IN BRIEF

SMALL RNAS

eIF4A2 helps silence mRNAs

microRNAs (miRNAs) regulate gene expression, but whether this involves inhibition of translation or altered mRNA decay is debated. Here, the authors observed that mRNA destabilization only occurred for mRNAs that had been translationally repressed (through removal of translation initiation factors), suggesting that translation inhibition preceeds mRNA degradation. Analysis of the role of different translation initiation factors revealed that the RNA helicase eIF4A2 is the only initiation factor necessary, and its knockdown decreased miRNA-mediated repression. Further examination indicated that eIF4A2 interacts with CCR4–NOT1,a complex that promotes deadenylation of miRNA-destabilized transcripts. The authors propose that miRNA-mediated mRNA repression first requires translation inhibition, directed by eIF42A, and then mRNA destabilization and degradation.

ORIGINAL RESEARCH PAPER Meijer, H. A. *et al.* Translational repression and eIF4A2 activity are critical for microRNA-mediated gene regulation. *Science* **340**, 82–85 (2013)

CYTOSKELETON

The actin–pluripotency connection

This study identifies a key role for actin remodelling in the switch from the keratinocyte stem cell type known as a holoclone (cells with a high growth potential owing to the lack of differentiated cells) to a paraclone (keratinocyte stem cells with very restricted growth). Upon exposure to epidermal growth factor (EGF), holoclone colonies expanded rapidly through migration of peripheral cells and cell flattening, whereas paraclone colonies decreased in size owing to cell shrinking. In both cases, the effects were mediated through EGF-dependent changes in actomyosin contractility. Consistent with this, actin was organized radially in holoclones and circumferentially in paraclones, which also confirms previous observations. Notably, inhibition of RAC1, which regulates actin polymerization, switched the actin organization of holoclones to a pattern resembling that of paraclones, promoting a reduction in holoclone colony size and clonal conversion.

ORIGINAL RESEARCH PAPER Nanba, D. *et al.* Actin filament dynamics impacts keratinocyte stem cell maintenance. *EMBO Mol. Med.* **5**, 640–653 (2013)

EXTRACELLULAR MATRIX

Epithelial patterning in branching morphogenesis

During puberty, hormonal signals initiate epithelial branching morphogenesis in mammary glands, and this study shows that the extracellular matrix has a role in patterning the epithelium. During branching morphogenesis, the epithelium progressed from a random orientation to being oriented along the long axis of the mammary gland, which indicates that a patterning cue for orientation might pre-exist in the stroma. Indeed, tracks of collagen I fibres in the stroma, which are oriented towards the long axis before branching morphogenesis begins, were co-oriented with the direction of epithelial outgrowth in early-stage mammary glands. The orientation of collagen I fibres was found to be sufficient to direct epithelial branch orientation, in a RAC1-dependent manner. RHOA–RHO kinase-mediated actomyosin contractions were not required to sense the orientation of collagen I fibres but they enhanced fibre orientation, which suggests that contractions generated by the branching epithelium could reinforce directional decisions.

ORIGINAL RESEARCH PAPER Brownfield, D. G. *et al.* Patterned collagen fibers orient branching mammary epithelium through distinct signaling modules. *Curr. Biol.* 4 Apr 2013 (doi:10.1016/j.cub.2013.03.032)