

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## IMMUNOLOGY

### Crystal ball for flu vaccines

People's immune response to an influenza vaccine can be predicted after vaccination from gene-expression signatures.

Bali Pulendran at Emory University in Atlanta, Georgia, and his colleagues measured immune responses and gene-expression changes in the white blood cells of 56 volunteers who received the inactivated vaccine against seasonal flu. Expression levels of 42 sets of 3 or 4 genes were used to predict flu-specific antibody response to the inactivated vaccine. For example, levels of the gene *CaMKIV* were inversely correlated with the antibody responses.

Mice lacking the *CaMKIV* protein produced more flu antibodies after vaccination than normal mice, confirming the protein's role in the immune response to vaccines. *Nature Immunol.* doi:10.1038/ni.2067 (2011)

## DEVELOPMENTAL BIOLOGY

### How the mole got its 'thumb'

Almost all land vertebrates have five fingers, but moles flout this rule. On top of their five digits, the creatures have co-opted a wrist bone to evolve a pseudo-thumb that increases hand-surface area for digging.

Marcelo Sánchez-Villagra at the University of Zürich in

Switzerland and his colleagues tracked key molecular markers in embryos of the Iberian mole (*Talpa occidentalis*; pictured) and the North American least shrew (*Cryptotis parva*), a close relative that lacks the long, sickle-shaped bone. They found increased expression of *Msx2*, a gene that promotes digit development, in the area of the developing mole paw in which a wrist bone becomes elongated. The gene product was absent from this region in the shrew.

The pseudo-thumb is not technically a sixth digit, because it comes from a wrist bone, and develops later than the five true digits. *Biol. Lett.* doi:10.1098/rsbl.2011.0494 (2011)

## ASTRONOMY

### Galactic dust from exploding stars

Supernova 1987A is the remnant of an exploded star located in the Large Magellanic Cloud (pictured), a dwarf galaxy some 49 kiloparsecs from Earth. New observations from the Herschel Space Observatory indicate that the explosion probably generated a mass of dust equivalent to 0.4–0.7 times the mass of the Sun.

Mikako Matsuura at University College London and her colleagues say that the vast amount of dust produced by 1987A lends support to the theory that supernovae generated much of the dust seen in distant galaxies.

*Science* doi:10.1126/science.1205983 (2011)

## NEURODEVELOPMENT

### Defects from stunted neurites

Mutations in the gene *FOXP2* lead to speech and language impairments in humans, but its exact role has not been clear. It turns out that the gene regulates other genes involved in the growth and branching of neuronal projections, making it a key player in neurodevelopment.

Simon Fisher at the Max Planck Institute for Psycholinguistics in Nijmegen, the Netherlands, and his colleagues screened embryonic mouse brain tissue for genes that the *FOXP2* protein binds to and teased out 264 targets. These genes cluster

in networks that control the formation of neurites, which connect neurons to each other. In mice making defective *FOXP2*, neurons showed reduced neurite outgrowth and branching.

*PLoS Genet.* 7, e1002145 (2011)

## CANCER

### Pushing back on drug resistance

Lung tumours may contain a mix of drug-resistant and drug-sensitive cells. Modified drug regimens could exploit this to delay the emergence of resistant tumours.

Certain non-small-cell lung cancers commonly acquire drug resistance, most often through a mutation called



EUROPEAN SOUTHERN OBSERVATORY

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