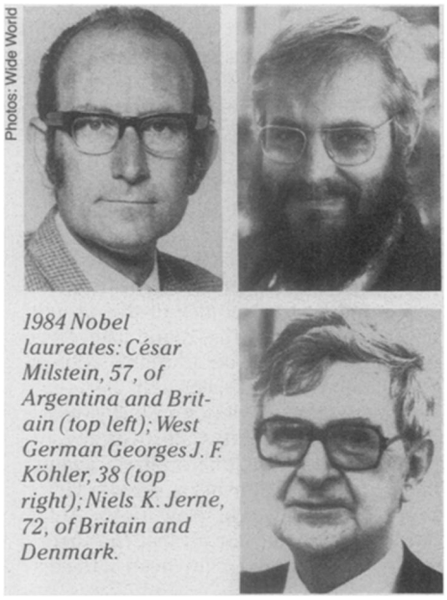
Nobel Prize to three in immunology

For major contributions to the theory and techniques of modern immunology, three researchers share the 1984 Nobel Prize in physiology or medicine. Niels K. Jerne of the Basel (Switzerland) Institute of Immunology has described some of the basic workings of the immune system, while César Milstein of the Medical Research Council Laboratory of Molecular Biology in Cambridge, England, and Georges J. F. Köhler, also of the Basel Institute, developed the monoclonal antibody technology that has advanced both basic and applied biomedical research.

The Nobel assembly of the Karolinska Institute in Stockholm announced the $193,000 award this week. The assembly cited Jerne for the "visionary way [he has] elucidated essential questions concerning specificity, development and regulation of the immune response."

The body's main immune response is



Photos: Wide World

1984 Nobel laureates: César Milstein, 57, of Argentina and Britain (top left); West German Georges J. F. Köhler, 38 (top right); Niels K. Jerne, 72, of Britain and Denmark.

the production of antibodies that adhere to and inactivate foreign substances such as bacteria, viruses and foreign cells. In 1955 Jerne proposed that the body contains all the antibody variety it will ever need, before it is challenged with any immune system-provoking substances, called antigens. This view replaced the prevailing dogma that an antibody is created only once an antigen is encountered.

Immunologist Michael Potter of the National Institutes of Health in Bethesda, Md., says the theory has been modified to become "the cornerstone or the basis for understanding modern cellular immunology." In the early '70s, Jerne formulated two other theories explaining how the immune system develops and is regulated. "Jerne has done a lifetime of work and he has been a major contributor in the field of immunology," Potter told SCIENCE NEWS.

Milstein and Köhler received the award for their collaborative original research on monoclonal antibodies at Cambridge in 1975 (SN: 12/23 & 30/78, p. 444). They developed the technique that produces the pure antibody of one specificity ("monoclonal") in their investigation of antibody structure. The unpatented method has been one of the foundations of the biotechnology industry that manufactures vaccines, hormones, drugs and diagnostic tests (SN: 5/7/83, p. 296). Monoclonal antibodies are also used to study the detail of molecule and cell surfaces, and are a potential tool for the treatment of cancer and other diseases.

Milstein and Köhler discovered that an immune system cell could be made to continuously grow, divide and produce its specific antibody by fusing it with a special tumor cell. They found that cells of the tumor called a myeloma were similar enough to fuse with the normal immune system cell but produced no antibody of their own.

"The monoclonal antibody technology has literally revolutionized the field of immunology because it made it possible to obtain antibodies in pure form and in unlimited amounts," says Potter, who developed the line of myeloma cells that was modified for Milstein and Köhler's work. "It has essentially tapped into the entire library of antibodies that the mammalian system generates. I would rank it as one of the most important experiments that's ever been done in immunology."

—C. Mlot

Heavy ions at 15 GeV

The Alternating Gradient Synchrotron (AGS) at Brookhaven National Laboratory in Upton, N.Y., was the world's most powerful proton accelerator when it was dedicated more than 20 years ago. Its 30 billion electron-volts (30 GeV) top energy represented an advance that accelerator builders had deemed impossible just a few years before. Today the large synchrotron at the Fermi National Accelerator Laboratory in Batavia, Ill., can accelerate protons to energies almost 30 times as great. Now, the AGS is about to become the world's most energetic accelerator of *heavy ions*.

On Oct. 17 Brookhaven held a ground-breaking ceremony to initiate construction of the Tandem/AGS Heavy Ion Project. The $10.3 million project will link the existing Tandem Van de Graaff accelerator and the AGS through a 2,000-foot beam transport tunnel. The Tandem will strip atoms of their electrons and preaccelerate the resulting ions. The AGS will finish the job. The combination will accelerate ions to energies as high as 15 GeV per neutron and proton in their nuclei. Completion is expected by 1986.

At present the world's most energetic heavy-ion accelerator is the Bevalac at the Lawrence Berkeley Laboratory in Berkeley, Calif., which can accelerate ions to 1 GeV per neutron and proton. However, the Bevalac accelerates all ions up to uranium, the heaviest natural element. The heaviest ions in the Tandem/AGS will be sulfur. Experimentation with heavy ions has already found the strange, highly reactive fragments of nuclei known as anomalons (SN: 6/30/84, p. 405) as well as hints of the existence of a quark-gluon plasma, a state in which protons and neutrons lose their identities and only quarks and the gluons that hold them together remain (SN: 7/16/83, p. 39).

—D. E. Thomsen

Law for Babies Doe

President Reagan signed into law last week a measure that redefines child abuse and neglect to include the "withholding of medically indicated treatment from disabled infants with life-threatening conditions," and clearly places responsibility for monitoring such abuse within state-run agencies rather than federal committees.

The new provision in H.R. 1904, which closely follows the wording of a U.S. Senate proposal devised last summer (SN: 7/14/84, p. 25), was prompted by the 1982 case of "Baby Doe," a severely handicapped Indiana infant whose medical treatment was denied with the approval of parents and state courts. The child died several days after birth, but the case launched a nationwide debate about how decisions should be made in treating such infants.

The eventual law, endorsed by 20 national organizations including representatives of hospitals, physicians and the disabled, emerged as a compromise agreement on the issue, and cites several exceptions in which heroic, lifesaving measures might legally be withheld from a child.

Spokespersons for the Association for Retarded Citizens and the American Academy of Pediatrics told SCIENCE NEWS they thought the law a fair compromise, while the American Medical Association continues to maintain that the legislation permits the government to intrude in the parents' decisions about their child's treatment.

Legal debate on the issue could continue, depending on what sorts of regulations the Department of Health and Human Services (HHS) now devises to implement the law. HHS has 90 days to draw up such regulations and submit them for public comment, and must publish the final regulations within the next six months.

—D. Franklin