Cloned cows have new lease on life

Biotech researchers have created cloned cows whose cells show no signs of aging, unlike Dolly the sheep and other animals cloned previously [*Science,* **288,** 665 (2000)]. The findings, by Robert P. Lanza, vice president of Advanced Cell Technology (ACT), Worcester, Mass., and coworkers, could lead to rejuvenated cells and tissues for transplantation and other medical applications. As animals age, telomeres (end-caps) on cell chromosomes tend to shorten, decreasing the cells' replicative lifetimes. Dolly and other previously cloned animals were born with shortened telomeres, like those in the mature animals from which their genetic material was obtained. But the cloned cows produced by ACT scientists have telomeres longer than those of normal cows of the same age and in some cases even longer than those of normal newborn calves. The researchers don't yet know exactly which of the methodological differences in the cloning technique they used caused the rejuvenating effect.◀

Inorganic pigments without toxic metals

Inorganic pigments that are devoid of toxic metals and can color glasses, glazes, and ceramics in hues from red to yellow have been developed by researchers in Germany [*Nature,* **404,** 980 (2000)]. Their goal was to find a substitute for the cadmium-based pigments currently in use. These pose a danger at disposal because cadmium, a heavy metal, can enter the environment at waste sites and incinerators. Chemists Martin Jansen at the Max Planck Institute for Solid-State Research, Stuttgart, and Hans-Peter Letschert at Degussa Metals Catalysts Cerdec, Frankfurt, focused their efforts on materials that absorb sharply at discrete wavelengths and "give the best color." Searching among perovskites for suitable candidates, they focused on $CaTaO_2N$ and $LaTaON_2$ and showed that, when pure, these compounds are brilliant red and yellow, respectively. Tailoring the ratio of oxygen to nitrogen yields pigments that range in color from light yellow to dark red. Thermal stability of the new pigments exceeds that of the cadmium sulfoselenides, making them suitable for coloring high-melt plastics. But tantalum will make the new pigments more expensive.◀

A C_{60} superconducting field-effect switch

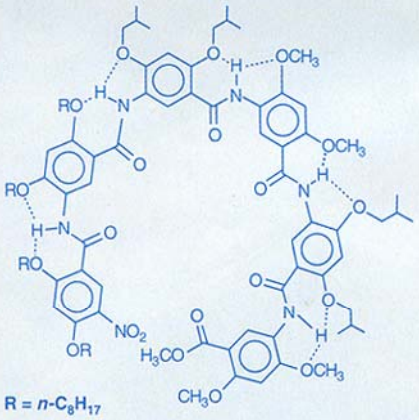
A superconducting field-effect switch with C_{60} as the active material has been reported for the first time by Jan Hendrik Schön, Christian Kloc, and Bertram Batlogg at Lucent Technologies' Bell Labs in Murray Hill, N.J., and Robert C. Haddon, a professor of chemistry and physics at the University of Kentucky, Lexington [*Science,* **288,** 656 (2000)]. Such switches enable a material to flip between superconducting and insulating states, depending on the temperature and the applied voltage. The C_{60}-based switch shows that molecular building blocks can be used to make devices with interesting physics applications, comments John T. McDevitt, a professor of chemistry at the University of Texas, Austin. Ionic materials such as the high-temperature superconducting cuprates, he notes, mechanically are like bricks and would be hard to fashion into useful forms such as wires. Molecular compounds like C_{60}, on the other hand, are more amenable to chemical processing. McDevitt points out that the C_{60}-based switch is superconducting below 11 K and that its robustness has not been tested.◀

Dex-Mtx recipe for linking proteins

Dexamethasone linked to methotrexate by a simple hydrocarbon spacer (Dex-Mtx) is an efficient—and potentially general—inducer of protein dimerization, according to a new report [*J. Am. Chem. Soc.,* **122,** 4247 (2000)]. Many cellular events are triggered by protein dimerization, and molecules that can dimerize proteins in vivo are useful tools for studying cell biology. Called chemical inducers of protein dimerization, or CIDs, these molecules consist of a linker joining two ligands that are specific for particular receptors. Proteins fused to the receptors are joined, or dimerized, when the ligands bind to their receptors. Most CIDs to date are based on the macrolide called FK506 or its analogs. "Because of the utility of CIDs, it is important to develop new CIDs that are easier to manipulate" than the existing ones, says Virginia W. Cornish, an assistant professor of chemistry at Columbia University. She and her coworkers, including MIT biology professor Robert T. Sauer, have shown that Dex-Mtx is not only easier to manipulate, but it also is more than 100 times more effective in a yeast assay than a Dex-FK506 CID. Because any protein could be fused to the receptors of Dex and Mtx—glucocorticoid receptor and dihydrofolate reductase, respectively—Dex-Mtx could be a general CID, she says.◀

Crescent foldamers

A new class of folding oligomers (foldamers) features rigid backbones that adopt a crescent conformation. Based on 2,4-dialkoxy-5-aminobenzoic acid, the foldamers are forced into that conformation by three-center hydrogen bonding between



the backbone amide linkages and the alkoxy substituents on the aromatic rings. When the oligomers are folded, the carbonyl oxygens of the amide bond face the concave side of the crescent and the alkyl groups on the ether side chains face the convex side. The oligomers were prepared by associate professors of chemistry Bing Gong at the University of Toledo, in Ohio, and Xiao Cheng Zeng at the University of Nebraska, Lincoln, and coworkers [*J. Am. Chem. Soc.,* **122,** 4219 (2000)]. The largest oligomer they report is the hexamer shown. "Although it is not a closed ring," Gong says, it adopts a conformation that resembles a crown ether and can bind cations and small molecules. Higher oligomers could lead to new helical foldamers, nanotubes, and nanopores with uniform pore sizes.◀