Biomedical materials

Networks for artificial tissues

Adv. Mater. **16,** 2007–2012 (2004)

Porous, biodegradable polymers can provide scaffolding for tissue engineering: seeded with cells, they are broken down as the cell colony grows and takes on the shape of the scaffold. But the results are far from ideal. Real tissues typically have precise spatial arrangements of different cell types, supported by a vascular blood supply.

Kevin R. King *et al.* offer an improved approach by using three-dimensional microfluidic networks made from biodegradable polymers to deliver cells to precise locations, or to provide a built-in system of vascular channels. They imprint thin films of the polymer poly(lactic-*co*-glycolide) (PLGA) with grooves as narrow as 2 μm across, and then laminate the films into blocks laced with a precise network of channels. An innovation is in patterning the PLGA from a melt, rather than from solution, after which the soft material is pressed into a preformed rubbery mould. King *et al.* also use heat to weld successive layers together, creating robust joins with little thermal degradation of the polymer.

Such microstructured materials might be additionally useful for delivering drugs or growth factors in an implanted medical device or scaffold. **Philip Ball**

Chemical biology

Sweetness on a chip

Chem. Biol. **11,** 1701–1707 (2004)

Cell-surface carbohydrates are involved in many biological processes, including cell–cell recognition, and cell adhesion and signalling. These carbohydrates are structurally complex, making it difficult to study some of the processes involved at the molecular level. But many new tools are being developed for studying glycobiology, including carbohydrate microarrays. Matthew D. Disney and Peter H. Seeberger report that these biochips can be used to examine the interactions of live bacteria with carbohydrates — often a key step in the bacterial invasion of host cells.

The authors created slides containing various carbohydrates, and then treated these microarrays with *Escherichia coli* bacteria that had been labelled with a dye. They found that the bacteria bound strongly to the sugar mannose but not to other carbohydrates, and that few bacterial cells were needed to produce a strong signal. The non-destructive nature of the microarrays also allowed the authors to collect the bacteria, grow them in culture, and determine their susceptibility to various antibiotics. Disney and Seeberger went on to use the microarrays to screen for inhibitors of carbohydrate–cell interactions. They envisage that the biochips will be useful for studying pathogenic bacteria and developing new drugs to combat these microbes. **Joshua Finkelstein**

M. HUMPHREY/AP

Flu shot. But ageing helper T cells render vaccines less effective in the elderly than the young.

Astronomy

Focus on exoplanets

Astrophys. J. Lett. **618,** L165–L168 (2005)

In the hunt for planets outside our Solar System, visual identification is the most difficult method to apply, but potentially the most informative. The problem is that at visible wavelengths an exoplanet image will be typically about a billion times fainter than its parent star, and a million times less bright in the infrared. The star's light also produces diffraction rings in conventional telescopes that often extend far beyond the orbit of an associated planet.

A. H. Greenaway *et al.* outline an ancillary optical system that could help to surmount these difficulties. Their 'pupil replication' method reduces the brightness of the star's diffraction rings, making it easier to cut out the starlight that swamps a planet's image.

Computer simulations show that the system can reduce by a factor of three the angle between a planet and star in which the planet can be detected. It should also be much cheaper and easier to implement than one of the alternative options — building a telescope with a larger diameter. **Mark Peplow**

Immunology

Helpless B cells

J. Exp. Med. **200,** 1613–1622 (2004)

Elderly people are strongly encouraged to have vaccinations against infectious diseases such as influenza and pneumonia. But their bodies are not always up to the task; their immune systems produce relatively weak and short-lived antibody responses, which make the shots less effective. Sheri M. Eaton *et al.* have investigated whether this defective reaction involves an age-related problem with the antibody-producing B cells, or with the T cells that help them out.

When the authors transferred aged helper T cells to young mice, the animals' B-cell response to immunization was crippled. But young and old mice given helper T cells from young donors showed no difference in B-cell activity. The findings suggest that helper T cells are the weakest link in older immune systems. According to Eaton *et al.*, a better understanding of these age-related defects could help to improve vaccine efficacy in the elderly. **Roxanne Khamsi**

Molecular biology

Silence, please

Cell **119,** 941–953 (2004)

Every cell nucleus is crammed with about two metres of DNA, wound snugly around proteins called histones to form chromatin. Just how tightly the chromatin is coiled in a particular region determines the availability of its genes; active genes are usually in looser, more open sections. Yujiang Shi *et al.* now add a new variety to the list of enzymes that control how open the chromatin is.

Chemical modifications to the tails of histone proteins are crucial to chromatin structure. Several types of modification change continually, with the balance between modified and unmodified histones controlling chromatin structure. Modification of histones by methylation has been considered more permanent, because only enzymes that add methyl groups (methylases) were known. But Shi *et al.* have discovered a histone demethylase.

Called LSD1 (for lysine-specific demethylase 1), this enzyme removes methyl groups from a specific lysine amino acid in histone protein H3. Methylation of this residue has been associated with active genes, so it is unsurprising that LSD1 activity shuts down certain genes. Moreover, Shi *et al.* find that decreasing the amount of LSD1 allows the genes to be turned on again. It seems that histone methylation is a dynamic process after all, and depends on the balance between methylases and demethylases. **Helen Dell**

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