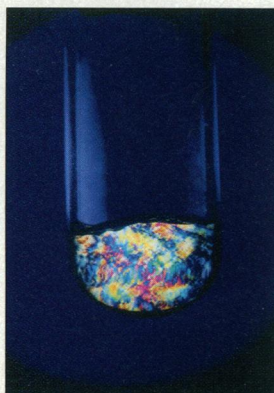




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Glacial washout

Ice core records indicate that the atmosphere during the last glacial maximum was dustier than today's atmosphere. Recent evidence also suggests that the tropical ocean surface waters were about 5°C cooler. Yung *et al.* (p. 962) propose that these observations reflect a weakened hydrologic cycle. Using a model of dust transport, the authors suggest that the hydrologic cycle was reduced by about a factor of 2 during glacial times.

Smart gel

When water is added to a polymer such as gelatin, a hydrogel is formed, which is stabilized by a three-dimensional polymer network. Such hydrogels are important, for example, in muscles or in contact lenses. Warriner *et al.* (p. 969) have discovered a class of hydrogels with unusual properties. These materials form lamellar gels from liquid-like phases upon addition of water, and redissolve into a liquid-like phase upon further water addition. The lamellar gel phase does not contain a solid component, and in the future could be used, for example, to incorporate biologically active membrane proteins.

Enlightened galaxies

Some galaxies are in the shape of disks, and some but not all of these exhibit substantial thickness. The formation mechanism that led to such distributions of stars is still a puzzle. Sridhar and Touma (p. 973) report a dynamic model of disk formation that invokes levitation—a process by which stars captured into a particular type of resonance acquire high vertical energy and so become distributed above and be-

Aging universe

Features of our galaxy called globular clusters can be used to help estimate the age of the universe: The ages of the oldest of these star clusters provide a lower bound. Observational data on globular clusters are in conflict with the age estimated from the expansion of the universe as expressed in the Hubble constant, however. Chaboyer *et al.* (p. 957) present the results of a Monte Carlo study of stellar evolution that was used to estimate the ages of the 17 oldest clusters in the Milky Way. The simulations produced a lower bound of 12.07 billion years and a median age of 14.56 billion years. The authors conclude that such ages constrain cosmological models, especially compared with Hubble Space Telescope results that put the age at less than about 10 billion years.

low the disk plane. The model may improve understanding of the origins of our own galaxy, which is intermediate between thin disk and the thicker halo galaxy shape.

Chain gang

Unlike most neurons in the adult brain, a small population of cells in the subventricular zone generates offspring that migrate to the olfactory bulb. Lois *et al.* (p. 978) show that these cells migrate in chains, the members of which are held together by membrane specializations. The chains are ensheathed by another cell type, likely glial cells. This chain migration may also be used by other neurons for tangential migration through neural tissue during development.

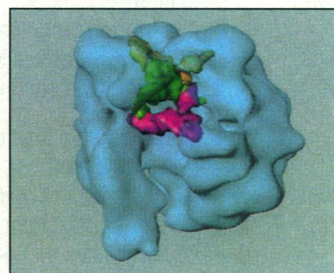
Control of resistance

The response to infection by parasites like *Leishmania major* was thought to be regulated by the production of interleukin-4 (IL-4), which was blamed for generating a nonproductive immune response and preventing the appropriate response from resolving the infection. However, when Noben-Trauth

et al. (p. 987) removed the IL-4 gene from a susceptible mouse strain, the mice did not become resistant, raising the possibility that something else may control the response. Güler *et al.* (p. 984) used an in vitro system and found that susceptibility may hinge on the loss of the susceptible T cell's capacity to generate IL-12, which induces the protective response, rather than on IL-4 inducing the inappropriate response. See also a news story by Marx (p. 912).

Translation operation

The ribosome executes the final step of translation, the conversion of a linear sequence of nucleotides into a linear sequence of



amino acids. Transfer RNA (tRNA) molecules act as intermediaries—on the one hand mirroring the sequence of nucleotides through hydrogen bonding interactions and, on the other, placing covalently bound

amino acids into position to be linked together by the ribosomal machinery. Three ribosomal tRNA-binding sites are known; these correspond roughly to the tRNA carrying the new amino acid to be added, the tRNA carrying the already-linked amino acids, and the exiting tRNA. Agrawal *et al.* (p. 1000) present a three-dimensional cryoelectron microscopy map of how the tRNAs fit within these sites and move through the ribosome.

Quality control

When mistakes are made during protein synthesis the resulting polypeptides are rapidly degraded. Keiler *et al.* (p. 990) report the discovery of a form of quality control for newly synthesized proteins even before their synthesis is complete. In bacteria that were making a protein from a defective messenger RNA, a peptide tag that marked the protein for immediate degradation was added during synthesis. This unprecedented mechanism is discussed in an accompanying Perspective by Jentsch (p. 955).

Poor reception

Mice with *diabetes* mutations and rats with *fatty* mutations are severely obese and usually develop diabetes. This phenotype resembles that of *obese* mice, which are defective in synthesis of leptin, a secreted protein that regulates body fat content. Genetic mapping studies by Chua *et al.* (p. 994; see also news story by Barinaga, p. 913) reveal the molecular logic underlying the phenotypic similarity. Their results suggest that the *diabetes* and *fatty* phenotypes are due to mutations in the newly characterized receptor for leptin, expressed in the brain.