Retinal transplants let rats see the light

Vision researchers have reported the first behavioral evidence that retinal cells transplanted into experimentally blinded animals can restore their ability to sense and respond to light. Another group reports that transplanted retinal cells can make the appropriate connections within an animal's brain.

Although the findings hold out hope for treating currently incurable vision disorders involving the retina — such as retinitis pigmentosa and macular degeneration — the researchers say it could take years to perfect retinal transplants for use in humans. And they caution that it is still unclear whether such transplants could provide even limited vision to blind people with retinal defects.

Manuel del Cerro and his colleagues at the University of Rochester (N.Y.) grafted fetal rat retinal cells into one retina of each of nine rats previously blinded by continuous exposure to bright light. During behavioral tests, the engrafted rats showed a greater ability to detect light than did a control group of nine blinded rats receiving no transplants, del Cerro reported in New Orleans last week at the annual meeting of the Society for Neuroscience.

His group checked for light-sensing ability by measuring how high the rats jumped when startled by a loud noise preceded by a flash of light. The researchers found that the engrafted rats were significantly less startled by the noise than were the control rats. This suggests that the engrafted rats saw the light and learned to brace themselves for the upcoming noise, the Rochester group asserts.

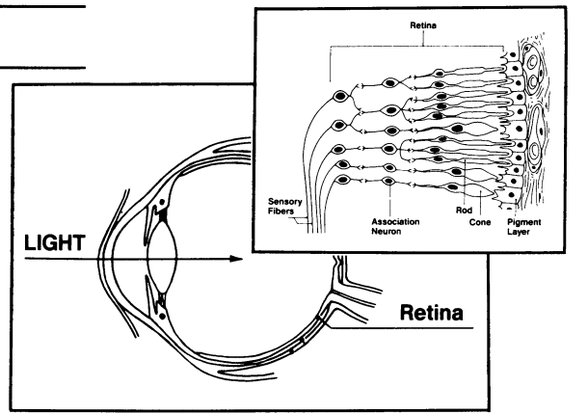
To confirm that hypothesis, del Cerro and his colleagues next transplanted retinal cells into one retina of each of the control rats. The newly engrafted rats became less easily startled, again suggesting that the transplants had restored the ability to detect light.

"This indicates that the grafted [cells] were sensitive to light and made effective [cell-to-cell] contacts within the [eye of the] host," says del Cerro. "It also indicates that the visual information . . . was transmitted to the proper critical regions in [each rat's] brain."

Two years ago, researchers at Washington University in St. Louis reported transplanting gelatin patches containing retinal cells into blinded rats (SN: 11/4/89, p.297). They found that the transplanted cells took up increased quantities of glucose after exposure to light, suggesting that the cells were functioning. But the researchers did not test whether these cells gave the rats the ability to perceive light.

In separate work described at last week's meeting, Raymond D. Lund of the University of Pittsburgh and P.J. Coffey of the University of Sheffield, England, discovered that patches of retinal cells grafted atop the midbrains of rats can grow and connect with brain areas that process and respond to visual stimuli. Lund reports that shining a light on the exposed transplant caused the pupil to constrict as if the eye had sensed the light. Moreover, he says, the rats with retinal transplants in their brains halted their normal activities when he illuminated their cages, although they could not tell the direction of the light.

In a third presentation at the meeting, Albert Aguayo and colleagues at McGill University in Montreal reported the results of using transplanted nerve grafts to guide the regrowth of damaged retinal cells' long, tail-like axons. They had previously found in hamsters that such grafts helped severed retinal axons reconnect to the appropriate brain regions (SN: 10/14/89, p.244). In their new work, they discovered that the regenerated axons formed a normal number of connections with brain cells. — *C. Ezzell*



When light strikes a normal retina, it stimulates an electrical response in the rod and cone cells (inset), which relay visual messages to the brain through sensory fibers (axons).

Suicidal ideas and coping in HIV-positives

Suicidal thoughts reflect a coping effort, rather than anguish and depression, among some homosexual men infected with the AIDS-causing virus (HIV) but displaying no disease symptoms, psychologists suggest in a new report. Data from an ongoing study point to a distinction between "coping-related" and "distress-related" thoughts about killing oneself, the investigators conclude in the November JOURNAL OF PERSONALITY AND SOCIAL PSYCHOLOGY.

Stephen G. Schneider and his coworkers at the University of California, Los Angeles, assert that HIV-positive homosexuals who have recently experienced the AIDS-related illness or death of a partner or friend — and who believe they themselves cannot escape the immune-system disorder — may entertain suicidal thoughts to gain a sense of mastery over the uncontrollable threat posed by AIDS in their own lives. These men report and display relatively little hopelessness, social isolation or other signs of emotional distress, but they often cite suicidal thoughts as a mental tactic to deal with fears of developing AIDS and facing a painful physical deterioration.

In contrast, HIV-negative homosexual men who report suicidal thoughts appear more likely to think of suicide in conjunction with feelings of depression and hopelessness, a distress-related response observed among the general population, the team maintains.

The 778 homosexual and bisexual men in the sample entered the study between August 1987 and October 1988. Most were white, college-educated and integrated into the homosexual community of Los Angeles. None had AIDS at the time; 170 of the men knew their HIV status.

A total of 212 participants reported having had suicidal thoughts — such as "I thought life was not worth living" or "I had some thoughts of killing myself" — during the six months preceding the study, although they had not actually attempted suicide. Of these 212 men, 100 carried HIV.

Surprisingly, HIV-positive men with lower levels of the white blood cells used as markers of immune-system deterioration did not report more pronounced suicidal thoughts than did HIV-positives with healthier cell counts. Instead, the researchers found that loneliness and a lack of support from close friends in the past were associated with suicidal thinking among the infected volunteers. This suggests that counselors working with HIV-positive homosexual men should look for long-standing tendencies to withdraw or experience depression in the face of severe stress, Schneider and his coworkers contend.

Mental health workers might also target younger HIV-positive men, who often face the threat of illness or death with less psychological preparation than their older counterparts, the researchers point out. They found that depression increased among older HIV-negatives — a trend that holds among men in general — and among younger HIV-positives.

For now, the results apply only to HIV-positive homosexual and bisexual men with no signs of AIDS, the investigators caution. Suicidal thoughts that help people cope with grave threats remain largely unexplored, they say. — *B. Bower*