Nobel Prizes: Seven in '77

Medicine: Spotlight on hormones

Guillemin, Schally, Yalow: Mapping and measuring hormones.

This year's Nobel Prize in Physiology or Medicine has been awarded to a woman and two men for their "formidable development" of the protein hormone research field. They are Rosalyn S. Yalow of the Veterans Administration Hospital in the Bronx, N.Y., Andrew V. Schally of the Veterans Administration Hospital in New Orleans and Roger C.L. Guillemin of the Salk Institute in La Jolla, Calif.

Yalow, a physicist, has been awarded half of the $145,000 prize for her role in the development of radioimmunoassay, a technique that has revolutionized the measurement of protein hormones in the body (SN: 8/12/72, p.108). The test "was accomplished by a spectacular combination of immunology, isotope research, mathematics and physics," the Nobel committee stated.

The technique involves combining a hormone in the body with its antibody, which results in a competition between the two substances. Then a small amount of a radioactive form of the hormone is introduced. By measuring how much of that radioactive form survives the competition with the antibody, one can tell how much of the natural hormone was present in the body to begin with.

Radioimmunoassay is so incredibly sensitive that it can measure hormones in amounts as small as a billionth of a gram. It is helping physicians diagnose conditions that previously escaped detection because established methods were too crude to measure the seemingly small changes in the quantities of hormones that can affect a person's health. For instance, RIA has revealed that adult diabetics, unlike diabetic children, do not have an insulin deficiency in their bodies, but have a still unexplained inability to use insulin to control their blood sugar level.

RIA can also detect minute amounts of enzymes, drugs and other substances in the body and has benefited many areas of medicine, including forensic medicine (crime detection).

Schally and Guillemin are sharing the other half of the $145,000 prize for their discovery that the pituitary gland of the brain really isn't the master hormone gland of the brain and body after all—rather, it is under the control of protein hormones secreted by the nearby hypothalamus.

In 1969 Guillemin's preliminary findings in this area were rejected by a leading science journal after a referee implied that hypothalamic hormones were probably imaginary. Since that time, however, not only have hypothalamic hormones been identified and isolated but they have even been synthesized by Schally, Guillemin and others. These hormones offer valuable treatments for growth problems (SN: 5/6/72, p.302; 5/4/74, p.286) as well as innovative approaches to birth control (SN: 11/6/71, p.310; 2/10/73, p.93; 3/12/77, p.170). Some of these hormones, Guillemin and others are finding, also influence mental states and behaviors and show promise as drugs for schizophrenia, Parkinson's disease and other conditions (SN: 9/25/76, p.202; 10/30/76, p.281).

Like many other Physiology or Medicine Nobel Prize winners, Yalow, Schally and Guillemin are previous recipients of the Lasker award, America's highest medical research citation (SN: 12/11/76, p.375; 11/22/75, p.327). Yalow is also the second woman to receive a Nobel Price in Physiology or Medicine and the sixth woman to win a Nobel Price in science. □

Physics: Magnetics and electronics of solids

Van Vleck, Anderson, Mott: Solid achievements in electronics and magnetism.

You can stick it in your ear. At least you can do that with some of the results of the work done by three scientists jointly awarded the 1977 Nobel Prize for Physics. Two Americans, J. H. Van Vleck of Harvard University and Philip W. Anderson of Bell Telephone Laboratories and Princeton University, and a Briton, Sir Neville Mott of Cambridge University, share the honor.

The three were honored for work in solid state physics that lies at the foundation of many of the technological developments of recent years. Their work involved various aspects of the magnetic behavior and electronic transport properties of solids. Both the magnetic qualities and the electron transport, which determines whether a given solid is an electrical conductor, insulator or semiconductor, must be understood in order to use the substance in electronic circuitry. The kind of work involved is exemplified by two pieces from Anderson's repertoire: the study of why certain atoms such as iron are magnetic when dissolved in nonmagnetic metals while others that might be expected to be magnetic are not, and a study of electron transport in materials with disordered structure. The latter study leads to an understanding of electrical conductivity in disordered materials. Anderson learned, for example, how electrons can be located or pinned down in a material like glass, rendering it an electrical insulator, but be free to move in other disordered materials, making them conductors. Previous theoretical work had given no explanation of electrical conductivity or the lack of it in amorphous materials, because the explanations up to that time had been based on the regularity of atomic order in the materials considered.

The official citation calls all three laureates theorists, but that designation is not so precise in solid state physics, a field that has a propensity for attracting practical minded people. Mott is especially famous for his ability to see possible uses for things, and that ability is credited with an important contribu-