Behavior

VIP: 'Very important peptide' in AIDS?

Scientists at the National Institute of Mental Health (NIMH) in Bethesda, Md., recently found a small protein that blocks the AIDS-causing virus, known as human immunodeficiency virus (HIV), at receptor sites on critical T4 immune cells (SN: 12/20&27/86, p.388). The protein, dubbed Peptide T, was isolated from the HIV envelope protein and is being tested on Swedish and U.S. AIDS patients (SN: 6/13/87, p.376).

At a seminar last week, the NIMH investigators described evidence suggesting that Peptide T may protect brain and immune cells by mimicking a naturally occurring peptide – vasoactive intestinal peptide (VIP). The two peptides contain a similar "core" sequence of five amino acids, says one of the researchers, Candace B. Pert, and both appear to attach to T4 receptors in the brain.

In experiments directed by Douglas E. Brenneman, VIP and Peptide T similarly protected mouse neurons in laboratory cultures from dying after exposure to low concentrations of the HIV envelope protein. On their own, significant numbers of the neurons perished at the same concentrations. Three other peptides that act on the brain and are related to VIP offered no protection against the cell destruction inflicted by the AIDS virus, says Brenneman.

Preliminary work suggests that VIP acts at three T4 receptor subtypes, says NIMH's Joanna M. Hill. Peptide T may act at only one of those subtypes, she notes. Furthermore, there are numerous T4 receptors in the cerebellum and basal ganglia, brain structures implicated in the dementia and muscular disorders that often accompany AIDS.

"My working theory, which is still largely speculative," says Hill, "is that much of AIDS dementia and motor dysfunction is caused by HIV envelope protein binding to T4 receptors in the brain and preventing normal VIP functions."

A preliminary clinical trial of five patients in the early stages of AIDS injected with Peptide T for 30 days resulted in all the subjects reporting more energy, says Peter Bridge of NIMH. Skin diseases, such as psoriasis, subsided in three of the patients, as did persistent, watery diarrhea in one subject. But the ability to copy a complex geometric figure from memory was severely impaired in four of the patients, observes Bridge.

Peptide T's usefulness in treating AIDS, and particularly in reversing the loss of concentration and memory, remains unclear, he says. A trial of six patients treated with the protein and six given a placebo is now underway at the University of Southern California in Los Angeles. Subjects have been difficult to recruit, he adds, often because they are unwilling to give up other unconventional AIDS treatments during Peptide T trials.

Facelift for newborn imitation

Within days of birth, can a newborn infant imitate the facial expressions of an adult, such as a happy face, a sad face or a look of surprise? Several recent studies have suggested that newborns are indeed capable of this skill, but a report in the January DEVELOPMENTAL PSYCHOLOGY sounds a note of caution.

Marsha Kaitz of Hebrew University in Jerusalem and her colleagues say that 1- to 2-day-old babies often respond to facial expressions of an adult by opening their mouths or pouting their lips, but do not actually imitate the expressions. The 20 female and six male newborns in their sample were held by a female who modeled a happy, sad and surprised expression on separate trials. Two observers rated the newborns' facial responses. When the model stuck her tongue out, however, the infants usually did so as well. The researchers say this indicates that a motor response associated with breast feeding, such as protuding the tongue, can be triggered by an adult's expression, but voluntary imitation of emotional expressions is not within a newborn's repertoire.

Biomedicine

Gold-filled discovery in transplants

Tissue transplantation may have a shining future – if gold proves to be as precious as recent research on neural transplants suggests. By filling envelopes made of viruses with colloidal gold and fusing them with nerve cells, scientists at the University of South Florida in Tampa have been able to track the migration of transplanted cells and measure their survival.

Used for years as a cell marker, the gelatin-like colloidal gold is easily distinguished by its yellow or bright white appearance through a microscope. Gary W. Arendash and his co-workers took advantage of gold's shining qualities and devised a model system applicable to transplantation science. As reported in the Feb. 5 SCIENCE, the researchers used a known technique to introduce the gold into cells: They mixed gold with a solution of harmless Sendai viruses that had been broken apart by a detergent. Pieces of the viral envelopes spontaneously regrouped as detergent was removed, forming whole envelopes that contained the gold colloid. Made from a virus that avidly fuses to vertebrate cells, the gold-filled Sendai virus envelopes attached to neural cells that were later transplanted into rats.

By scanning transplanted tissue for signs of gold, the scientists were able to follow the migration of transplanted cells through areas of the rats' brains, and to determine that the transplanted cells survived at least three months. Both location and viability are crucial to understanding the fate of nerve-tissue transplants, which have attracted attention and controversy as potential treatments for conditions like Parkinson's disease (SN: 11/28/87, p.341). Arendash said in an interview that it should be possible to similarly label other types of cells used for transplants, and that the gold/Sendai system might settle the debate over whether adrenal cells transplanted into the brain for treating Parkinson's actually survive, or instead release nerve-cell-stimulating factors before their death. Although tissue must be removed when the colloidal gold technique is used, the scientists are now evaluating another marker that is already being used in clinical imaging techniques and that might be engulfed by reforming Sendai virus envelopes – thus providing a way to follow grafts *in vivo*.

Lungs hit harder by pot than by cigarettes

Taking a puff from a marijuana cigarette carries more punch than previously thought, according to study results released last week by the University of California at Los Angeles. By measuring carbon monoxide in the blood and inhaled tar in the lungs of men who had smoked tobacco or marijuana cigarettes, researchers found that a single marijuana cigarette may be as unhealthy as smoking five cigarettes made of tobacco.

In research published last year, the same scientists had concluded that habitual smoking of three or four marijuana cigarettes a day caused the same amount of bronchitis symptoms and lung-cell damage as smoking more than 20 tobacco cigarettes daily. The group reports its more recent findings in the Feb. 11 NEW ENGLAND JOURNAL OF MEDICINE.

Included in the study were 15 men who had smoked both marijuana and tobacco for at least five years. Measurements were taken after they had smoked one or the other type of cigarette, as well as after they had smoked marijuana from which the active ingredient THC had been removed. Carbon monoxide levels, which have been associated with coronary heart disease, were nearly five times higher after marijuana smoking than after tobacco smoking. Marijuana smoking also resulted in three times the amount of tar inhaled and one-third more tar retained in the lungs and respiratory tract. The presence or absence of THC had minimal effects on test results, say the scientists, who attribute the differences to the way marijuana is inhaled more deeply and held in the lungs.