THIS MONTH IN *NATURE BIOTECHNOLOGY*

Unimolecular diagnostics

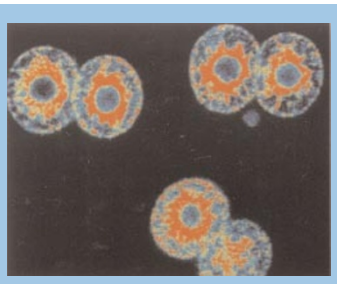
Whitcombe et al. (p. 804) describe a new method for detecting amplicons in high-throughput PCR reactions, using specially designed fluorescent molecules that function both as PCR primers and as probes for amplicons. The unique unimolecular design of this system could potentially give it an edge over existing bimolecular systems.

Plant pathogenesis heats up

Plants produce salicyclic acid (SA) as a defense signal during pathogen infection. SA also has the unusual property of inducing heating—either naturally or after exogenous application. Based on these effects, Van Der Straeten and colleagues have devised an infrared thermographic assay to detect plant pathogen infections long before lesions are visible (p. □□□).

Evolving cytokines

Despite potent antiviral and antiproliferative activities, interferons have not been optimized as therapeutic agents. Chang et al. apply the power of DNA family shuffling to selectively evolve interferon genes for specific applications (p. 793). Starting from over 20 human interferon genes, they generated variants with strongly increased activity on murine cells, some of which were even more potent than native murine interferon.



The high-intensity light required by current fluorescent imaging techniques can cause cellular damage and reduce specimen viability, both major problems when imaging live specimens. Two-photon laser scanning microscopy is an alternative approach that may be less harmful to living cells. The findings of Squirrell et al. (p. □□□) support this view, demonstrating that the technique can generate high-resolution images without affecting the developmental viability of mammalian embryos.

Long-life Abs

Antibody-based reagents are often rapidly cleared from the body, making them prohibitively expensive for treating chronic ailments in which therapeutic levels must be maintained over months or years. In this issue (p. 780), Chapman and colleagues improve the in vivo stability of antibodies, without diminishing their therapeutic activity, using site-specific polyethylene glycol (PEG) modification of antibody fragments.

Research Briefs written by Natalie DeWitt and Robert Frederickson

Isn't it good, low-lignin wood

In wood processing, the removal of lignin is an energy-intensive and environmentally unfriendly process. Chiang and colleagues (see pp. 750 and 808) have made this step easier using genetic engineering to manipulate the lignin biosynthetic pathway in aspen. They develop transgenic trees with a lignin content that is significantly lower than the wild type. Both lignin composition and cell-wall morphology is unaffected and the transgenic trees grow faster than their natural counterparts.

Peptide MMP inhibitor

Matrix metalloproteinases (MMPs) are implicated in tumor growth, angiogenesis, and metastasis, and thus are promising targets for cancer therapies. Koivunen et al. (pp. 749 and 768) describe the use of phage panning to isolate a cyclic peptide that selectively targets MMPs most closely associated with metastatic potential, and homes to angiogenic blood vessels in vivo. The peptide prevents invasive tumor growth and increases the survival of tumor bearing animals.

Profiling gene expression

In this issue, Shimkets et al. describe a method that may rival SAGE and differential display for measuring gene expression (p. 798). Their method makes use of six-base restriction enzyme signatures to identify expressed genes. The cDNA prepared from polyA$^+$ mRNA is digested with individual pairs of restriction enzymes and amplified by PCR. Lengths of the amplified fragments are then compared with fragment lengths predicted for individual genes by screening gene databases. The presence of unpredicted fragments flags novel genes.

Hybridization prediction

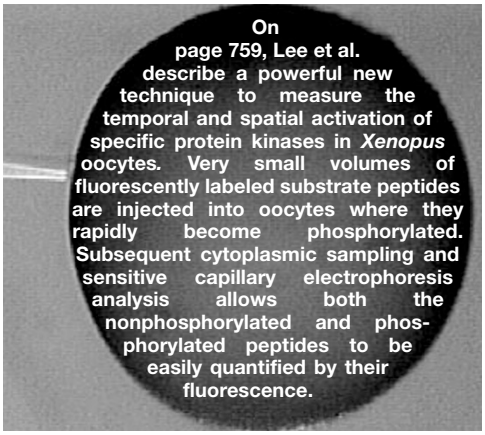
Identifying the optimal target sequence for antisense and ribozyme strategies is an ongoing challenge. Mir and Southern study the effects of RNA structure on duplex formation by analyzing the hybridization pattern of $tRNA^{phe}$ to an array comprising complementary oligonucleotides of overlapping length and sequence. They show that both single- and double-stranded regions contribute to efficient hybridization (see p.751 and 788).

PNA–NLS delivers

Peptide nucleic acids (PNAs) are stable peptide-based DNA mimics used as gene delivery vehicles. An important limiting factor in gene delivery is nuclear transfer of the transfected DNA. Branden et al. (p. 784) have fused a PNA to a nuclear localization signal (NLS), demonstrating that the chimera can effect efficient nuclear delivery and gene expression of a hybridized plasmid.

High-performance PFVs

Liposomes tend to accumulate in disease sites such as tumors, which makes them good drug carriers. On page 775, Madden and colleagues enhance the performance drug retention and drug delivery of such programmable fusogenic vesicles (PFVs) by modifying lipid composition.



On page 759, Lee et al. describe a powerful new technique to measure the temporal and spatial activation of specific protein kinases in *Xenopus* oocytes. Very small volumes of fluorescently labeled substrate peptides are injected into oocytes where they rapidly become phosphorylated. Subsequent cytoplasmic sampling and sensitive capillary electrophoresis analysis allows both the nonphosphorylated and phosphorylated peptides to be easily quantified by their fluorescence.