Promising new prion research. The June 3rd issue of Science reported that research conducted by the National Institutes of Health suggests that brain damage caused by transmissible spongiform encephalopathy (TSE) infections would be lessened if the resulting abnormal prions could be prevented from interacting with brain cells. Prions are naturally occurring proteins found in the brains of healthy humans and animals. When a human or animal contracts a TSE — such as mad cow disease in bovines, Creutzfeldt-Jakob disease in humans, and scrapie in sheep — prions begin to twist into abnormal shapes and form clumps that kill brain cells, producing symptoms including dementia and leading to certain death.

NIH researchers, led by virologist Dr. Bruce Chesebro, bred genetically altered mice that did not have the fatty bond that allows prions to attach to brain cells. The team subsequently infected 128 of the altered mice and 70 unaltered mice with a form of scrapie, modified to infect rodents.

Although the unaltered mice sickened and died within the expected time period, the altered mice did not develop the typical symptoms and have survived for almost two years, far longer than the unaltered mice. When the researchers examined the brains of the altered mice, they discovered that the prions had mutated in a different manner than that normally associated with the disease and had not attached themselves to brain cells. In fact, the malformed prion patterns appeared similar to those found in Alzheimer’s patients.

Whereas scientists studying the treatment of prion diseases currently concentrate on preventing the accumulation of malformed prions, the NIH’s findings suggest that treatment research might be better directed at preventing prion clusters from binding to brain cells.

Rapid results lead to higher HIV testing rates. Nonprofit AIDS organizations in Atlanta, GA, are attributing a significant rise in HIV testing to their use of the rapid oral test OraQuick. News of increased numbers seeking HIV testing is encouraging at a time when HIV cases in the United States are at their highest numbers since the 1980s.

The CDC reported at its 2005 National HIV Prevention Conference in June that more than 1 million Americans are HIV-positive and one-quarter of them do not know they have the virus. Experts estimate that most new HIV infections are contracted from people who are not aware of their HIV-positive status.

Recently, the Atlanta Journal Constitution reported that the number of people seeking HIV testing at the nonprofit AID Atlanta had doubled since the agency began using OraQuick last fall. AID Atlanta and other similar organizations in the city credit the increase in testing to the ease with which samples can be obtained — mouth swabs are used instead of blood draws — and the speed with which results are returned.

Because traditional HIV tests can require up to two weeks to obtain results, the anxiety associated with such a wait often prevents individuals either from getting tested in the first place or from returning to obtain their results. The OraQuick test works by detecting antibodies to the AIDS virus and returns a result in 20 minutes. In the case of a positive result, a second test called OraSure is administered and sent to a lab for confirmation.

Global disease

Potential Marburg and Ebola vaccines. A team of scientists from the Public Health Agency of Canada in Winnipeg, Manitoba, and the U.S. Army Medical Research Institute of Infectious Diseases in Fort Detrick, MD, reported in the June online issue of Nature Medicine that it has developed Marburg and Ebola vaccines that prevented macaque monkeys from contracting the viruses when exposed. Six macaques were vaccinated against Marburg, and six were vaccinated against Ebola; a month later, four monkeys from each group were given large doses of the virus against which they had been immunized. These viruses typically cause most of their victims to bleed to death within a few days of exposure; however, the immunized monkeys showed no signs of illness or contagiousness after being infected. Two macaques from each group were exposed to the virus for which they were not inoculated; these monkeys did not survive.

The Ebola vaccine is not the first to successfully protect monkeys, but the Marburg vaccine produced by the Canadian and U.S. team is the first of its kind to prove effective in nonhuman primates. Because monkeys and humans typically experience the same symptoms when infected with these viruses, the study’s results are encouraging for the future of vaccinations for both humans and animals; it could take up to six years to thoroughly test the safety and effectiveness of the vaccines.

The hemorrhagic fevers produced by the Ebola and Marburg viruses are particularly devastating because they transmit easily to loved ones and healthcare workers who tend to the sick. Currently, there is no treatment for either disease. Angola is currently experiencing the world’s largest recorded outbreak of the Marburg virus, with more than 400 cases since January.