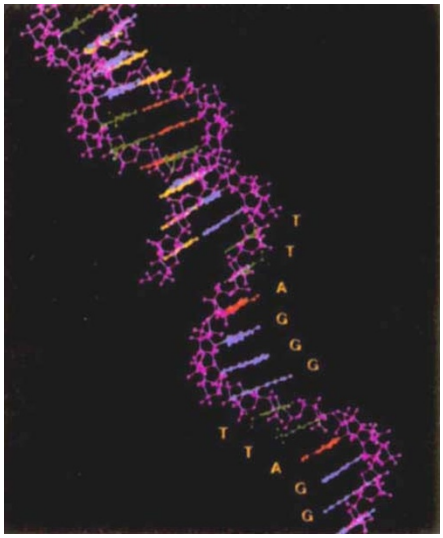
Energy-saving bacteria

Several commercially important aromatic compounds are the products of the glucose phosphotransferase system (PTS), a fermentation process that uses glucose as its preferred substrate. Bolivar's group at the Universidad Nacional Autónoma de México (see p.620, and commentary on p.580) have selected *E. coli* mutants that bypassed the PTS for glucose transport, yet retained fast growth rates. The process should increase the availability of phosphoenolpyruvate (PEP, a limiting factor) for other biosynthetic reactions, thus reducing production costs of aromatic compounds for industrial use.

Disease-resistant grapes. Perl et al. have found that the addition of certain antioxidants during and following grape-*Agrobacterium* cocultivation results in stable transgenic plants, overcoming a major obstacle in the transfomation of grapes (see p.624 and p.582).



The human telomere. Norton et al. report that peptide nucleic acids can inhibit telomerase activity (see p.615, and commentary on p.580), thought to be critical for sustained human tumor proliferation. PNAs are more efficient and more specific than analogous PS oligomers in their recognition of the RNA component of telomerase.

Optimized protein secretion

Researchers at Genentech (South San Francisco, CA) have altered the focus of traditional techniques to enhance secretion of heterologous proteins in *Escherichia coli* by optimizing, rather than maximizing, the translational level of a given protein (see p.629). By randomly mutating the translational initiation region (TIR) of the heat-stable enterotoxin II signal sequence, Simmons and Yansura have produced a library of vectors with a range of translational initiation efficiencies. Heterologous proteins are only secreted from *E. coli* optimally within a very narrow range of TIR strengths, but library screening should make possible the identification of the vector with the TIR that allows maximum secretion of any heterologous protein.

Functional genetic screen

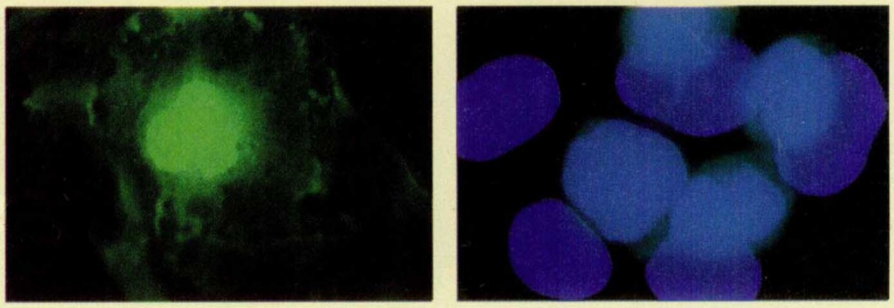
A clever genetic approach employed by workers at the European Molecular Biology Laboratory in Heidelberg uses the lethal phenotype caused by expression of tyrosine kinases (the signal transduction proteins) in the fission yeast *Schizosaccharomyces pombe* to select negative regulators in a functional assay (see p.600, and commentary on p.578). Tyrosine kinase antagonizer clones were selected by fusing the gene encoding a tyrosine kinase (c-Src) to an inducible promoter and transforming *S. pombe* cells carrying the construct with an expression vector library. Only cells that produced functional negative regulators survived when production of the tyrosine kinase was induced. The EMBL group's screen also has potential in identifying other receptor type kinase regulators.

Engineering fungal tolerance

In theory, engineering plants that disrupt fungal cell walls would confer resistance to fungal pests and reduce or eliminate the need for chemical fungicides. Investigators in France have now demonstrated in field trials that this approach works in practice (see p.643). Chitinase production in transgenic oil seed rape plants reduced the extent of fungal disease in plants grown in both high-disease and low-disease regions of France. Chitinase degrades chitin, a component of the fungal cell wall. The extent of disease resistance correlates with the proportion of chitin in the fungus and the levels of chitinase expression in the plant tissues.

Improved fluorescent markers

In this issue, two groups, Cheng et al. (see p.606) and Levy et al. (see p.610) have developed vectors that express mutant green fluorescent protein, causing mammalian cells to light up. The simplified ability to identify successful gene transfer bodes well for the future of gene therapy, as seen in the accompanying commentary by Verma on p.576.



Essential fatty acids in plants

The quality of oil produced from the seeds of commercial oil seed crops could be improved by engineering plants to convert less useful fatty acids like linoleic acid to more nutritionally beneficial ones like γ-linolenic acid (GLA). Thomas and Reddy (see p.639) effected the conversion in tobacco plants by engineering them to express a cyanobacterial Δ^6 desaturase. The transgenic tobacco lines accumulated both GLA and another useful fatty acid, octadecatetraenoic acid, in their leaves. Although lipid composition of the seeds was not altered, the authors suggest seed-specific promoters as the next step.

Bacterial decontaminators

Bacteria, with their own ion exchange matrix, are used in this novel method by Bonthrone et al. for the removal of recalcitrant heavy metals, such as nickel, from industrial waste (see p.635). *Citrobacter* cells, preloaded with enzymatically deposited uranium hydrogen phosphate (HUP) in membrane-bound, polycrystalline deposits, which can act as an ion exchange matrix, intercalate nickel ions into the HUP crystals. The *Citrobacter* cells that have intercalated nickel (and uranium) ions simultaneously into the lattice can then be removed from the waste solution.