
Vaccine, interferon battle eye herpes

Herpes simplex virus can attack the eyes as well as the genitals and skin—in fact, it is the most common infection of the eye. Ocular herpes hits about 500,000 people in the United States each year. The virus scars the clear tissue over the eye, and while most initial bouts are mild, the damage from recurring infection may cause blindness in one eye in as many as 54,000 people annually in the United States, estimates Arden Wander of the University of Cincinnati.

While there are treatments for active outbreaks, the ability to prevent those outbreaks has so far eluded researchers. Wander is working on a vaccine against ocular herpes, one of two approaches against the infection discussed at last week's Research to Prevent Blindness seminar in Washington, D.C. Gilbert Smolin of the University of California at San Francisco (UCSF) described preliminary success using interferon.

Antitherpes vaccines are tricky, notes Wander. Disabled herpesviruses used to provoke immunity against their virulent kin can hide in nerve cells much as the active virus does, and if the immune system of someone inoculated with such a virus is later injured by illness or drugs, the virus can become active. Killed herpesvirus is risky because in animal trials, the virus's genetic material has caused cancer.

So Wander and H. Curt Bubel are trying an early product of the virus—one of the first proteins it makes after getting into the cell—as an immunity provoker.

Three days after inoculating guinea pigs' eyes with herpes, Wander found that all the nonvaccinated animals showed evidence of the virus, compared with only one of 10 vaccinated animals.

In a separate study to determine whether the virus would establish itself in a latent state, the researchers found dormant herpesvirus in 65 percent of the nonvaccinated animals 85 days after infection, but not in any of the vaccinated animals, although all the animals suffered initial outbreaks. The immune systems of the vaccinated guinea pigs evidently destroyed the virus, in essence curing them, Wander says. In addition, the initial herpes outbreak in the vaccinated animals "caused less damage and was of shorter duration," says Wander, who was "extremely encouraged" by the results.

"It shows spectacular promise in that it ameliorates the infection, there is less virus being produced and it prevents latent infection," he says. But, he notes, "We certainly have a long way to go."

Smolin's approach at UCSF exploits the antiviral properties of the immune system protein interferon to limit the virus's recurrence. He was able to limit the shedding of herpesvirus to only 30 percent of

infected rabbits treated with interferon, while 78 percent of those that did not receive interferon exhibited shedding.

"Our regimen may provide a safe and reliable means of significantly diminishing this recurrent viral shedding and subsequent clinical disease after a trigger stimulus," he says. —*J. Silberman*

Low vitamin A linked to deaths

"Mild" vitamin A deficiency, which causes dry eyes, may have a more serious sequela—death.

The lethal effect of severe vitamin A deficiency has long been known. "But the effect of a mild vitamin A deficiency on mortality has been overlooked," Alfred Sommer of Johns Hopkins University in Baltimore said at the Research to Prevent Blindness seminar. Sommer directed a study of children in Indonesia that was originally intended to determine the incidence of vitamin A-related eye problems.

An initial one-and-a-half-year study of 4,000 Indonesian children showed, "quite unexpectedly," Sommer notes, a mortality increase in apparently well-nourished children with mild vitamin A deficiency. In a follow-up study of 30,000 Indonesian children completed just last month, children in half of a group of paired villages were given a two-cent capsule containing 200,000 units of vitamin A and received a second supplement after six months. The mortality rate was 30 percent lower in children who received the supplements.

Five million to 10 million children in the world have xerophthalmia (dry eye caused by insufficient vitamin A). Sommer estimates that mild vitamin A deficiency could account for 20 to 30 percent of all childhood deaths in developing countries where the deficiency is endemic.

Says Clinton Chichester of the Nutrition Foundation in Washington, D.C., "Mild vitamin A deficiency is significant, there's no doubt about that. But the number has yet to be precisely determined."

With low vitamin A levels, the covering of the eye stops producing mucus and the top layer dries out, forming a scaly, skin-like tissue (see p. 236). The same sort of change occurs in the gastrointestinal tract and the lungs, and Sommer found that children with the mild deficiency were three to four times more likely to develop lung or digestive problems.

"We think the high mortality is because of the increased risk of respiratory disease and diarrhea," says Sommer. "Our hope for the future is that intervention programs will be markedly expanded and will have a definite and large impact on childhood mortality in general."

The practice of fortifying staples such as dried milk with vitamin A has prevented the problem in more developed countries, Sommer notes. —*J. Silberman*

Soviets return after 237+ days

Three Soviet cosmonauts landed on earth last week after spending nearly eight months in orbit aboard the Salyut 7 space station. Leonid Kizim, Vladimir Solovyov and Oleg Atkov touched down on Oct. 2, the 238th day of their mission, having substantially raised the 211-day record set by two other cosmonauts in 1982. The U.S. mark was the 84-day mission of the third crew of Skylab astronauts in 1973-74.

U.S. and Soviet planners are both working toward "permanent occupancy" of space, and although that evocative phrase is not necessarily meant to describe individual human beings, it does imply lengthy stays in weightlessness and the other environmental conditions of life in orbit. Bone decalcification, weight loss and reduction in muscle tone have all been noted following extended space flights, and ways to combat them are being studied by U.S. and Soviet researchers.

Back on earth following his stay aboard Salyut 7, cosmonaut Atkov noted this week that he felt "like someone standing up for the first time after an illness." When he and his fellow cosmonauts were presented to the press, television cameras showed them seated on stretchers, propped up to face reporters. During the mission, all three spacemen had performed exercises to minimize muscle atrophy and other symptoms of prolonged weightlessness.

There have been numerous U.S. studies of space flight reactions, but because the really long-baseline data have resulted from Soviet missions, some U.S. biomedical researchers (as well as those in other fields) have been hoping for a re-signing of the U.S.-Soviet agreement on nonmilitary space cooperation, which was allowed to lapse in 1982 by President Reagan.

When the agreement was still in effect, said Massachusetts Institute of Technology professor Bernard F. Burke at a recent congressional hearing on the matter, "the highlight of the life sciences work was probably the long-duration flight data that the Soviets could provide from their extended space flight missions." Proceedings of a Congressional Office of Technology Assessment workshop in May noted that some data in the life sciences have been exchanged since the agreement expired, but, for example, "NASA is still awaiting the results of biomedical studies conducted aboard [the] 211-day Salyut 7 mission, concluded in December 1982. Scientists in the field report that the *quality* of interchanges, personal as well as scientific, has not declined since the agreement expired, but the overall *amount* of activity is declining steadily as previous arrangements are concluded." Thus, the closer U.S. space station plans come to reality, the more relevant the Soviet data may appear. —*J. Eberhart*