The response was best after the booster shot, but signs of immunity were already present 2 weeks after the first injection, Gambotto says.

What’s more, when the scientists took blood from each monkey and exposed the sample to live SARS virus in a lab dish, the antibodies and T cells neutralized the virus. Gambotto and his colleagues now intend to test the vaccine in ferrets exposed to SARS virus. Ferrets are more susceptible to the disease than rhesus macaques are. Several groups are working on SARS vaccines. Gambotto predicts that one or more of these vaccines could reach large human trials within a year or two, especially if more outbreaks warrant an expedited approach.—N.S.

**ASTRONOMY**

**X-ray images highlight galaxy collisions**

Viewed in visible light, the elliptical galaxy NGC 4261 looks positively sedate. But a new X-ray image reveals evidence of a violent past—a trail more than 50 light-years across and rife with black holes and neutron stars. The trail indicates that the galaxy collided with another galaxy a few billion years ago, says Lars Hernquist of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass.

He and his colleagues say that the image, recorded by NASA’s Chandra X-ray Observatory, suggests that X-ray studies may be the best way to identify ancient collisions between galaxies. The researchers report their findings in an upcoming *Astrophysical Journal Letters.*

**HIDDEN STRUCTURE**

X-ray image of the galaxy NGC 4261 reveals a trail of black holes and neutron stars (dots) that can’t be seen in visible light.

The black holes and neutron stars are strung out along the outskirts of the galaxy, which lies 100 million light-years from Earth. These strong X-ray emitters appear to have formed following the demise of a smaller galaxy that was pulled apart as it fell into NGC 4261. The stars formed from the compression of gas in the collision’s aftermath. The ancient collisions fit a model in which the large, elliptical galaxies seen today were formed by the merger of relatively small spiral galaxies in the distant past.—R.C.

**ENVIRONMENT**

**When testosterone gets down and dirty**

Testosterone, the primary male sex hormone, or androgen, migrates in the environment in ways that could pose a threat to water quality, according to three new reports.

Soil physicist Francis X.M. Casey of North Dakota State University in Fargo and his colleagues have found that, despite their expectations, soil bacteria don’t necessarily trap and degrade testosterone. The scientists put testosterone atop 8-centimeter-high columns of rich Midwestern soil and then moved water through the dirt. Intact testosterone exited the bottom of the columns, indicating that substantial amounts of the hormone evaded bacterial degradation.

The result was a surprise for two reasons, says Casey. First, the researchers had found that the female hormone estrogen mostly breaks down under the same conditions. Second, the team’s preliminary experiments in test tubes had indicated that testosterone strongly attaches to soil particles and can be degraded.

“Testosterone migration through the soil exists as a potential danger to . . . water quality,” the scientists conclude in an upcoming issue of *Environmental Science & Technology.*

Their findings may help explain observations in a paper to appear in a forthcoming *Environmental Health Perspectives* by Ana M. Soto of the Tufts University School of Medicine in Boston and her colleagues. Those researchers confirm androgenic activity—and, to a lesser extent, estrogenic activity—in Nebraska rivers downstream of cattle feedlots (SN: 1/5/02, p. 10).

As environmental pollutants, even tiny concentrations of hormones can wreak havoc. Indeed, another paper slated to appear in *Environmental Health Perspectives* finds defeminization and demasculinization of fish in those Nebraska waters. Soto, Edward F. Orlando of St. Mary’s College of Maryland in St. Mary’s City, and their colleagues attribute these effects to androgens or a combination of androgens and estrogens.—J.R.