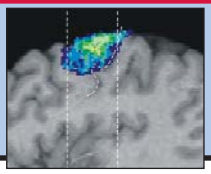


ny's statistical analyses relied on the most generous interpretations of the results, but he went on to describe in detail several immunologic and virologic hints that the vaccine might have worked in some people.

Preliminary data show, for example, that women and black men had higher levels of anti-HIV antibodies than the white men in the study. That, Berman said, might help explain their lower infection rates. In addition, molecular analysis of the HIV strains that infected people who had been vaccinated indicated that they differed substantially from the one used to make the vaccine, suggesting that the vaccine did not stop divergent strains but may have protected against similar strains. "The data won't go away," said Berman. The company hopes to report results later this year from another large efficacy study of its vaccine now underway in Thailand.

Most researchers were not impressed, however. A leading critic of the VaxGen vaccine, John Moore of Cornell University's Weill Medical College in New York City, had a cutting, if understated, reaction to Berman's talk: "It was boring in many respects."

There was a bright spot on the AIDS vaccine front, though: The Franco-German company Aventis Pasteur and Merck & Co. of Whitehouse Station, New Jersey, announced that they plan to launch studies that combine their AIDS vaccines.

As Merck's Emilio Emini explained at the Banff meeting, tests with monkeys show that combining the two companies' vaccines in a one-two punch may work better than any of the strategies the companies are testing separately in human trials. "We were driven by the data," says Emini, who heads Merck's HIV vaccine program in West Point, Pennsylvania.

Merck and Aventis Pasteur have both developed AIDS vaccines that stitch HIV genes into harmless viruses. Emini reported that, in monkey studies pitting various combinations of vaccines against each other, Merck's adenovirus-based HIV vaccine chased with a booster dose of the Aventis canarypox/HIV vaccine led to some of the strongest immune responses observed. Human trials of the Merck vaccine followed by the Aventis preparation are awaiting U.S. regulatory approval and could start in the next few months.

AIDS vaccine researcher Norman Letvin of Beth Israel Deaconess Medical Center in Boston says there are "very good data" that pox viruses such as canarypox can give a powerful boost to so-called killer cells, immune warriors that selectively target and destroy cells infected with HIV and other invaders. The proposed clinical trial of the two vaccines is "an experiment that begs to be done," he says. **–JON COHEN**

EVOLUTION

Colorful Males Flaunt Their Health

From flies to birds to people, males tell potential mates, "I'm the best." Their boasts come in many forms, from colorful body parts to heartfelt serenades. The most flamboyant or melodic suitors are females' favorites, but evolutionary biologists have often wondered exactly why. On pages 103 and 125, two research teams show that in some birds, a female's attraction to a brighter bill ensures her a healthy mate.

In one study, Jonathan Blount, an evolutionary biologist at the University of Glasgow, U.K., and colleagues manipulated the amount of pigments called carotenoids in the diets of zebra finches and then tested the birds' immune responses. Carotenoid supplements meant brighter bills and healthier birds, they report. Conversely, a team led by evolutionary biologist Bruno Faivre of the University of Burgundy in Dijon, France, found that blackbirds whose immune systems are under stress have duller bills.

"The [two] studies are important and complementary," says Joseph Waas of the University of Waikato, New Zealand. Together they provide experimental evidence that bill color is a true indicator of the male's fitness because carotenoids help boost the immune system.

Scientists have known for almost 30 years that carotenoids are linked to immunity. Parasite infections can lower carotenoid concentrations in the blood, and studies in humans have suggested that eating more carotenoids—carrots and other vegetables are chock-full of them—can reduce the risk of some chronic diseases. At the same time, ecologists have found that these pigments are important for animals' mating displays: They provide the color for vivid feathers and beaks that females find sexy.

In the past decades, researchers have tied these two lines of research together. Marlene Zuk, an evolutionary biologist at the University of California, Riverside, and her colleagues suggested that extraordinary sexual displays—feathers, crests, and so on—might indicate how well a male copes with disease and parasitic infections. And in 1994, George Lozano, a freelance evolutionary biologist living in Ottawa, Canada, proposed that when the immune system is under pressure, those display colors dim, which would make sick males less desirable.

To test this theory, Blount and his colleagues manipulated the amount of carotenoids in 10 pairs of zebra finch brothers. One of each pair received water fortified with carotenoids; the other drank plain water. Within a month, carotenoid supplements turned bills much redder, the researchers report. And females preferred these males to their drab siblings.

Carotenoid supplements also boosted the birds' immunity. When the researchers injected the finches with a protein that causes swelling, those with the reddest beaks had more ▶

Sex appeal. Females adore blackbird males with bright bills, which signal vigorous immune systems.

CREDIT: ROGER WILMSHURST/PHOTO RESEARCHERS

carotenoids in their blood and the strongest immune response. The implication: When females opt for the colorful male, they are selecting a mate with a strong immune system. "The characteristics that females really pay attention to are things that reflect the [male's] day-to-day well-being," explains Zuk.

In their experiments, Faivre and his colleagues followed the fate of carotenoids over time. They measured the amount of carotenoids in the bills of about 50 blackbirds. Then they injected sheep red blood cells into all but 15 birds. The treated birds reacted to the foreign cells by mounting a strong immune response. As they did, the amount of carotenoids in the bills—and the intensity of bill color—dropped, Faivre reports. "When the animal gets infected, the carotenoids are mobilized and used to fight off infection," says Lozano.

