new proteins were in the nucleus. And immunofluorescence revealed that components of the translation machinery are indeed present in the nucleus.

To test whether transcription and translation are actually coupled in eukaryotic cells, the authors added α-amanitin, which inhibits RNA polymerase II. They found that this blocked much of the nucleoplasmic incorporation of biotin-lysine-tRNA, suggesting that nuclear translation does, indeed, depend on concurrent transcription.

Alison Mitchell

References and links

ORIGINAL RESEARCH PAPER Iborra, F. J., Jackson, D. A. & Cook, P. R. Coupled transcription and translation within nuclei of mammalian cells. *Science* June 21 2001 (e-pub ahead of print)

FURTHER READING Principles of nuclear structure and function

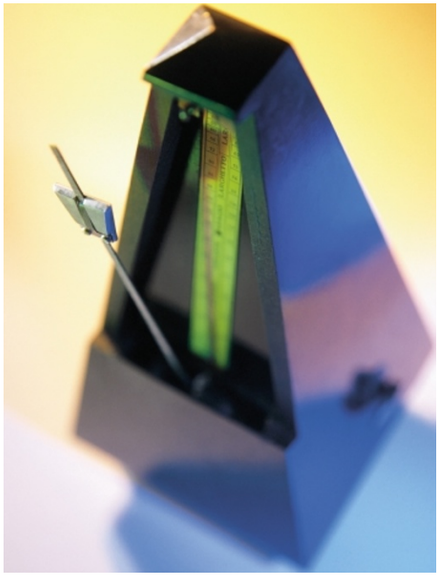
WEB SITE Cook laboratory

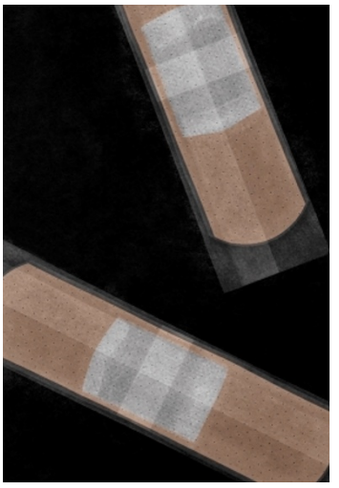
for vascular physiology and also, as McKnight and colleagues speculate, "may ultimately help to explain how the mammalian forebrain oscillates between states of alertness and tiredness".

Alison Schuldt

References and links

ORIGINAL RESEARCH PAPERS McNamara, P. *et al.* Regulation of CLOCK and MOP4 by nuclear hormone receptors in the vasculature: a humoral mechanism to reset a peripheral clock. *Cell* **105**, 877–889 (2001) | McKnight, S. L. *et al.* NPAS2: an analog of clock operative in the mammalian forebrain. *Science* 6 July 2001 (epub ahead of print) | McKnight, S. L. *et al.* Regulation of Clock and NPAS2 DNA binding by the redox state of NAD cofactors. *Science* 6 July 2001 (epub ahead of print) (2001)





CANCER

Coming unstuck

E-cadherin is known to regulate cell–cell adhesion, but what regulates E-cadherin? Van Roy and colleagues now show that SIP1, a zinc finger protein with a Smad interaction domain, can repress the expression of E-cadherin and thereby function as a potent promoter of invasion.

Reporter assays showed that transcriptional repression of E-cadherin by SIP1 requires the amino- and carboxy-terminal zinc finger clusters of SIP1 and both E2 boxes in the E-cadherin promoter. By using a SIP1-inducible expression system and an E-cadherin positive cell line, the authors showed a strong correlation between SIP1 induction and E-cadherin repression. Likewise, northern blot analysis of several E-cadherin-positive and -negative cell lines revealed a strong inverse correlation between SIP1 and E-cadherin expression. As catenins are important for the formation of stable cell–cell contacts, the effect of SIP1 on the expression and localization of β-catenin was examined — neither was affected. Moreover, there was no evidence that SIP1 increases nuclear or cytosolic β-catenin-mediated signalling.

So what's the phenotypic consequence of inducing SIP1 expression in E-cadherin-positive epithelial cells? Cell–cell aggregation is abrogated, cell invasion into collagen type I gels increases and unidirectional cell migration decreases — all very desirable traits for a progressing epithelial tumour cell.

Katrin Bussell

References and links

ORIGINAL RESEARCH PAPER Comijn, J. *et al.* The two-handed E box binding zinc finger protein SIP1 downregulates E-cadherin and induces invasion. *Mol. Cell* **7**, 1267–1278 (2001)

IN BRIEF

CELL SIGNALLING

PAR-1 is a Dishevelled-associated kinase and a positive regulator of Wnt signalling.

Sun, T.-Q. *et al. Nature Cell Biol.* **3**, 628–636 (2001)

Dishevelled (Dsh), as well as regulating the Wnt–β-catenin pathway, also controls planar polarity through the Jun amino-terminal kinase (JNK) pathway. Sun and colleagues have now identified *Drosophila* PAR-1 — an important regulator of polarity — as a kinase that exists in a complex with Dsh. Activation of PAR-1 is needed for Dsh phosphorylation and potentiation of the β-catenin pathway, while inhibiting the JNK pathway.

RNA TRANSPORT

Developmental changes due to long-distance movement of a homeobox fusion transcript in tomato.

Kim, M. *et al. Science* **293**, 287–289 (2001)

Until now, the functional significance of long-distance movement of messenger RNA in plants was unclear. Kim *et al.*, however, have shown that, after grafting, a mutation that causes tomato leaves to be rounded can be transmitted from a mutant plant into a wild-type plant. Mutant mRNA was detected in the phloem sieve tubes and associated companion cells of wild-type plants, and accumulated in sites of known expression in wild-type plants.

RNA EXPORT

Messenger RNAs are recruited for nuclear export during transcription.

Lei, E. P. *et al. Genes Dev.* **15**, 1771–1782 (2001)

Export of mRNA requires processing, packaging, recognition by export factors and finally translocation through the nuclear pore. It is becoming increasingly evident that these processes are tightly linked. Here, the authors show that two *Saccharomyces cerevisiae* export factors, Npl3 and Yra1, are recruited to the mRNA as early as during transcription. Npl3 seems to be recruited before Yra1, probably through direct interaction with RNA polymerase II.

CYTOSKELETON

Essential roles for four cytoplasmic intermediate filament proteins in *Caenorhabditis elegans* development.

Karabinos, A. *et al. Proc. Natl Acad. Sci. USA* **98**, 7863–7868 (2001)

Many genetically tractable organisms, including *Drosophila* and yeast, do not have intermediate filaments, whereas mammalian cells have over 50 isoforms. *Caenorhabditis elegans* now emerges as the perfect model organism to study intermediate filament function, as it only has 11 isoforms. The authors knocked out each of these genes by RNA interference and found phenotypes for five of them. Four of these are essential for development of the worm.