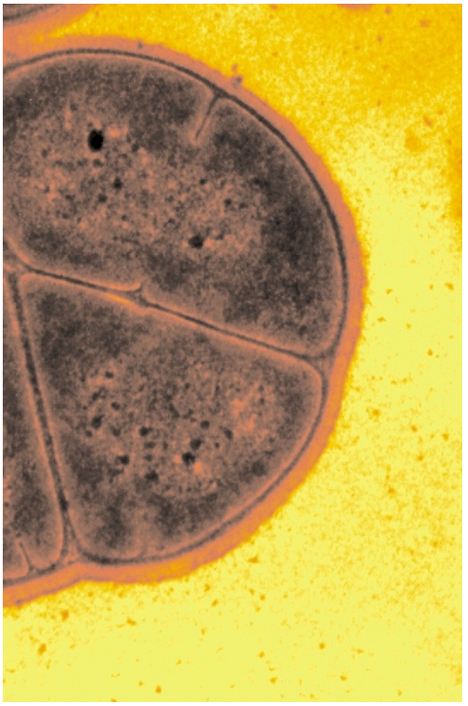

Services University of the Health Sciences,

that the ultraviolet resistance capacity of DEIRA is due to the abundance and versatility of PHX genes, which fall into four classes. These include genes that degrade and export damaged nucleic acids and proteins, molecular chaperones, detoxification enzymes and proteases. The abundance of PHX genes in each of these classes (particularly the first), compared to other prokaryotes, could be the intrinsic property that maintains the survival and stability of the cell when it is exposed to radiation or desiccation. Indeed, the expression levels of standard repair proteins in DEIRA (or *Escherichia coli*) are not in the PHX range (except one), but most chaperone, degradation and protease proteins are.

It remains to be seen whether DEIRA has novel proteins among its PHX genes, or whether it simply uses the standard repair machinery in a new and more efficient way. Meanwhile, NASA have their eyes on DEIRA for other reasons: extremophiles such as DEIRA represent a distinct life form that could give clues to the earliest inhabitants of Earth and Mars. And if that doesn't work out, there's always a use here on earth for a bug tough enough to clean up heavy metals and radioactive waste without risking its life.

Tanita Casci

References and links

ORIGINAL RESEARCH PAPER Karlin, S. & Mrázek, J. Predicted highly expressed and putative alien genes of *Deinococcus radiodurans* and implications for resistance to ionizing radiation damage. *Proc. Natl Acad. Sci. USA* **98**, 5240–5245 (2001)

FURTHER READING Rothschild, L. J. *et al*. Life in extreme environments. *Nature* **409**, 1092–1101 (2001)

In a News and Views article, Mike Culbertson concludes that the method has broad implications for genetic disease research and could be valuable for positional cloning projects.

Mark Patterson

References and links

ORIGINAL RESEARCH PAPER Noensie, E. N. & Dietz, H. C. A strategy for disease gene identification through nonsense-mediated mRNA decay inhibition. *Nature Biotechnol.* **19**, 434–439 (2001)

FURTHER READING Culbertson, M. R. Sense versus nonsense in DNA diagnostics. *Nature Biotechnol.* **19**, 413–414 (2001)

WEB SITE Harry Dietz's lab

IN BRIEF

RNA SPLICING

Trans-spliced leader addition to mRNAs in a cnidarian.

Stover, N. A. & Steele, R. E. *Proc. Natl Acad. Sci USA* **98**, 5693–5698 (2001)

Spliced leader (SL) *trans*-splicing, which replaces the 5′ end of an mRNA with another RNA segment, has only been reported in certain phyla. Because of the many similarities between *trans*- and *cis*-splicing, understanding how SL *trans*-splicing evolved is of biological interest. In March, we highlighted the discovery of SL *trans*-splicing in a primitive chordate. This paper reports that SL addition also occurs in Hydra, an early diverging metazoan, and indicates that SL *trans*-splicing might have arisen multiple times.

GENE THERAPY

Gene therapy restores vision in a canine model of childhood blindness.

Acland, G. M. *et al. Nature Genet*. **28**, 92–95 (2001)

Leber congenital amaurosis (LCA), which causes severe retinal degeneration and blindness in children, can result from mutations in *RPE65*. This paper reports the successful treatment of LCA retinopathy in a naturally occurring dog model of the condition using gene therapy. Subretinal delivery of the wild-type *RPE65* gene to *RPE65*$^{-/-}$ blind dogs restored their sight, as indicated by electrophysiological and behavioural tests. The study provides hope that similar methods will also prove successful in treating retinopathies in humans.

DEVELOPMENT

Pax6 and SOX2 form a co-DNA-binding partner complex that regulates initiation of lens development.

Kamachi, Y. *et al. Genes Dev*. **15**, 1272–1286 (2001)

PAX6 has a key role in eye and lens development. Kamachi *et al.* show here that PAX6 and SOX2 initiate lens development by co-operatively binding to lens-specific enhancers; PAX6–SOX2 complex formation *in vitro* correlates with the activation of a δ-crystallin minimal enhancer *in vivo*. When ectopicaly expressed, *PAX6* and *SOX2* cause ectopic lens placode formation, and can thus be considered to function as a genetic switch that initiates lens differentiation.

HUMAN GENETICS

Autosomal recessive hypercholesterolemia caused by mutations in a putative LDL receptor adaptor protein.

Garcia, C. K. *et al. Science* April 26 2001 (10.1126/science.1060458)

Familial hypercholesterolaemia (FH) is commonly caused by a defective low-density lipoprotein receptor (LDLR). Now, Garcia *et al.* have identified the defect that accounts for a rarer form of FH. By positional cloning, they identified the *ARH* gene (autosomal recessive hypercholesterolaemia), and found mutations in several unrelated FH families. The ARH protein, which includes a conserved phosphotyrosine-binding domain, might bind to the cytoplasmic domain of LDLR itself and function as an 'adaptor' protein.