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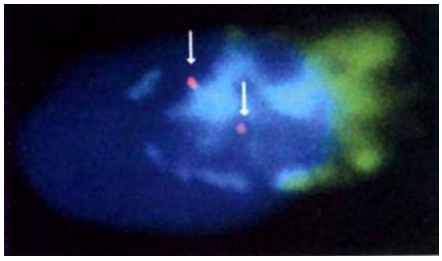
NMDA receptor antagonists

Researchers at the Johns Hopkins University School of Medicine (Baltimore, MD) and Affymax (Palo Alto, CA) have isolated a new family of peptides that interacts with the *N*-methyl D-aspartate receptor (NMDAR) (see p. 944 and p. 986). Li et al. screened a random peptide library using a purified fusion protein of the ligand-binding domain of NMDAR. They then produced and screened a mutagenized peptide library of the identified peptide family and were able to increase the affinity of the truncated protein receptor, showing noncompetitive inhibition of the channel activity.

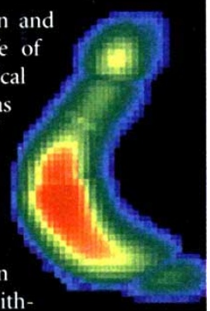
Metal scavengers

The specificity of bacteria used in bioremediation of waste waters contaminated with heavy metals could be increased by expressing peptides that form co-ordination spheres around metal ions on the surface of the cells. Sousa et al. from the Centro Nacional de Biotechnología (Madrid) engineered histidine clusters on the LamB carrier protein of *Escherichia coli* (see p. 947 and p. 1017), which allowed the bacteria to accumulate Cd^{2+} levels tenfold greater than the wild-type, without affecting cell viability. The LamB-His chains were also sufficiently flexible to allow cells to adhere to a metal ion-coated solid support.



In order to identify cells transduced for gene therapy, a method to simultaneously monitor cells for both gene integration and protein expression has been developed (see p. 1012). Sections were stained with an immunofluorescent antibody followed by fluorescent in situ hybridization.

NO imaging



The low concentration and short in vivo half-life of the diatomic free radical nitric oxide (NO) has hampered the study of this ubiquitous component of biological processes. But by spin-trapping the free radical with an iron complexed *N*-(dithiocarboxy) sarcosine, a research group at the Yamagata Technopolis Foundation in Yamagata, Japan has formed complexes that can be detected in vivo with electron paramagnetic resonance (EPR) imaging (see p. 944 and p. 992). Yoshimura et al. have shown increased production of NO in the liver, kidney, blood, and urine (but not in the brain and the spleen) in response to septic shock.

Microinjection alternative

The traditional microinjection method for generating transgenic animals could be succeeded by a transformation method borrowed from gene therapy protocols. A research group at the University of Tokyo has used a replication-defective adenoviral vector to introduce a nuclear-targeted reporter gene into zona-free mouse eggs. The eggs subsequently develop into transgenic mice (see p. 942 and p. 982). A single copy of almost the entire viral genome was integrated into the mouse chromosomes and was stably transmitted to the F1 generation.

In seeking light, plants expend energy on stem elongation that might otherwise be used for leaf expansion. By overexpressing phytochrome A in tobacco, this elongation response can be cancelled, producing transgenic plants that are dwarfed in comparison with wild-type plants (see p. 945 and p. 995). In some strains, transgenic plants allocated a higher proportion of bioassimilates to leaf expansion than stem elongation, potentially increasing productivity.

Chilling resistance

Cold susceptibility makes tobacco a warm-climate crop, but Ishizaki-Nishizawa and colleagues at the Central Laboratories for Key Technology (Kanazawa, Japan) have attempted to change that. By expressing a cyanobacterium Δ9 desaturase gene transgenically, *cis*-double bonds were introduced into saturated fatty acids linked to plastid membrane lipids (see p. 946 and p. 1003), reducing the levels of saturated fatty acids in plant membranes. The transgenic tobacco plants, unlike wild-type plants, resisted short-period exposures to temperatures of 1°C, and they germinated and developed normal chloroplasts at temperatures 15°C lower than optimal for wild-type plants.

Sandwich oligo assay

The ubiquitous ELISA has been redesigned by substituting an oligonucleotide for the detection antibody (see p. 947 and p. 1021). Using combinatorial chemistry techniques to identify sequences that are specific for the vascular endothelial growth factor (VEGF), Drolet et al. have developed a set of nuclease-resistant, fluorescein-tagged oligonucleotides that act as the detection reagent for quantification of VEGF in serum. The capture reagent is a monoclonal antibody to VEGF and the sensitivity of the assay goes down to as little as 25 pg/ml.

Novel ion exchange

Researchers at Nimbus Biotechnologie (Leipzig, Germany) and the Universities of Würzburg and Munich have used the phase transition characteristics of phospholipid bilayers on a silica gel as a way of chromatographically separating proteins (see p. 999). The binding of proteins is thus controlled via a temperature gradient because lateral diffusion of phospholipids in the bilayer alters its composition, which in turn affects the charge of the column surface.

Stabilized streptavidin

Reznik et al. at Boston University (Boston, MA) have increased the stability of streptavidin–biotin binding by introducing covalent bonds between the two dimers of tetrameric streptavidin (see p. 1007). Covalent bonds between cysteine groups across the dimer–dimer interface were created, enhancing the stability of the streptavidin–biotin complexes at temperatures of 70°C and in 7 *M* guanidine hydrochloride denaturing conditions.