

New pertussis vaccines safer, more effective

The ritual of fretful parents fussing over feverish infants after childhood vaccinations may soon be history. Two studies demonstrate that a new generation of whooping cough (pertussis) vaccines is both safer and more effective than the vaccine now used in the United States.

In studies of 15,000 infants in Italy and 10,000 infants in Sweden, the new pertussis vaccines provided better protection and caused fewer and milder side effects. "This is truly an effective vaccine," announced Anthony S. Fauci at a press conference in Bethesda, Md., last week. Fauci is director of the National Institute of Allergy and Infectious Diseases, which cosponsored the vaccine trials. The U.S. Public Health Service hopes to expedite approval of the new vaccines, perhaps in 6 months.

Pertussis is an extremely contagious respiratory infection caused by the bacterium *Bordetella pertussis*. It causes violent spells of coughing, vomiting, and inability to breathe. Gasping for breath between coughing spells creates the "whooping" sound characteristic of the disease. Pertussis may lead to pneumonia and neurological damage.

Worldwide, more than 50 million people contract pertussis every year, and more than 350,000 die—primarily infants. In the United States, mandatory vaccination at 2, 4, 6, and 18 months, with a booster at age 4 to 6, has lowered the number of infections from 160,000 in 1947 to fewer than 5,000 in 1994.

But pertussis vaccination carries some risk. Current vaccines used in the

United States contain whole, but inactive, bacteria that cause fever, swelling, fussiness, and—very rarely—neurological damage (SN: 7/30/88, p.72). For this reason, some countries, including Italy and Sweden, don't require a pertussis vaccination.

The new vaccines remove these risks. Referred to as acellular vaccines, they include only the bacterial proteins needed to stimulate protection against pertussis. Two acellular vaccines are available in the United States, but only for children who are at least a year old.

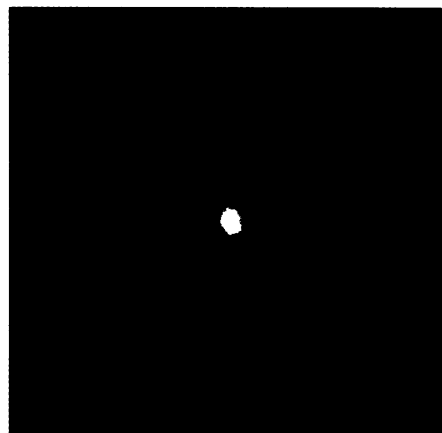
The international team of researchers tested acellular vaccines in infants during pertussis epidemics in Italy and Sweden. Children in both studies got vaccines at 2, 4, and 6 months.

In the Swedish study, infants received a five-component or a two-component acellular vaccine, the standard whole-cell vaccine, or no vaccine. The five-component acellular vaccine gave 85 percent protection, while the two-component vaccine gave 58 percent protection. The Italian study tested two kinds of three-component acellular vaccines against the standard vaccine or no vaccine. Both acellular vaccines offered 84 percent protection.

Surprisingly, the whole-cell vaccine offered no better than 48 percent protection. Fauci speculates that it performed poorly because the trials omitted boosters.

Until the acellular vaccines make it to the U.S. market, Fauci advises parents to continue with the standard immunization schedule. —L. Seachrist

ASCA sheds light on galaxy formation



Mushotzky/ROSAT

X-ray image of the cluster Abell 2199. Yellow denotes highest intensity.

They have the spherical shape of ordinary galaxy clusters and radiate X rays and visible light at the expected intensity. In fact, the four groupings of galaxies recently observed with the Japanese X-ray satellite ASCA probably are ordinary clusters—which is precisely what intrigues Michael Loewenstein and Richard F. Mushotzky.

Shortly after its 1993 launch, ASCA recorded X rays from the hot gas swaddling four galaxy clusters that lie within a few hundred million light-years of the Milky Way. For the first time, astronomers could closely examine X-ray emissions from two elements—silicon and oxygen—that provide a fossil record of ancient starbirth. Analysis of these data now reveals that the four clusters—Abell 496, Abell 1060, Abell 2199, and AWM7—contain enormous amounts of silicon and oxygen.

Only massive stars can forge these elements. When such stars explode as type II supernovas, they hurl silicon and oxygen into space, enriching the intracluster medium. The abundance of the two elements indicates that the clusters' assortment of galaxies contained in the distant past an unusually high proportion of massive stars, creating a hotbed of violence, assert Loewenstein and Mushotzky of NASA's Goddard Space Flight Center in Greenbelt, Md.

These supernovas, energetic and numerous, ejected from their home galaxies as much visible mass as remains in the galaxies today, the astronomers estimate. And if these galactic groupings resemble others in the universe, then many apparently sedate clusters suffered similarly violent pasts, Loewenstein and Mushotzky reported last month at a meeting of the Astronomical Society of the Pacific in College Park, Md.

Since the 1970s, several craft have found that clusters contain substantial amounts of heavy elements. But nearly all have relied on X-ray emissions from

Galileo launches probe toward Jupiter

After a 6-year piggyback ride, the probe on the Galileo spacecraft successfully separated from the mother ship on July 13 and began the 51-million-mile journey to Jupiter.

The probe's plunge into Jupiter's atmosphere 5 months from now might look something like this artist's conception. Protected from the heat by a shield, the cone-shaped probe will hit the atmosphere at 106,000 miles per hour and float down on a parachute.

Seven instruments will scrutinize Jupiter's roiling atmosphere, measuring its chemical composition and recording lightning, winds, and cloud properties. The probe will beam its data up to the mother ship for 75 minutes

before it vaporizes. Originally, the project team planned that Galileo would relay the probe's data back to Earth in real time. But because the spacecraft's main antenna failed to open, the data must be saved on a tape recorder for gradual playback over the smaller, low-gain antenna. —C. Wu



NASA