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Nuclear Export Through Nuclear Envelope Remodeling in Saccharomyces cerevisiae

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Abstract

In eukaryotes, subsets of exported mRNAs are organized into large ribonucleoprotein (megaRNP) granules. How megaRNPs exit the nucleus is unclear, as their diameters are much larger than the nuclear pore complex (NPC) central channel. We previously identified a non-canonical nuclear export mechanism in Drosophila (Speese et al., Cell 2012) and mammals (Ding et al., in preparation), in which megaRNPs exit the nucleus by budding across nuclear envelope (NE) membranes. Here, we present evidence for a similar pathway in the nucleus of the budding yeast S. cerevisiae, which contain morphologically similar granules bearing mRNAs. Wild-type yeast displayed these granules at very low frequency, but this frequency was dramatically increased when the non-essential NPC protein Nup116 was deleted. These granules were not artifacts of defective NPCs; a mutation in the exportin XPO1 (CRM1), in which NPCs are normal, induced similar megaRNP upregulation. We hypothesize that a non-canonical nuclear export pathway, analogous to those observed in Drosophila and in mammalian cells, exists in yeast, and that this pathway is upregulated for use when NPCs or nuclear export are impaired.

Tweets referencing this article:

Amity Manning Lab
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RT @mary_munson4: Received a beautifully written and thoughtful #preprint #prereview on our #bioRxiv paper from a graduate student at the U…

06 Feb 2018

Dr. Keerthi Krishnan
@KeerthiKrishna3

Woot! #Asapbio #preprint https://t.co/yfAlvSIlYV

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