IN BRIEF

PHAGOCYTOSIS

Identification of two evolutionarily conserved genes regulating processing of engulfed apoptotic cells

Kinchen, J. M. & Ravichandran, K. S. *Nature* **464**, 778–782 (2010)

Apoptotic cells are engulfed by phagosomes and degraded by phagosome maturation. RAB-5 and RAB-7 are sequentially recruited to phagosomes that contain apoptotic cells, and SAND-1 (the worm homologue of mammalian MON1A) has been proposed to function upstream of RAB-7 in the phagosome maturation process. This study now shows how SAND-1 and its partner CCZ-1 are involved in apoptotic cell degradation. Phagosomes in worms that lack SAND-1 or CCZ-1 internalize apoptotic cells but fail to recruit RAB-7. RAB-5 is still recruited to and activated by these phagosomes, suggesting that the loss of SAND-1 causes a block in phagosome maturation between the RAB-5- and RAB-7-positive stages. In mammals, MON1A interacts with GTP–RAB5 and simultaneously binds CCZ1 at a distinct site. The MON1A–CCZ1 complex, but not either protein alone, binds RAB7 and promotes RAB7 activation. Thus, MON1A and CCZ1 probably have an evolutionarily conserved role in the RAB-5- to RAB-7-positive transition in phagosome maturation.

STEM CELLS

Zscan4 regulates telomere elongation and genomic stability in ES cells

Zalzman, M. *et al. Nature* **464**, 858–863 (2010)

This study shows that zinc finger and SCAN domain containing 4 (*Zscan4*), a cluster of six transcribed paralogous genes, is essential for the maintenance of genomic integrity in mouse embryonic stem (ES) cells. Knockdown of *Zscan4* in ES cells led to reduced proliferation and, eventually, cell death. Furthermore, *Zscan4* knockdown led to karyotypic abnormalities (including chromosome fusions and deletions), increased incidence of sister chromatid exchange and telomere shortening; this effect was rescued by *Zscan4* expression, which led to telomere elongation. Indeed, ZSCAN4 was found to colocalize at telomeres in ES cells with proteins involved in homologous recombination. This suggests that ZSCAN4 sustains genomic stability in ES cells by facilitating telomere elongation through the induction of meiotic homologous recombination.

GENE EXPRESSION

BREs mediate both repression and activation of *oskar* mRNA translation and act in *trans*

Reveal, B. *et al. Dev. Cell* **18**, 496–502 (2010)

Formation of the anterior–posterior body axis in *Drosophila melanogaster* embryos depends on the localization of the protein Oskar (OSK) to the posterior pole of the oocyte. *osk* mRNA needs to be translationally repressed until it reaches the posterior pole. Translational repression is mediated by Bruno response elements (BREs) in the *osk* mRNA 3′ untranslated region. Using transgenes mutated in different BREs and inserted in embryos lacking endogenous *osk* mRNA, Reveal *et al.* identify a cluster of BREs located near the mRNA polyA tail with an additional positive role in translational activation. Surprisingly, repression and activation defects were rescued when transgenes were inserted in embryos expressing mutant mRNAs that do not produce any OSK but have intact BREs, suggesting that BREs can function in *trans*. The mechanism underlying mRNA regulatory element function in *trans* is still unknown, but probably involves ribonucleoprotein particles containing several mRNAs.