10-1-1982

The Study of Reproductive Problems
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Reproductive problems are common to purebred dogs, and, to some extent, to cats. They are costly and frustrating and may end a breeding program. Cures and remedies are few because information is scarce. "There is a great deal of basic research necessary to solve these problems," explained Vicki Meyers, V.M.D., instructor in genetics, pediatrics, and reproduction at the School of Veterinary Medicine of the University of Pennsylvania, "much work needs to be done, much more information needs to be collected."

To help breeders solve reproductive problems of their breeding stock, and to gather information, the section of medical genetics established a weekly clinic in genetics, pediatrics, and reproductive problems. Here, Dr. Meyers and others counsel dog and cat owners and, together with referring veterinarians, seek solutions to the puzzle of infertility and reproductive problems in the animals.

"Infertility can have many causes. We look at the animal, check its history, and review the breeding management. Often things can be straightened out by changing the latter. We approach reproductive problems in the same manner as it would be approached in human or large animal medicine." Breeding management is particularly important in dogs because bitches are fertile only for a brief period every six to ten months. "That problem does not exist in cats, who are very efficient breeders and cycle frequently," said Dr. Meyers. "Also cats are not as varied as dogs: you do not have the tremendous number of breeds. As a consequence few cats with reproductive problems are presented at the clinic. We would like to see more to study them and to gather information."

Breeding management for dogs includes close monitoring of the heat cycle through vaginal smears to observe the cell changes which occur prior to estrus. "It's not difficult to prepare and read the slides; all it takes is some practice and a small microscope. It need not be a fancy one, it can be a children's microscope," she explained. Another aid in breeding dogs is artificial insemination. "The owner can handle that also. The equipment is easily available. I have been teaching breeders how to do it and hope that they in turn will show others. To do artificial insemination here takes too much time and, therefore, is quite costly."

Proper breeding management also requires that a bitch be bred several times over a period of days once the slides indicate that estrus is present. If natural breedings are not possible, then artificial inseminations should be done. The object is to get the animal in whelp. She recommends that vaginal slides be read throughout the heat cycle to establish the day of ovulation retrospectively and to predict the whelping date. Dr. Meyers stated that the change in breeding management in most cases resulted in litters. She did point out that even though breedings are done at the proper time, twenty to thirty percent of normal bitches do not whelp litters. Dogs, unlike people, do not abort early in pregnancy, instead, the fetuses are resorbed. "When we open the uterus we find resorption sites. We do not know why this occurs, most likely something was wrong with the fetus," she explained. Bitches sometimes abort later in pregnancy, usually due to infectious disease, such as brucella. Cats abort more frequently due to a herpes-type infection against which the animal can be protected through vaccination.

Slides are not the only monitoring devices utilized to eliminate reproductive problems. Some brood bitches are followed more closely through blood samples taken throughout the heat cycle and diestrus to determine hormonal values and to analyze these retrospectively. "We know, for example, that the blood progesterone level rises in a bitch in diestrus, whether she is in whelp or not," Dr. Meyers explained. "We also know that it drops two months after ovulation. We don't know though what causes the bitch to go into labor; the drop in progesterone alone does not initiate it." In one study of research, dogs' progesterone levels are not only measured through blood samples but also through samples taken directly from the ovaries and the uterus of the pregnant female. "We want to find out whether the ovaries alone produce the hormone or whether the placenta also make it."
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Additional information about normal hormonal values and their function is important to help in determining whether you have found the cause of a reproductive problem. For example, it has been shown that uterine infections are common after misplacing shots given to bitches which were accidentally bred.

Most uterine infections though are caused by bacteria. "When a bitch is in season it is very possible for bacteria, which are normally present in the vaginal tract, to make their way into the uterus. It's just a matter of chance," Dr. Meyers explained. He stated that during the breeding season the bacteria can multiply undisturbed and produce symptoms of pregnancy. It has been found that uterine cell changes occurring during diestrus, such as an increase in uterine gland, creates an ideal environment for bacterial growth. It is postulated that older bitches are more susceptible to uterine gland changes which increase with each heat cycle. Progesterone often does not manifest itself for several weeks. Once symptoms are evident, swift action has to be taken. In the past bitches with pyometra were spayed. Now such drastic treatment is no longer the only alternative.

Dr. Meyers and his colleagues have devised a regimen which eliminates infection and maintains the breeding capacity of the animal. The treatment differs from others in that a uterine biopsy and culture are taken to identify the bacteria infecting the uterus. "Doing a vaginal culture only will not provide the answer because there are so many bacteria there normally," he said. During the biopsy surgery the uterus is examined, and the ovaries are checked and palpated. These examinations enable the clinicians to make a definite diagnosis of infection and other problems and help to ascertain the extent of damage to the uterus. The data aid in finding out whether reproductive capacity can be restored in a severely damaged uterus.

Bitches are treated with small doses of prostaglandin F2 alpha for three days. Dr. Meyers explained that the dosage for a bitch has to be carefully calculated because dogs are very sensitive to the drug. Cats are more tolerant and can be given higher doses. Prostaglandin F2 alpha causes the uterus to contract and expel the purulent material.

The veterinarians also measure plasma progesterone levels and white blood cell counts before, during, and after treatment. Since progesterone levels are normally low during diestrus when the disease appears, it is thought that a reduction in these levels may be helpful in preventing a relapse. It has been found that prostaglandin F2 alpha can reduce progesterone production by the ovaries during late diestrus.

So far ten bitches have been treated at VHUP. The oldest was six years old, though treatment is usually reserved for the young bitches that a breeder wishes to retain for his program. A number of the treated animals have whelped normal litters; none has had to be spayed to date. The largest litter was by a mastiff which recently whelped fifteen puppies.

"The typical story goes something like this: the dog produced three pups and then suddenly ceased to produce. We find that there are very few sperm, and in most cases there is no history of disease. Extensive tests and examinations reveal no causes for the absence of sperm," Dr. Meyers feels that a testicular biopsy is important to rule out that infertility is caused by infection or autoimmune disease. She pointed out that infertility in some beagles is due to immune mediated orchitis and thyroiditis and that the tendency for it is inherited.

Low thyroid function, according to Dr. Meyers, presently has not been found to be a major cause of reproductive failure. "People find that the T4 is low, they supplement, but they do other things, so who is to say whether results are due to the thyroid supplement alone," she said. "To get the picture as to whether the thyroid is functioning properly, a thyroid stimulation test has to be done. We have not found low thyroid function in the infertile dogs we have treated here. She added that women with low thyroid function conceive but frequently miscarriages; but whether this occurs in bitches is not known. "There really is no clear picture of the effects of low thyroid hormone production on the reproduction of dogs."

Other hormones play a role in male reproduction and one researcher. Dr. Vicki Schenke of the dermatology department, is collecting data about testosterone levels in males. She is trying to define the normal levels of the hormone in males given of age and size, and is measuring the blood values of many dogs to obtain these vital data.

Dr. Meyers work does not end when the bitch or cat is in whelp. Often she and her colleagues are called upon when problems develop during pregnancy or birth. Much of this is done by telephone. By working closely with referring veterinarians, Dr. Meyers and her colleagues help breeders realize the goal of a litter of healthy, lively puppies or kittens.

The mechanisms of reproduction and birth still pose many questions. Answers to these will only come through more research. Dr. Meyers sums it up this way: "The more we see, the more we learn, and the more we can help."