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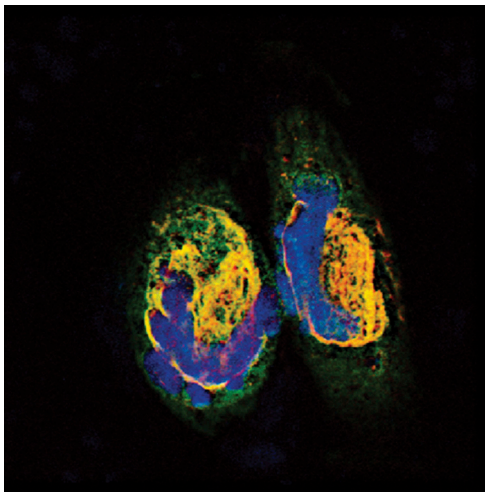


RRP17 (red) binds CAPS1 (green) to help the heart pump out hormones.

Heart hormone release

Problems of the heart may be healed by brain matter, if findings from Rybkin et al. are any indication. Proteins that normally instigate neurotransmitter release help the heart calm down during times of stress and high blood pressure.

Rybkin et al. deal with matters of the heart. In a search for novel heart-specific signaling proteins that might regulate functions such as heart rate, they previously found one that was similar to the signal-transducing small G-protein, Ras. They called the newbie RRP17, for Ras-related protein on human chromosome 17.

RRP17 binds to a protein called CAPS1, which enhances neurotransmitter vesicle release. The team now shows that CAPS1 levels rise in heart cells in response to cardiac stress. RRP17 levels did not increase during the stress, but what was already there promoted CAPS1 to drive the release of secretory vesicles containing a blood pressure–reducing hormone.

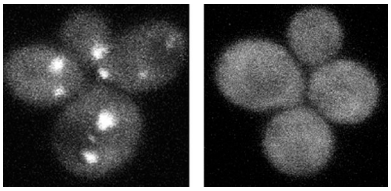
Mice lacking RRP17 secreted less of the hormone and consequently had higher blood pressure. Although RRP17, like CAPS1, was also abundant in the brain, the team has yet to observe any neurological impairment in the mice lacking the protein. Although the mice function just fine in their cage, explain the authors, whether they would perform normally in cognitive tests remains to be determined. JCB

Reference: Rybkin, I.I., et al. 2007. *J. Cell Biol.* 179:527–537.

Constructing P-bodies

Putting together a P-body requires both building blocks and glue. Decker et al. now show that a yeast mRNA decapping activator protein contributes to both jobs: it forms part of the building block and also helps to glue those blocks together.

P-bodies are cytoplasmic granules that contain unused mRNAs with their associated proteins (complexes known as mRNPs) and mRNA decay factors. Much of the team's previous work investigated how the mRNPs—which form the building blocks—affect mRNA function. How and why mRNPs assemble into P-bodies was unclear.



Construction of P-bodies (white) stops in the absence of Edc3p (right).

The new work further reveals the inner organization of the building blocks by identifying how an mRNA decapping activator, called Edc3p, brings together the mRNP components. Edc3p bound to two protein complexes that associated with P-body–bound mRNAs: a complex of 5′ decapping enzymes and a complex of other decapping activators.

mRNPs then came together into large, visible P-bodies via specific domains of Edc3p, which the team identified through deletion analysis. Removing either of these gluing domains or the entire Edc3p protein resulted in a loss of visible P-bodies from yeast cells.

Yeast unable to assemble large P-bodies just as easily repressed translation and degraded some mRNAs, showing that neither Edc3p or visible P-bodies are required for these functions.

Although the team has yet to identify abnormalities in yeast that are unable to assemble P-bodies, the fact that visible P-bodies are a conserved phenotype of multiple species suggests that aggregation is indeed important. Aggregation might affect specific mRNAs or be needed to prevent mRNPs from interacting with other cellular proteins, say the authors. JCB

Reference: Decker, C.J., et al. 2007. *J. Cell Biol.* 179:437–449.

A polarity/proton loop

Pushing protons out of a cell's leading edge prompts a positive feedback loop for polarity, according to a new report by Frantz et al.

An important polarity protein in numerous cell types is a Rho GTPase called Cdc42, which transduces signals to the cytoskeleton to maintain polarized growth. Now, Frantz and colleagues show that Cdc42 also maintains polarity during fibroblast migration.

Migration is thought to be regulated by intracellular pH. The team found that Cdc42 caused an increase in intracellular pH by activating a sodium/hydrogen exchanger called NHE1, which drives protons out of the cell.

This increase in pH was necessary to activate Cdc42 at the leading edge of the cell. The pH increase was needed to bring Cdc42's activator, a guanine nucleotide exchange factor (GEF), to the membrane, allowing the GEF to pass a new GTP to Cdc42 for hydrolysis.

The team is currently investigating what kicks off this positive feedback loop for polarity. They are also intrigued that, given the pH dependency of GEF activity, numerous cell signaling pathways that also require GEFs and GTPases might be regulated by proton flux. JCB

Reference: Frantz, C., et al. 2007. *J. Cell Biol.* 179:403–410.