

RANDOM SELECTIONS

Association between aplastic anaemia and mutations in telomerase RNA

T. Vulliamy, A. Marrone, I. Dokal and P. J. Mason
Lancet, 2002, **359**, 2168–2170

Between two and five people in a million suffer from aplastic anaemia, a disorder of the bone marrow, about 75% of such cases being idiopathic. PCR amplification was used to screen human telomerase RNA gene (*hTR*) in 44 patients with aplastic anaemia (17 patients with idiopathic disease and 27 patients with constitutional disease) and 214 normal control individuals. The size of signal corresponding to a sub-telomeric probe from chromosome 7 was used as a measure for the telomeric length. Two of the 17 patients with idiopathic aplastic anaemia and three of the 27 patients with constitutional aplastic anaemia were heterozygous for mutations in *hTR*. No *hTR* mutations were found in samples from 214 normal controls. Data demonstrate that shortening of the telomere and mutations in the telomerase RNA gene might be important in a subset of patients with aplastic anaemia.

Monitoring the identity of bacteria using their intrinsic fluorescence

L. Leblanc and E. Dufour
FEMS Microbiol. Lett., 2002, **211**, 147–153

The authors explored the use of intrinsic fluorophores present in bacteria as an alternative to the traditional phenotypic characterization based on morphology and biochemical tests. The characteristic fluorescence spectra, following excitation at 250 nm, 270 nm and 316 nm, were recorded for 25 bacterial strains in dilute saline solution (OD at 620 nm = 0.5) at ambient temperature. The matrix obtained from the experimental data was analysed by Mahalanobis distances method for discriminant analysis. Reproducibility of the data permitted identification and discrimination of *Lactobacilli* at genus, species and strain levels.

Red pepper and functional dyspepsia

M. Bortolotti, G. Coccia and G. Grossi
New Engl. J. Med., 2002, **346**, 947–948

Functional dyspepsia is a chronic digestive disorder of unknown cause. Bortolotti *et al.* evaluated red-pepper (*Capsicum annum*) powder as a potential therapy for this disorder. In a double-blind test involving 30 patients with functional dyspepsia, 15 were provided with 2.5 g

of red-pepper powder contained in a capsule and administered before meal thrice daily for five weeks. The 15 control patients received placebo pills. Statistical analysis of the symptoms reported by the patients indicated that red-pepper was more effective than the placebo pills. Since one of the components of red pepper, capsaicin (*trans*-8-methyl-*N*-vanillyl-6-nonenamide), is a known reliever of cutaneous and mucosal pain, it is argued that capsaicin-induced desensitization might be involved in relieving the symptoms of dyspepsia.

Bioreactor production of human α 1-anti-trypsin using metabolically regulated plant cell cultures

M. Trexler, K. A. McDonald and A. P. Jackman
Biotechnol. Progr., 2002, **18**, 501–508

Plant cell culture systems are cheaper alternatives to mammalian cell culture systems, albeit permitting glycosylation of the recombinant protein products. The authors used a suspension cell culture of transgenic japonica rice variety to produce recombinant human α 1-anti-trypsin (*r*-AAT), a 52 kDa glycoprotein, and one of the most abundant human protease inhibitors present in blood, deficiency of which leads to emphysema in lungs caused by elastase tissue destruction. The *r*-AAT gene was expressed from a regulatable α -amylase promoter induced by addition of 8 g/l of mannitol. This report describes the performance of a scaled up system in a 5-l bioreactor making extracellular *r*-AAT protein with the cell biomass doubling time of 1.5–1.7 days. The product was confirmed by immunoblotting and inhibition assays with porcine pancreatic elastase, a serine protease. Proteins up to 7.3 mg *r*-AAT/(L day) and 3.2 mg *r*-AAT/(g dw day) could be obtained by this cell culture system.

Cacao usage by the earliest Maya civilization

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Nature, 2002, **418**, 289–290

The archaeological site at Colha in northern Belize, Central America is an authentic source of tools and domestic items from the Preclassic period, as far back as 900 BC. The authors collected 500 mg samples from each of the 14 vessels recovered from burial sites at Colha, solubilized the dry residue in distilled water, and filtered. The filtrate

was analysed using high performance liquid chromatography coupled to atmospheric pressure chemical ionization mass spectroscopy. This new technique identified theobromine as one of the components in the mass spectrum as well as in the UV chromatogram. Theobromine is a distinctive chemical marker for the plant *Theobroma cacao* (chocolate). This finding suggests that chocolate was consumed by the Preclassic Maya people even in the 600 BCs.

A continuous source of Bose–Einstein condensed atoms

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Science, 2002, **296**, 2193–2195

Bose–Einstein condensed (BEC) atoms could so far be produced in pulsed modes. In their attempts to generate a continuous source of BEC of sodium atoms, the authors encountered several problems, including interference from stray resonant light and magnetic fields. Laser cooling followed by evaporative cooling produces condensed atoms in pulse mode. The authors developed novel techniques to produce a new condensed atom in proximity to another condensate, and to merge them. Their success is due to using optical tweezers to move sodium atom condensates from where they are produced into a reservoir trap. The freshly produced condensates periodically replenish others in the reservoir trap, thereby continuously maintaining a number of condensates above 10^6 . This report of continuous BEC source will find use in realizing continuous atom lasers.

Dynamic fracture by large extra-terrestrial impacts as the origin of shatter cones

A. Sagy, Ze'ev Reches and J. Fineberg
Nature, 2002, **418**, 310–313

'Shatter cones' are distinctive 'marks' left on fractured rocks caused by the large amount of energy dissipated during the impact of a meteorite or a comet. The authors investigated the classic 'horse tail' hierarchical networks of shattered cones to postulate a mechanism of propagation of nonlinear waves along the fracture fronts. The quantitative predictions on the fracture velocities near and away from the site of impact were corroborated by field measurements at Vredefort (South Africa) and Kentland (Indiana, USA).