

Chimp test for oral hepatitis B vaccine

Oral vaccination for hepatitis B has moved one step closer to human trials. Two years ago, virologists made a vaccine of viruses genetically engineered to carry parts of the hepatitis B virus (SN: 7/18/87, p.39) and showed it could immunize hamsters against the disease. Now, scientists at the same laboratory have successfully immunized chimpanzees, with their human-like immune systems, using a similar vaccine in a gelatin capsule.

An oral hepatitis B vaccine could cost less, hurt less and store better than the three-shot regimen of current vaccines for the disease. The virus, spread through blood and sexual contact, can cause liver diseases. It currently infects about 300 million people worldwide.

With their colleagues, Michael D. Lubeck of Wyeth-Ayerst Research in Philadelphia and Robert H. Purcell at the National Institute of Allergy and Infectious Diseases in Bethesda, Md., attached the major surface antigen of the hepatitis B virus to adenoviruses, which normally infect human lungs but can also grow in the gut. The team fed the still-viable viruses to three chimps.

The type 4 and 7 adenoviruses used in the study can cause acute respiratory disease if inhaled. But growing in the gut, they induce immunity rather than illness. The U.S. military has used oral vaccines to immunize millions of soldiers against adenovirus, achieving a safety record that makes adenoviruses good vaccine candidates, the researchers say.

Eight weeks after vaccination, the team experimentally infected all three vaccinated chimps and one unvaccinated control chimp with hepatitis B virus. Two chimps that developed some antibodies to hepatitis B virus successfully fought off infection. The third vaccinated chimp developed no antibodies and contracted the disease, as did the control chimp.

The study represents the first report of a virus-carried vaccine stimulating hepatitis B antibodies in chimps, says virologist Bernard N. Fields of Harvard University Medical School in Boston. Moreover, it demonstrates for the first time that chimps can be infected with adenoviruses 4 and 7, Purcell and his colleagues assert in the September PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Vol.86, No.17). And because adenoviruses normally infect humans rather than chimps, Fields and Purcell say the vaccine might stimulate a stronger antibody response in people.

"This may be the last step before clinical trials because this also constitutes a safety test of the recombinant carrier in what I think is a relevant animal model system," Purcell says. — S. Hart

Down payment for collider construction

By next summer, a wide swath of land surrounding Waxahachie, Tex., should see new activity as construction of the most expensive physics experiment ever — the Superconducting Super Collider (SSC) — begins. Congress last week approved \$225 million in funding for the project during fiscal year 1990, including \$135 million for initial construction expenses. President Bush is expected to sign the appropriations bill.

Approval of funding for construction, after several years of delay, brought sighs of relief from SSC supporters. But the project still faces a number of uncertainties. One concern centers on the SSC's ultimate cost, which could escalate well beyond the \$4.8 billion to \$6 billion now proposed. The Department of Energy, which is responsible for the project, is presently reevaluating the entire scheme to come up with a revised cost estimate and schedule.

Moreover, in spite of U.S. invitations, the project has attracted minimal financial support from other countries. Members of Congress, while welcoming foreign participation, have expressed concern about losing technology to competitors, thereby putting the United States at an economic disadvantage. "The SSC is an American project,"

Deputy Secretary of Energy W. Henson Moore stated last June. "The SSC project will ensure that America stays in the forefront of innovation and technological progress."

Construction of the SSC also presents its share of technical challenges, especially designing and manufacturing the thousands of giant superconducting magnets required to keep proton beams in line and tightly focused. In a recent report to the director of the SSC Laboratory, now located in Dallas, a review panel outlined a number of problems with the prototype magnets. However, SSC scientists and engineers believe they can overcome these difficulties. Minor design modifications would neither unduly delay the project nor substantially increase its cost, they say.

"It's an ambitious undertaking but one that is entirely doable," says SSC Laboratory spokesman Russ Wylie. "What we are seeing are the normal kinds of issues that come up in any engineering project, and they are to be expected."

SSC officials are now putting together a panel to select the project's architect, engineer and construction management firm, in preparation for the start of tunnel construction. — I. Peterson

U.S. youth gaining weight, losing stamina

In the age of Nintendo and nachos, kids may be choosing activities that engage the brain rather than the body. A new study, based on a physical fitness test administered at schools across the United States, shows a decline in students' cardiovascular endurance and an increase in their weight.

Study director Wynn F. Updyke of Indiana University at Bloomington described the unpublished results last week at a press conference in Washington, D.C. The ongoing testing, sponsored by the Chrysler Corporation Fund and the Amateur Athletic Union, involves an estimated 9.7 million of the 46 million U.S. schoolchildren. Updyke compared student performance from 1980 to 1989 on four tests of strength, endurance and flexibility.

Students older than 10 now take about a minute longer to run a mile, a decline possibly due to a 3.6- to 8.3-pound weight gain during the decade. While Updyke says the gain doesn't stem from height changes, his data do not reveal whether the extra pounds come from fat. But the 1985 and 1987 phases of the National Children and Youth Fitness Study do show U.S. kids getting fatter, says that study's author, James G. Ross of Macro Systems Inc. in Silver Spring, Md.

The good news from Updyke's analysis is that students in all categories improved their performance in sit-ups. On average, girls can also sustain a flexed arm hang longer, and boys in most categories can do more pull-ups.

Despite such upswings, Updyke maintains that kids are becoming more sedentary. "We are essentially cave-age, stone-age bodies attempting to cope in the space-age culture," he says.

Ross contends the survey results may not accurately reflect the fitness level of U.S. youth. He notes that Updyke drew his sample from schools voluntarily participating in the fitness program rather than from the total school population. Ross agrees, however, that cardiovascular fitness is declining.

Updyke's analysis also shows a decline in the proportion of students achieving "attainment" (average) or "outstanding" test ratings. Charles B. Corbin at Arizona State University in Tempe, president of the American Academy of Physical Education, says that decline may reflect discouragement among average or poor athletes. He says he has just completed research showing that top honors in standardized fitness tests tend to go to the same students who win other athletic prizes. — D.E. Loupe