulatory particle (RP) being the one showing most difference compared to wild type strains.



Δubi4 mutants do not show alteration in PSG dissolution



The dynamics of PSG dissolution is not altered in ubi4 mutants compared to wild type strains.

Conclusions and future perspectives

Our results so far show an important role of ubiquitin in the formation and/or composition of PSGs. Experiments to test whether the lack of ubiquitin have consequences on cell survival when cells are induced to exit stationary phase by adding glucose are in progress and will provide us insight into the understanding of the role of PSGs in eukaryotic cells.

References

Gu, Z. C., Wu, E., Sailer, C., Jando, J., Styles, E., Eisenkolb, I., … Enenkel, C. (2017). Ubiquitin orchestrates proteasome dynamics between proliferation and quiescence in yeast. Molecular Biology of the Cell, 28(19), 2479–2491. https://doi.org/10.1091/mbc.E17-03-0162

Enenkel, C. (2018). The paradox of proteasome granules. Current Genetics, 64(1), 137–140. https://doi.org/10.1007/s00294-017-0739-y

Yedidi, R. S., Fatehi, A. K., & Enenkel, C. (2016). Proteasome dynamics between proliferation and quiescence stages of Saccharomyces cerevisiae. Critical Reviews in Biochemistry and Molecular Biology, 51(6), 497–512. https://doi.org/10.1080/10409238.2016.1230087