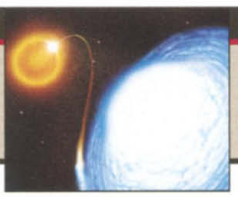
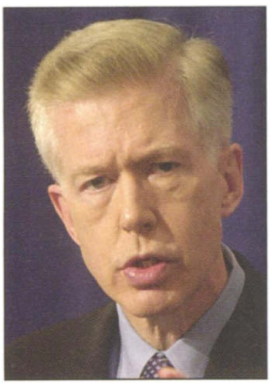


STEM CELL RESEARCH

California Flashes A Green Light



Golden opportunity. California Governor Gray Davis signs stem cell research bill.

On 22 September, California Governor Gray Davis signed the nation's first state law explicitly allowing scientists to derive human embryonic stem cell lines as well as to clone embryos to study and treat diseases in what is known as nuclear transfer research. The measure, sponsored by state Senator Deborah Ortiz (D–Sacramento), "is going to make a huge difference" in directing state resources toward such research and luring scientists to California, says stem cell researcher Irving Weissman of Stanford University, who helped draft the legislation. National regulations currently prohibit the use of federal funds, but not state or private money, for such research.

The measure permits "research involving the derivation and use of human embryonic stem cells, human embryonic germ cells, and human adult stem cells from any source, including somatic cell nuclear transplantation," with regulation by institutional review boards. The bill might also boost the supply of embryos available for research by calling on fertility doctors to inform patients of this option. Davis also signed a second bill making permanent a temporary ban on reproductive cloning.

The nuclear transfer bill does not provide new funds for stem cell research, but an aide to Ortiz says it is expected to "open up" existing state research funding programs by signaling the importance of stem cell research. The national debate has had an "enormously chilling effect" on the research, says Susanne Huttner, associate vice provost for research in the University of California (UC) system and head of the Industry-University Cooperative Research Program. She plans a mailing to alert scientists to the new measure.

The bill's greatest value, says Weissman, is its support for nuclear transfer. "There's a whole area of research that's been sitting there, and people have been afraid to do it," he says. Scientists want to be able to both create a cell line using a nucleus from a cell of a person with a genetically transmitted disease and distribute the cells to other researchers. "Under this law," he notes, "it'll be done in California."

Fittingly enough, UC San Francisco last week sent out its first batch of long-awaited stem cells to nine U.S. investigators. A U.K. shipment is next, says spokesperson Jennifer O'Brien. –CONSTANCE HOLDEN

NEUROSCIENCE

Drug Find Could Give Ravers the Jitters

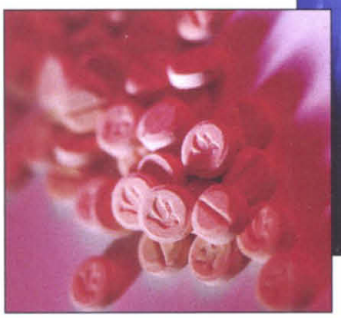
"Ecstasy" is a cruel misnomer for the party drug (±)3,4-methylenedioxymethamphetamine (MDMA). Long known to disrupt neurons that communicate via the neurotransmitter serotonin, the controversial drug now appears to have even more potential for roughing up the dopamine system.

A quintessential social drug, ecstasy heightens sensations, gives a euphoric rush, and creates feelings of warmth and empathy. It ostensibly achieves this effect by causing neurons to spurt huge quantities of serotonin. In the immediate aftermath, the partier is temporarily drained of serotonin, often depressed and unable to concentrate. Some researchers see strong evidence from both brain and behavioral research that permanent brain damage also can result from MDMA use, but others are skeptical and suggest that the drug might be useful for certain types of psychotherapy.

Now George Ricaurte and colleagues at Johns Hopkins University School of Medicine in Baltimore report on page 2260 that ecstasy can cause "profound dopaminergic toxicity," possibly explaining some of the drug's reported negative short- and long-term effects. Researchers administered the equivalent of a heavy party night's worth of MDMA to monkeys. The damage they observed suggests that one all-night "rave" might be enough to induce permanent brain damage and make a person more vulnerable to Parkinson's disease, which is caused by a loss of dopamine-producing neurons.

The researchers injected three doses of MDMA into five monkeys over a period of 9 hours. One monkey died of hyperthermia within hours: Overheating is one of the main side effects of ecstasy. Another grew shaky after the second dose and was not given the third. After 2 weeks, the three other animals were killed and found to have lasting reductions in systems that process serotonin and, even more markedly, dopamine. These neurotransmitters were depleted, and neurons that use them showed damage to their axons, projections that send signals to other cells. The two-dose monkey, killed after 6 weeks, showed similar symptoms. The researchers repeated the regimen with five baboons and, even 8 weeks after exposure, recorded a "profound loss" of markers seen in healthy dopaminergic axons.

Ricaurte says that other studies might have missed such dopamine system damage because they spaced the doses farther apart; protracted MDMA exposure, in contrast, might make dopamine neurons more vulnerable to the drug's toxic effects. The researchers go on to speculate that damage to the dopamine system might be responsible for cognitive deficits, such as memory loss, seen in some MDMA users. They assert that one reason no one has associated MDMA



Rave. Emergency room personnel call the hyperthermic effect of ecstasy (*inset*) "Saturday night fever."

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