

Medical Genetics

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a congenital malformation syndrome in shi tzus. The pups have abnormal heads, large livers, and malformations of the rear legs. Most are still-born or die very early. We don't know as yet why the malformations occur or how the condition is inherited."

As diagnostic techniques become more sophisticated, the number of genetic diseases discovered will increase. Dr. Patterson pointed out that when pregnant animals are exposed to environmental agents called teratogens, the offspring may have congenital defects that resemble genetically determined abnormalities. Teratogens include radiation and certain chemicals. For example, it is known that ewes which eat the plant *veratrum* during a particular stage of pregnancy will give birth to cyclopians lambs. ● One of the more common forms of sexual anomalies can be due to exposure of the fetus to androgenic steroids. Sometimes it is difficult to determine whether a defect is primarily genetic in origin or is due to environmental teratogens. In these cases, research into the structure of the chromosome, the pedigrees of the affected animals, and specialized biochemical tests may provide the answer.

The researchers in the Section are also studying chromosomal abnormalities. The cytogenetics laboratory has defined the normal Giesma banding pattern of dog chromosomes, and this has aided in the identification and characterization of hereditary defects in the sexual development found in American cocker spaniels and miniature schnauzers. These and other defects in the development of the reproductive tract are being studied by Dr. Vicki Meyers-Wallen and other members of the Section of Medical Genetics.

Dr. Meyers-Wallen is investigating sex reversal in cocker spaniels and Persistent Mullerian Duct Syndrome in miniature schnauzers. A cocker spaniel with the disorder looks like an abnormal male or a female, having undescended testes or ovotestes (a combination of ovary and testes) and a vulva-like structure. The chromosome constitution of such dogs is like that of a female: 78,XX. Miniature schnauzers with Persistent Mullerian Duct Syndrome appear like normal males, though they are cryptorchid. Internally these animals have a uterus. Their chromosome constitution is 78,XY and rarely 79,XXY.

In normal development the testes of the embryo produces Mullerian inhibiting substance (MIS), which inhibits the development of a uterus or oviducts in a male fetus. It is thought that these defects are a result of MIS deficiency or refractory response to MIS by Mullerian structures (oviducts and uterus) during embryonic development.

Dr. Meyers-Wallen is studying whether the Mullerian duct persistence is associated with deficiency of MIS or whether the gene mutations responsible for these two defects in Mullerian duct regression are autosomal or



Dr. Peter F. Jezyk examines a chromatogram.

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x-linked. Sex reversal has been described in other animals and humans. So far, the miniature schnauzer is the only model described that closely resembles the Persistent Mullerian Duct Syndrome in humans. Investigation of these problems in dogs will lead to a better understanding of the disorder and may lead to methods of prevention in humans and dogs.

In 1983 the Inherited Eye Disease Studies Unit (IEDSU) was established within the Section of Medical Genetics. "This is a clinic devoted to inherited eye disorders in all animal species," said Dr. Gustavo D. Aguirre, associate

professor of ophthalmology and head of the IEDSU.

The unit provides clinical examinations and genetic counseling pertaining to eye disorders. Dr. Aguirre and his colleagues have developed diagnostic methods through which dogs with inherited eye disorders can be identified early in life. "The ophthalmological manifestations of these diseases vary from breed to breed," Dr. Aguirre said. "Many do not become evident through ophthalmic examination until later in life. ● Often the animal has already been used for breeding." By means of an electroretinogram (ERG), the researchers at the School can detect PRA in certain breeds long before the disease can be detected by ophthalmologic exam. Thus the animals can be screened prior to becoming part of a breeding program. "Many of the eye diseases are inherited recessively," said Dr. Aguirre. "Some animals are carriers and when two such dogs are mated, some of the offspring will show the disease, some will be carriers, and some will be genetically normal." Studies have shown that PRA is not one disease but a distinct entity for each breed. The PRA studies have implications not only for dogs but also for humans. It appears that PRA is similar to retinitis pigmentosa.

In addition to the eye clinic, the Section of Medical Genetics also offers clinics in pediatrics, reproduction and genetic problems. "In our pediatric clinic we see not only young animals for routine examination but also animals with severe problems," said Dr. Jezyk. "Many of the genetic diseases do not manifest themselves until the animal is over six months old." If an animal is identified as having genetic disease, often counseling with the breeder takes place to determine where the disorder originated. "We do pedigree analysis," said Dr. Jezyk. "● Often we can identify a carrier and then can advise the breeder about steps to take to eliminate the disorder from the breeding program." Recently the National Institutes of Health designated the Section of Medical Genetics as the National Referral Center for Animal Models of Human Genetic Disease.

Many of the genetic diseases found in companion animals provide valuable models for these same diseases in humans. Through their research, the members of the Section of Medical Genetics not only help to unravel the mysteries of the causes and control of genetic diseases in animals, but also find new ways, in many cases, of approaching genetic diseases in man. H. W.

Donation by the Kennel Club of Philadelphia

William L. Kendrick, president of the Kennel Club of Philadelphia, announced a \$12,000 donation to the University of Pennsylvania School of Veterinary Medicine. "We greatly appreciate this generous donation by the Kennel Club of Philadelphia," said Dean Robert R. Marshak. "It will enable us to help relieve the financial distress of some of our students, as \$6,000 will be placed in the scholarship fund to be used for student financial aid. The balance will be utilized to purchase a gastroduodenoscope and an observerscope, instruments much needed for the diagnosis and study of gastrointestinal diseases."

This gift by the Kennel Club of Philadelphia represents the largest contribution ever received by the School from an all-breed club.

GME Seminar

Granulomatous meningo-encephalitis (GME) will be the topic of a lecture series on May 25, 1986, in Washington, D.C. The lectures, part of the neurology program held under the auspices of the American College of Veterinary Internal Medicine Fourth Annual Forum, are being organized by Dr. Sheldon Steinberg, who is also chairman of the neurology meeting. "Mr. Gilbert Kahn, through the Charing Cross Research Fund, is supporting research into various aspects of GME," said Dr. Steinberg. "He has provided funds which enable us to assemble leading researchers into this disorder for the session in Washington."

The four speakers will be Dr. John T. McGrath, professor of pathology at the University of Pennsylvania School of Veterinary Medicine; Dr. Kyle G. Braund, Scott-Ritchey Laboratories, Auburn University; Dr. Robert J.

Higgins, Department of Veterinary Medical Pathology, School of Veterinary Medicine, University of California, Davis; Dr. Mark Vandevelde, Institute for Comparative Neurology, University of Berne, Switzerland.

Funding for Agricultural Research

The School of Veterinary Medicine has received a grant totalling \$87,750 to fund four research projects at New Bolton Center. The funded projects are as follows:

- Economic Data Envelopment Analysis of Veterinary and Nutritional Services to Dairy Herds
- Serological Identification of Swine Herds with Trichonosis by ELISA, as a Basis for Control
- Shipping Fever in Feeder Calves
- Reproductive Failure in the Pig