RNA INTERFERENCE

Meeting places

Nature Cell Biol. doi:10.1038/ncb1265 (2005)
Nature Cell Biol. doi: 10.1038/ncb1274 (2005)

Genes are transcribed into messenger RNAs that are then translated into proteins. This central dogma of molecular biology has recently been shaken by the discovery of new classes of small RNAs. Micro RNAs and small interfering RNAs, for example, suppress gene expression without coding for proteins.

Two independent teams, George Sen and Helen Blau of Stanford University, and a group led by Gregory Hannon of Cold Spring Harbor Laboratory, have shed more light on how, or at least where, this happens. Both groups show that components of the cellular machinery needed to help these small RNAs repress the translation of mRNAs, concentrate in the P-bodies of mammalian cells — tiny organelles in the cytoplasm where superfluous mRNAs are processed. Whether this co-localization is a cause or a consequence of mRNA suppression has yet to be determined.

COMPUTATIONAL BIOLOGY

Patterns pending

J. Biol. doi:10.1186/jbiol23 (2005)

To help them build computer models of networks, such as the interactions between molecules inside cells, biologists developed the idea of 'network motifs'. Motifs are simple patterns of interconnection that occur more often than would be expected by chance.

Researchers led by Frederick Roth at Harvard Medical School in Boston investigated five networks that connect genes and proteins in cells of the yeast *Saccharomyces cerevisiae*. As well as finding motifs, they put motifs into higher-order groupings called 'network themes', which seem to represent the elemental design principles of the network. Maps based on such themes could predict the function of unknown genes.

PHYSICS

Speed trap

Phys. Rev. A **71,** 050101 (2005)

Is the speed of light the same in different directions? Yes, according to the most definitive answer yet given to this long-studied question.

Stephan Schiller's group at the Heinrich Heine University in Düsseldorf, Germany, searched for changes in the speed of light by studying laser beams that were reflected back and forth in sapphire crystals held close to absolute zero. As the crystals were rotated, their resonance frequencies remained constant, suggesting that the speed of light is unchanged. The experiment's accuracy of around 6 parts in 10^{16} is an order of magnitude better than the most stringent previous test.

PALAEONTOLOGY

Tyrannosaurus sex

Science **308,** 1456-1459 (2005)

Examination of a *Tyrannosaurus rex* unearthed in 2003 in Montana has revealed a bone tissue similar to that of today's female birds, say researchers led by Mary Schweitzer from North Carolina State University, Raleigh.

IMAGE UNAVAILABLE FOR COPYRIGHT REASONS

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Medullary tissue is found on the inside of hollow bones and is pitted with channels through which blood vessels run. This makes it an excellent source of the calcium that female birds need to produce eggshells. Evidence that *T. rex* used a similar system emphasizes how closely birds are related to these dinosaurs, and suggests that this specimen was an egg-laying mother.

MATERIALS

Going soft

Phys. Rev. Lett. **94,** 205502 (2005)

You can squeeze and mould it like putty. But the material developed by Wei Hua Wang, of the Institute of Physics in Beijing, and his team is not a plastic made from polymers — it is a metallic glass that goes soft in boiling water.

Wang's blend of cerium, aluminium and copper, with a dash of niobium, is completely amorphous. At room temperature, it has the hardness, toughness and electrical conductivity of a typical metal. When heated, it displays plastic properties, becoming malleable at just 68 °C. This unusually low glass transition temperature, combined with resistance to crystallization, means the material should appeal to manufacturers.

JOURNAL CLUB

Luigi Piro
National Institute for Astrophysics, Rome

The mission scientist for a space telescope that probed the origin of gamma-ray bursts explains why these dramatic pulses of energy have cosmic importance.

I was the lead scientist for BeppoSAX, a satellite that could pinpoint gamma-ray (γ-ray) bursts. We discovered that these energy bursts are produced when massive stars in the distant Universe undergo powerful explosions. Intriguing questions remain about the nature of such events, but the bursts also provide thrilling data for cosmologists.

My team and other astronomers are considering how to use γ-ray bursts to learn about the early history of the Universe. One idea is to analyse the accompanying X-rays to get information about the composition of the regions through which the radiation has travelled. Another idea is to use γ-ray bursts as 'cosmic rulers': if astronomers know a burst's total energy, then its brightness, as viewed from Earth, can be used to infer its distance.

Cosmology was revolutionized when type 1a supernovae — exploding stars — were used as cosmic rulers. They revealed that the current expansion of the Universe is accelerating. Gamma-ray bursts should tell us more because they are brighter, and so reach us from farther away.

Indeed, a report in *The Astrophysical Journal* (G. Ghirlanda, G. Ghisellini, D. Lazzati and C. Firmani **613,** L13–L16; 2004) shows that using even a limited number of γ-ray bursts as rulers reduces the margin of error in current cosmological models. The researchers calculated the bursts' total energies from their peak frequencies and directions.

Observations of γ-ray bursts from Swift, a new space telescope, will further test this method and, I hope, shed light on dark energy. Dark energy is thought to drive the expansion of the Universe, but its physical nature is a mystery.

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