Poster

Proteasome assembly in cells exiting quiescence

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ABSTRACT

Recent findings in our laboratory have linked nuclear pore complex basket network to proteasome assembly at the nuclear envelope. The 26S proteasome has a crucial role in maintaining protein homeostasis and is key to control proper cell cycle progression through the degradation of ubiquitinated proteins. The proteasome is constituted by a 20S catalytic core particle capped either by one, or two 19S regulatory particles. In dividing fission yeast cells, proteasomes can be observed in both the cytoplasm, the nucleus and at the nuclear periphery. However, little is known about how these different proteasome pools are assembled and what is the role of the nuclear envelope in this process.

Upon carbon depletion induced quiescence, the 26S proteasome is disassembled and accumulates in cytoplasmic spheres known as proteasome storage granules (PSGs). Importantly, upon nutrient addition (glucose) PSGs are rapidly dissolved and functional proteasomes are assembled.

We have developed an assay based on PSGs disassembly into functional proteasomes as a tool to study the role of the nuclear envelope in the dynamics of nuclear proteasome assembly. We use live cell imaging to follow proteasome components of the 19S (Rpn8) and the 20S (Pam1 and Pre6) particles, as well as proteasome assembly related chaperones (Ump1 and Ecm29). Our preliminary data suggest that PSGs assay in cells exiting quiescence is a good tool to study proteasome assembly and dynamics.

REFERENCES

Gallardo,P., Salas-Pino,S. and Daga,R.R. (2017) A new role for the nuclear basket network. *Microb. Cell*, 4(12), 423–425.

Laporte,D. *et al*. (2008) Reversible cytoplasmic localization of the proteasome in quiescent yeast cells. *J. Cell Biol.*, 181(5), 737–45.

Yedidi,R.S. et al. (2016) Proteasome dynamics between proliferation and quiescence stages of Saccharomyces cerevisiae. Crit. Rev. Biochem. Mol. Biol., 51(6), 497–512.

Chowdhury,M. and Enekel,C. (2015) Intracellular dynamics of the ubiquitin-proteasome-system. F1000Res., 4, 367.