

Not all P-bodies are created equal: Exploring the differences and dynamics of stress-specific P-bodies

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Abstract

Processing bodies (P-bodies) are membrane-less cytoplasmic ribonucleoprotein granules that form rapidly, typically within 10 minutes of stress, as for under example- glucose starvation. These membrane-less organelles, primarily contain translationally repressed mRNAs, the 5'-3' mRNA decay machinery and auxiliary factors. Depending on the stress, a certain subset of mRNAs is sequestered into P-bodies, where they can be either stored or decayed. We show that in *S. cerevisiae* various stresses induce P-bodies with different morphologies, biophysical properties and temporal sequence of protein recruitment. While under some conditions P-bodies dissolve even before or after stress removal, under other stresses P-bodies persist even after stress removal. We grouped the P-bodies accordingly into temporary and persistent P-bodies. The persistent P-bodies do not recruit the RNA decay machinery *en bloc* but rather sequentially from the 5' to the 3' UTR over a period of 60 min. Surprisingly, we found that strong translation attenuation is not a pre-requisite for P-body formation for an number of stresses.