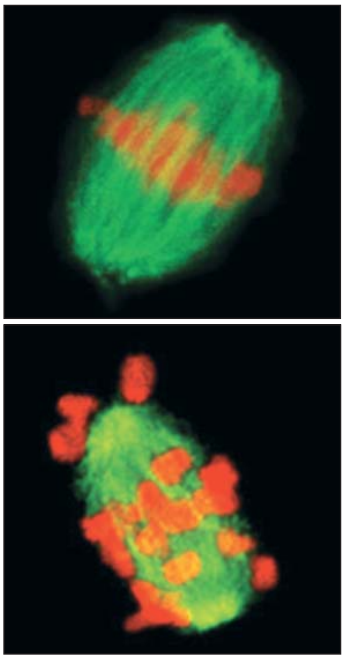
Beak color may thus be a truer reflection of a male's current health than feathers, which can't release carotenoids and change color only during molting. When bright-billed males claim they're the best, females are therefore right to listen.

–ELIZABETH PENNISI

ENDOCRINE DISRUPTERS

Lab Accident Reveals Potential Health Risks of Common Compound

In August 1998, geneticist Patricia Hunt noticed a bizarre change in the eggs of the female mice she was studying. For some inexplicable reason, the chromosomes in 40% of the eggs looked abnormal—a wild jump from the 1% to 2% abnormality her lab typically observes. Something seemed to have gone terribly wrong with meiosis, the process that separates chromosomes during reproduction so that when egg and sperm come together, they each contribute half the genetic material to an embryo. Hunt, whose lab at Case Western Reserve University in Cleveland, Ohio, specializes in problems with meiosis—which in humans causes more birth defects, mental retardation, and miscarriage than any other factor—had her lab workers redo the study twice, yielding the same baffling results each time.



Meiotic mess. Chromosomes (red) should neatly line up on spindle (green), but BPA wreaks havoc (*bottom*) in mouse eggs.

CREDIT: P. A. HUNT *ET AL.*, *CURRENT BIOLOGY* **13**, 546 (2003)

The first clue came that fall, when Hunt noticed that her mouse cages, made of a plastic called polycarbonate, appeared to be melting. She found that a lab worker had mistakenly washed the cages with a highly alkaline detergent. "He was a temporary worker who made a lasting impression," Hunt says. Hunt, Terry Hassold, and their colleagues eventually pinned the meiotic abnormalities on a chemical called bisphenol A (BPA) leaching from the damaged plastic. Although several labs have shown that BPA, a compound widely used in plastics manufacturing, can disrupt the reproductive system of rodents, none had previously shown an effect on meiosis.

The detective work, described in a paper in the 1 April issue of *Current Biology*, has thrust Hunt's lab into the middle of the controversial field of endocrine disrupters. Some researchers and environmentalists have argued that low levels of certain synthetic chemicals in the environment are causing reproductive problems in wildlife and perhaps humans. BPA, which weakly mimics the effects of estrogen has been among the suspects.

Researchers from diverse disciplines say the work deserves serious attention. "It's fascinating," says Charles Epstein, a developmental biologist at the University of California, San Francisco, who studies chromosomal imbalances in mice. Even Stephen Safe of Texas A&M University in College Station, a leading skeptic of evidence linking endocrine disruptors to health problems, says, "I think their data are very interesting." Leading proponents of BPA's harmful effects predictably have stronger words: "I look at this as a watershed paper," says reproductive biologist Frederick vom Saal of the University of Missouri, Columbia, whose lab has published several studies of BPA's impact on mouse reproductive development.

Hunt and co-workers first noticed prob- ▶

ScienceScope

HHS Softens Conflicts Guidance

The federal government has softened the tone of draft guidance for curbing conflicts of interest in clinical trails. The Department of Health and Human Services (HHS) this week released the reworked statement after biomedical groups complained that an earlier draft went too far.

The new guidance stems from the death 4 years ago of a volunteer in a gene therapy trial in which an investigator and the university had a financial interest. Biomedical researchers and university groups said HHS's first draft, released 2 years ago, was too specific in its conflict disclosure recommendations, particularly for institutional conflicts (*Science*, 16 March 2001, p. 2060).

The new draft recasts previous guidance into "points for consideration" by investigators, ethics review boards, and institutions. The draft includes suggestions that universities separate financial and research decision-making and that they define for themselves what constitutes institutional conflict.

The document mirrors reports from two task forces co-organized by the Association of American Medical Colleges, notes AAMC's David Korn, a former Stanford University dean: "We are very pleased." But some patient groups say mandatory rules are needed. Vera Hassner Sharav of the Alliance for Human Research Protection calls the new draft "a smokescreen" for inaction. HHS will collect comments until 30 May.

–JOCELYN KAISER

Reinventing the AIDS Vaccine Enterprise?

A coalition of prominent researchers is hatching a bold proposal to create a $5 billion fund to coordinate the hunt for an AIDS vaccine. "What we're doing in AIDS vaccine research is not systematic enough," says one person familiar with the discussions of the group, which includes Nobel laureate and former National Institutes of Health (NIH) director Harold Varmus; Rick Klausner and Helene Gayle of the Bill and Melinda Gates Foundation; and Larry Corey, a researcher at Seattle's Fred Hutchinson Cancer Research Center who heads the NIH-funded HIV Vaccine Trials Network.

The new organization would need up to $5 billion, sources say, and could receive substantial funding from the Gates Foundation if the idea flies. To drum up discussion, the group soon hopes to publish an outline of the idea. –JON COHEN