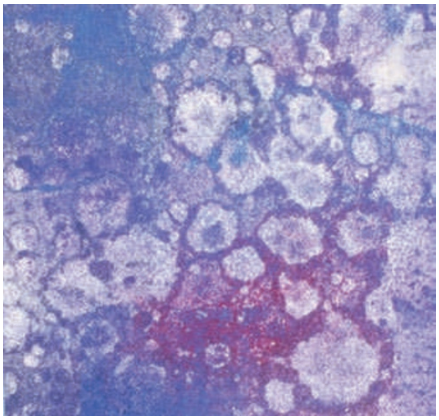
IN BRIEF

CANCER

Loss of the *Alox5* gene impairs leukemia stem cells and prevents chronic myeloid leukemia

Chen, Y. *et al. Nature Genetics* **41**, 783–793 (2009)

Although targeting cancer stem cells is thought to be essential for curing cancers, few target genes in cancer stem cells have been identified. Chen and colleagues identified the 5-lipoxygenase gene (*Alox5*) as a crucial regulator of leukaemia stem cells in BCR–ABL-induced chronic myeloid leukaemia (CML). In mice lacking *Alox5*, BCR–ABL did not generate CML, and there was impaired function of leukaemia stem cells. Treatment of CML mice with an inhibitor of 5-lipoxygenase also impaired the function of leukaemia stem cells, and prolonged survival.



IMMUNE REGULATION

mTOR regulates memory CD8 T-cell differentiation

Araki, K. *et al. Nature* **460**, 108–112 (2009)

Inducing effective memory T cell responses is a major goal of vaccination. This paper showed that mammalian target of rapamycin (mTOR) is a regulator of memory CD8 T cell differentiation, and unexpectedly the immunosuppressive drug rapamycin had stimulatory effects on the generation of memory CD8 T cells. Rapamycin enhanced the quantity and functional qualities of virus-specific memory CD8 T cells in mice following acute virus infection, and enhanced memory T cell responses in non-human primates following vaccination. So, the mTOR pathway could be manipulated to improve the response of vaccine- or infection-induced memory CD8 T cells.

BIOTECHNOLOGY

Biodesign of a renal-protective peptide based on alternative splicing of B-type natriuretic peptide

Pan, S. *et al. Proc. Natl Acad. Sci. USA* **106**, 11282–11287 (2009)

B-type natriuretic peptide (BNP) has vasodilatory properties, but its use in heart failure is limited by side effects. This study identified an alternatively spliced transcript of BNP that is present in failing human heart. The resultant peptide retained the ability of BNP to stimulate cyclic GMP production and, in a canine model of heart failure, did not alter mean arterial pressure but increased glomerular filtration rate. Moreover, the peptide lacked the vasoactive properties of BNP, showing that peptides with beneficial properties can be designed based on products of alternative RNA splicing.

RNA

Transfection of small RNAs globally perturbs gene regulation by endogenous microRNAs

Khan, A. A. *et al. Nature Biotech.* **27**, 549–555 (2009)

Although transfection of small RNA molecules, such as small interfering RNA (siRNA) and microRNA (miRNA), usually lowers target gene expression, an increase in gene expression can sometimes occur. To test if such gene upregulation is due to a loss of function of endogenous miRNA, Khan and colleagues analysed genome-wide transcript responses from 151 published transfection experiments. They showed that transfecting small RNA molecules effects the expression of genes that are predicted to be under endogenous miRNA regulation, which could have practical implications for miRNA target prediction, design of RNA genomic screens and siRNA therapeutics.