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IN BRIEF

GENE EXPRESSION

Promoters as spiked enhancers

Sequence determinants that distinguish between promoter and enhancer activities are poorly characterized. Nguyen *et al.* used massive parallel promoter and enhancer reporter assays in mouse cortical neurons to examine the activities of multiple short (139 bp) sequences that cover hundreds of conserved promoters and enhancers. About 30% of the sequences had activity; the mean enhancer activity of these sequences was similar for promoter-derived and enhancer-derived sequences, but promoter-derived sequences had greater promoter activity than enhancer-derived sequences. This indicates that sequences harbouring strong promoter activity have additional sequence determinants to enhancer sequences. Indeed, the binding motifs of several transcription factor families had both strong promoter and enhancer activity, whereas binding motifs of others had only enhancer activity. Finally, some transcription factors could increase the promoter activity of enhancers.

ORIGINAL ARTICLE Nguyen, T. A. *et al.* High-throughput functional comparison of promoter and enhancer activities. *Genome Res.* http://dx.doi.org/10.1101/gr.204834.116 (2016)

NUCLEAR ORGANIZATION

Building nuclear bodies with RNA

Several long non-coding RNAs function as scaffolds in the construction of nuclear bodies. Mannen *et al.* sought novel nuclear bodies containing such 'architectural RNA' (arcRNA). The proteins DBC1, HNRNPD, HNRNPL, ZNF346 and SAM68 localized to SAM68 nuclear bodies (SNBs). SNBs disappeared in the presence of RNase or in the absence of DBC1 or SAM68, suggesting that they require these proteins and RNA for their formation. Furthermore, depletion of HNRNPL resulted in two SNB substructures — one containing DBC1 and the other containing SAM68 and HNRNPD — that disappeared following RNase treatment. Protein domain mapping experiments suggested that HNRNPL bridges these substructures by binding to an arcRNA in the DBC1 substructure (to which DBC1 also binds), and to an arcRNA in the SAM68 substructure (to which HNRNPD and SAM68 also bind). This study confirms that arcRNAs can be essential components of nuclear bodies.

ORIGINAL ARTICLE Mannen, T. *et al.* The Sam68 nuclear body is composed of two RNase-sensitive substructures joined by the adaptor HNRNPL. *J. Cell Biol.* **214**, 45–59 (2016)

QUALITY CONTROL

Triaging mitochondrial membrane proteins

Mitochondrial membrane proteins that are imported from the cytosol contain insoluble transmembrane domains (TMDs) and thus rely on factors to prevent their aggregation in the cytosol and to route them for degradation upon import failure. Hegde and colleagues report that ubiquilins (UBQLNs) perform this function. UBQLNs interacted with the TMDs of mitochondrial membrane proteins in a dynamic manner, providing a mechanism by which client proteins can be targeted to mitochondria (by unknown factors) while remaining soluble. However, this mechanism was time-limited as UBQLNs also recruited an E3 ligase through their carboxy-terminal ubiquitin-associating domain. Ubiquitylation served as a 'fate switch' as it blocked mitochondrial import and enabled the amino-terminal ubiquitin-like domain of UBQLNs to engage with the proteasome more efficiently, thus favouring degradation.

ORIGINAL ARTICLE Itakura, E. *et al.* Ubiquilins chaperone and triage mitochondrial membrane proteins for degradation. *Mol. Cell* **63**, 21–33 (2016)