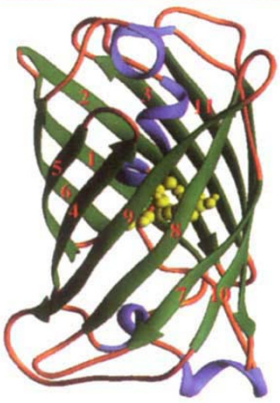
Specific aggregation

Aggregation of partially folded intermediates during in vitro folding of recombinant proteins was thought to be a non-specific process. However, researchers at the Massachusetts Institute of Technology (Cambridge, MA) compared the interactions between P22 tailspike and P22 coat protein intermediates in isolation and in mixed refolding reactions and showed that no heterogeneous coaggregates form (see p. 1231 and p. 1283). Nondenaturing electrophoresis and immunoblot analyses showed that the tailspike and coat products specifically self-associate.

GFP molecular structure

Green fluorescent protein (GFP) is becoming a ubiquitous marker in virtually all fields of cell, developmental and applied biology. A number of different mutations have been introduced that alter its inherent fluorescent properties. Until now, the rationale for the altered fluorescence has been a matter of speculation. Yang et al. present the atomic structure of the recombinant wild-type protein to 1.9 Å (see p. 1219 and p. 1246). The solution of the novel "β-can" structure may aid in the development of a protein with additional excitation and emission characteristics, undoubtedly increasing the utility of this workhorse protein.



Pathogenic satellite RNAs

Satellite RNA viruses are small parasitic molecules that have the ability to reduce the infectivity of their associated helper viruses and have thus been considered as effective biocontrol agents. However, mutant forms of these satellite RNAs actually exacerbate disease caused by the host virus. The risk of using this form of biocontrol was investigated by Palukaitis and Roossinck, who examined the potential of spontaneous mutations in the parasitic RNA to augment rather than inhibit disease (see p. 1226 and p. 1264). After passaging two CMV satellite RNAs through ten sets of tobacco plants, the RNAs ceased to attenuate the infection and instead caused yellow chlorosis which was associated with a single-base substitution change in the RNAs' sequence.

Tagging protein movement

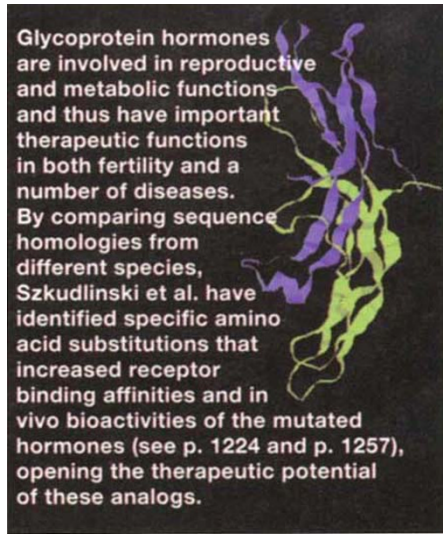
One of the many applications of green fluorescent protein (GFP) is its use to localize proteins within cells. To track protein movement within a living cell, the protein tag must be able to diffuse freely without binding to cellular components. Yokoe and Meyer have demonstrated that GFP satisfies this requirement by examining the dynamics of a GFP tagged K-ras GTP binding protein in vitro (see p. 1221 and p. 1252). By locally enhancing GFPís fluorescence using UV laser mediated excitation, they measured GFP-K-ras membrane dissociation rates and observed the dynamic equilibrium between membrane-bound GFP-K-ras and its diffusable form.

Allergen testing

A variety of transgenes have been added, and many others are being considered, to enhance the production of a variety of food crops. One of the potential risks of genetically modified plants is the inadvertent expression of an allergen. Astwood et al. demonstrated (see p. 1269) that protein stability measured in vitro, using simulated gastric fluid, can be used to screen transgenic crops for potential allergens.

Baculovirus expression

Posttranslational processing in the baculovirus-insect cell expression system resembles that of higher eukaryotes, however the glycosylation is incomplete. By expressing a bovine β1,4-galactosyltransferase gene under the control of an early stage viral promoter, Jarvis and Finn were able to modify the insect cell glycosylation pathway to resemble that of higher eukaryotes (see p. 1288).



Glycoprotein hormones are involved in reproductive and metabolic functions and thus have important therapeutic functions in both fertility and a number of diseases. By comparing sequence homologies from different species, Szkudlinski et al. have identified specific amino acid substitutions that increased receptor binding affinities and in vivo bioactivities of the mutated hormones (see p. 1224 and p. 1257), opening the therapeutic potential of these analogs.

Interchangeable resistance genes

The acetyl transferase-encoding *bar* and *pat* genes are routinely used as herbicide resistance genes because of their inactivation of l-phosphinthricin (l-PPT). Comparison of the BAR and PAT proteins by Wehrmann and collaborators, showed that both enzymes are homodimers with similar pH and temperature opitma, molecular masses and substrate specificities (see p. 1274). The functional equivalence of these proteins allows them to be used interchangeably in transgenic plants. Furthermore, both proteins are rapidly degraded in simulated human gastric fluid, suggesting they are safe for consumption in genetically engineered foods.

Familial hypercholesterolemia

A majority of heart-related deaths are attributable to lipid-related defects resulting in elevated cholesterol levels. Environmental factors, as well as inherited abnormalities such as familial hypercholesterolemia (FH)—a defect in the low-density-lipoprotein receptor—contribute to the disease. FH, an autosomal dominant disease, is heterogeneous involving several genes and thus identification of genetic defects can be difficult. Baron and coworkers have developed a screening methodology (see p. 1227 and p. 1279) based on PCR and oligonucleotide ligation assays (OLA) that uses different color fluorescent dyes, allowing the simultaneous identification of several different alleles. This screen has the potential to make clinical testing possible.