IN BRIEF

GENE THERAPY

Improved vector for retinal diseases

Gene therapy for inherited retinal diseases shows therapeutic promise, but an important drawback is the need for injection through the retina, which risks tissue damage. These authors carried out *in vivo* directed evolution of the adeno-associated virus (AAV) vector to successfully select for variants that can deliver a transgene to the retina following injection into the easily accessible vitreous humor. As well as rescuing retinal disease phenotypes in two mouse models, primate photoreceptors were also successfully transduced using this method.

ORIGINAL RESEARCH PAPER Dalkara, D. *et al.* *In vivo*-directed evolution of a new adeno-associated virus for therapeutic outer retinal gene delivery from the vitreous. *Sci. Transl Med.* **5**, 189ra76 (2013)

STEM CELLS

Regulating self-renewal

Self-renewal is an important property of stem and progenitor cells but little is known about its regulation. This study shows that the RNA-binding protein ZFP36L2 is required for the self-renewal of red blood cell progenitors in mice. The authors demonstrated that ZFP36L2 is transcriptionally upregulated by glucocorticoids, which stimulate red blood cell formation. ZFP36L2 delays the differentiation of red blood cell progenitors through the post-transcriptional downregulation of several mRNAs, thus promoting the self-renewal of this cell type.

ORIGINAL RESEARCH PAPER Zhang, L. *et al.* ZFP36L2 is required for self-renewal of early burst-forming unit erythroid progenitors. *Nature* http://dx.doi.org/10.1038/nature12215 (2013)

EPIGENETICS

Transient transcription error inheritance

These authors investigated the potential for errors in transcription to result in a heritable phenotypic change. They engineered the *Escherichia coli lac* repressor *lacI* to include sequences that result in transcription slippage. They then showed that, although a functional protein is produced, this error is able to result in a switch in the transcriptional circuit that LacI regulates. Furthermore, they show this switch to be heritable through generations. Thus, transcription encodes information that results in a heritable epigenetic change.

ORIGINAL RESEARCH PAPER Gordon, A. J. E. *et al.* Heritable change caused by transient transcription errors. *PLoS Genet.* http://dx.doi.org/10.1371/journal.pgen.1003595 (2013)

DEVELOPMENT

Expression profiling without cell isolation

Profiling gene expression in specific cell types without their isolation is an important challenge in developmental biology. Working in fruit flies, Southall *et al.* fused a *Drosophila melanogaster* RNA polymerase II (Pol II) subunit to an *Escherichia coli* DNA adenine methyltransferase (Dam). This fusion was expressed under the control of a neural stem cell enhancer, so the authors named this method targeted DamID (TaDa). As DNA adenine methylation does not naturally occur in most eukaryotes, the timecourse of adenine methylation patterns in whole *D. melanogaster* brains was used to infer Pol II occupancy and gene expression profiles in neural stem cells. This system is applicable to the characterization of genome-binding profiles of different proteins in various cell types and model organisms.

ORIGINAL RESEARCH PAPER Southall, T. D. *et al.* Cell-type-specific profiling of gene expression and chromatin binding without cell isolation: assaying RNA Pol II occupancy in neural stem cells. *Dev. Cell* http://dx.doi.org/10.1016/j.devcel.2013.05.020 (2013)