life sciences

LITHIUM

Psychiatric drug deforms mice

Lithium is a controversial psychiatric drug espoused by some physicians and dismissed by others in treatment of manic and other psychotic disorders. In the past, lithium salts have been shown to deform unborn amphibians and chicks, but not rats or mice.

Mice now have been shown to be sensitive to lithium too. Dr. K. T. Szabo of the Smith Kline & French Laboratories in Philadelphia studied the effects of lithium carbonate on the offspring of a randomly bred strain of mice with a low natural incidence of malformations. Pregnant mice were dosed with lithium carbonate in various doses for 10 consecutive days, he reports in the Jan. 3 NATURE.

Says Dr. Szabo, "With a dose producing a serum lithium level comparable with that of the human therapeutic dose, cleft palate was induced." In various experiments, the deformity was seen in about 25 percent of treated animals and in none of the controls. No other types of defects were observed.

REPRODUCTIVE PHYSIOLOGY

Hormone role in egg implantation

When pregnant rats are treated with atropine, a neurodepressive drug, no later than the third day of pregnancy, implantation of a fertilized egg is delayed, says Dr. James S. Schlough of Wisconsin State University at Whitewater. Subsequent administration of gonadotropins, hormones vital to the implantation process, overcomes the atropine effect, he reports in the December BIOLOGY OF REPRODUCTION.

The finding that hormone administration reverses the effects of the atropine suggests that implantation failure can be attributed to insufficient natural levels of gonadotropins. Atropine, Dr. Schlough speculates, interferes with the central nervous system's stimulation of the glands that release the hormones, thus indicating a direct role for the nervous system in implantation.

IMMUNOLOGY

Enzyme levels in fetus

Though all of an individual's genes are present at conception, their expression does not occur immediately. To understand the processes of prenatal human development, scientists are interested in the time at which various tissue, organs and biochemicals take form and begin to function.

Synthesis of immunoglobins and complement, both protein components of the immune system, is known to begin in the fetus during the second half of gestation. Three British scientists now report on the prenatal synthesis of another component of the body's defense system: the enzyme lysozyme that destroys the walls of bacterial cells.

Dr. A. A. Glynn of the Wright-Flemming Institute of Microbiology, with Drs. W. Martin and M. Adinolfi of Guy's Hospital Medical School, all in London, compared lysozyme levels in sera taken from mothers and infants at birth and found greater enzyme levels in the newborns than in their mothers. This, they report in the Jan. 3 NATURE, indicated that the antibacterial enzyme is synthesized before birth and not merely transferred from mother to child.

Subsequently they measured lysozyme levels in 42 fetuses aborted by natural or therapeutic means. They found the enzyme present in 40 percent of fetuses between 9 and 12 weeks old and in 86 percent of those between 21 and 24 weeks old, showing that its synthesis begins early during gestation. Lysozyme apparently plays an important part in the resistance to infection before and immediately after birth.

GENETICS

Detection of inborn errors

Identification of persons carrying genes for various metabolic disorders is becoming of increasing concern to physicians involved in genetic counseling. Tests, however, are complicated, costly and often too specific for routine screening. They are usually employed only when there is some obvious reason to suspect that a couple's offspring may be born with a defect.

In the Dec. 26 SCIENCE, five investigators report a comparatively inexpensive, quick and simple test method that may prove useful in screening for a range of familial disorders. Already it has been shown to be efficient in identifying carriers of Pompe's disease, in which metabolic errors prevent normal patterns of glycogen storage, and in another enzyme disorder, acid phosphatase deficiency.

In the laboratory, lymphocytes from the prospective parents are mixed with phytohemagglutinin, a mucoprotein that causes them to change shape, stimulates enzyme synthesis and then triggers cell division. By measuring levels of enzymes in this system, scientists can determine normal and abnormal patterns. The test system was developed by Drs. Kurt Hirschhorn, Rochelle Hirschhorn and William Waithe of the Mount Sinai School of Medicine in New York; Dr. Henry Nadler of Northwestern University School of Medicine and Dr. Barbara Brown of Washington University School of Medicine in St. Louis.

PLANT GENETICS

Breeding healthy white pines

White pine blister rust is chronically epidemic on stands of white pines in north temperate climates, causing extensive economic loss and, in some cases, threatening the regeneration of the species itself.

The best approach, according to California researchers Dr. Bohun Kinloch of the U.S. Department of Agriculture in Berkeley and Drs. Gaylord Parks and Carl Fowler of the Eldorado National Forest in Placerville, is genetic breeding for resistance. In experiments with susceptible trees and those showing natural resistance, they have found that resistance is under the control of single genes that are easily inherited.

"We report one, if not the first, instance of an effective and simply inherited factor for the resistance to a major forest disease in a commercially important species," they say in the Jan. 9 SCIENCE.