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## Coming to the Ryan Veterinary Hospital in January: Hemodialysis

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by Susan I. Finkelstein

Life-saving kidney dialysis treatment, known as hemodialysis, will be possible, beginning in January 2004, for ailing dogs and cats at the Matthew J. Ryan Veterinary Hospital—thanks to the pioneering efforts of **Dr. Reid P. Groman**, staff veterinarian in emergency and critical care medicine. Previously, Ryan veterinarians would refer approximately two patients each month to the Animal Medical Center in New York City—a process often repeated for each animal three times a week—but such a trip was not feasible, of course, when animals needed immediate attention, particularly after ingesting antifreeze. In addition to the referrals, Ryan hospital receptionists reported fielding several calls every week from pet owners inquiring if dialysis was available here. So, indeed, Dr. Groman anticipates a case-load that is more than ample to support the endeavor.

Among the thousands of companion animals treated every year at the Ryan Hospital are more than 400 cats and dogs experiencing acute kidney failure due to antifreeze poisoning, infection, trauma, inherited kidney diseases, and infectious nephritis. Although about 40 cats a year successfully receive kidney transplants at the Hospital, factors such as patient instability, donor unavailability, and transplantation reactions (in dogs, especially) limit treatment for most other patients to conservative medical management, with an annual mortality rate of 33 percent.

Ninety percent of the animals that manage to survive acute kidney failure from antifreeze poisoning—even after receiving aggressive medical treatment—die within a year, according to Ryan Hospital data. Since dialysis removes the toxin, as opposed to medical therapy that only blocks the conversion of the antifreeze to other toxic metabolites, pets brought in to Ryan immediately following antifreeze ingestion face a more favorable prognosis once they receive the dialysis that is now available to them. In fact, the potential for recovery and long-term survival for animals

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In hemodialysis, an artificial kidney removes waste products, or uremic toxins, from the blood that the kidney normally filters and excretes on its own. The animal's blood is drawn from its body and circulated through the dialysis machine, where it passes through a membrane that serves as an artificial kidney by removing many of the toxins; the "filtered" blood then returns to the animal's body.

Typical treatments last about four or five hours (as long as ten hours for some intoxications), and usually occur two or three times per week for several weeks to several months.

Patients rarely require sedation for the procedure. They are kept on a soft, warm "bed" and fitted with a harness that permits them to stand up and move, but will not permit them to jump off the table and pull out their catheter. Set-up requires about one hour per patient, including patient assessment, evaluating the catheter and catheter site, formulating the prescription, and so forth.

Dr. Groman anticipates that companion animal patients will most commonly

receive hemodialysis for ingestion of antifreeze and other toxins, such as ibuprofen and easter lilies, and infectious diseases, most notably leptospirosis (a bacterial disease that attacks the liver and/or kidneys in dogs) and pyelonephritis (kidney inflammation caused by a bacterial infection, which can occur in both cats and dogs). In addition, cats awaiting kidney transplantation but that are too ill to be anesthetized and withstand the surgery will be eligible to receive dialysis treatment so that they may be "conditioned" or "stabilized" for transplantation.

"Many critically ill animals develop acute renal failure during their hospitalization here and elsewhere. These may be dialysis candidates, too," says Dr. Groman.



**Sam presented to the Emergency Service in early November with a one-day history of anorexia, and was diagnosed with acute renal failure. He was suffering from a resistant urinary tract infection and blocked ureters. In addition to receiving 10 dialysis treatments, Sam had surgery to successfully remove the blockage. Sam is presently doing well at home, and has no residual signs of kidney disease at this time.**

**When Sam received his treatment, the dialysis room featured a temporary set-up. Right now the room is being renovated to install the treatment tables and other equipment in a permanent lay-out. The room will be functional again in January.**

The Companion Animal Hemodialysis Center, on the third floor of the Ryan Hospital, has three "beds," or stations, and two dialysis machines that can run simultaneously. The third bed can be used to prepare a patient while another finishes its treatment. The machines are identical to those used in human dialysis units, but have been modified for animals using human neonatal and pediatric blood circuits; only those parts that connect the animals to the machines were adapted—pediatric equipment is used for dogs, and neonatal equipment for cats. (Very large dogs can be treated with an adult circuit.) The School has also purchased water-treatment apparatus (a reverse osmosis machine) to cleanse the city water before it comes into contact with the patient's blood, and state-of-the-art monitoring equipment—"rivaling most human facilities," notes Dr. Groman—to measure blood pressure, volume status, and coagulation status.

In preparation, Dr. Groman trained at the University of California, Davis for six months, between September 2002 and March 2003, under the tutelage of Dr. Larry Cowgill, who has trained every veterinarian presently performing hemodialysis anywhere.