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## Inherited Immunodeficiency in Irish Settlers

shrink or eliminate the tumor. Cindy received a five-day infusion of chemotherapy drugs. A course of radiation treatment lasting longer than a month was also prescribed. This was administered by Dr. Sydney Evans.

As her treatment had to be performed at VHUP, Cindy became a regular resident. "We visited her once a week as we live three hours away," said Ms. Duarte. "The dog was cheerful and seemed pleased to see us. She obviously knew all the nurses and her way around the ward. She seemed quite comfortable during her stay and was not fretting or whining when we left."

Cindy stayed at VHUP for eight weeks. "When she left, many staff members came to say 'Good Bye,'" said Ms. Duarte. "It was quite emotional and I never expected the concern all these people showed for our dog." Cindy is home now and her hair is growing back. She was sent home with two courses of chemotherapy which are being administered by her veterinarian. Her blood is being monitored weekly to catch any adverse effects quickly. "Our veterinarian has worked closely with the specialists at Penn, and getting the follow-up treatments at his office has made it easier for us."

Recently, Cindy returned to VHUP for another CT scan. It showed no evidence of the tumor. "We are elated," said Ms. Duarte. "The dog is her old self, her memory has returned, and she can do her obedience exercises. She acts like a three-year-old. We are even thinking about taking her into the show ring again, in the veteran's class!"

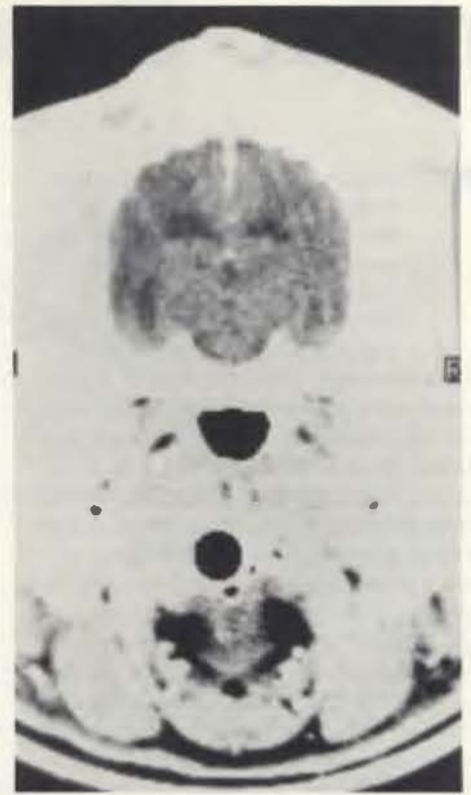
Cindy is not the norm. "She is a lot younger than our other brain surgery patients," said Dr. Dayrell-Hart. "Most of the cats and dogs we operate on are much older and not as good risks. But we have had a good

rate of success." Most frequently, surgery is just part of the treatment, as in the case of Cindy, animals often also receive chemotherapy and radiation treatment. "We have some patients which were treated for brain tumors three years ago; there are others who lived only another year longer. But with each patient we learn more, and this helps the next case," said Dr. Dayrell-Hart. "We ask the owners to bring the animal back if it is failing. If it has to be euthanized, we do it here and then conduct an autopsy. This helps us evaluate the treatment and ascertain the changes in the brain. Owners do go along with this as they realize that this knowledge will help another animal."

When Ms. Duarte was asked whether she would have another dog treated should the problem ever arise again, she said that she didn't know. "Cindy is special to us and we wanted to do anything to save her. But it was an emotionally draining experience and I don't know whether I could face that again, the worry, the shock seeing her with her head shaved, and the concern as to whether she might be suffering. It is hard."

Dr. Dayrell-Hart and her colleagues are cautiously optimistic about Cindy's prognosis. "We think that it was a primary lymphoma. Blood and bone marrow tests show no evidence of other tumors." Neurosurgery in small animals is a new field, and each case contributes to the knowledge. "We are fortunate in that we have the different specialists here and the physicians from CHOP. Without all these people, a case like Cindy's could not have been treated here."

Dr. Dayrell-Hart graduated from Penn in 1983. She completed her residency in neurology here last year and was appointed a lecturer in medicine.



CT-scan, posttreatment.

## Inherited Immunodeficiency in Irish Setters

Ten years ago, a syndrome characterized by recurrent bacterial infections and very high white blood cell counts was reported in young Irish setters. Their white blood cells were apparently unable to kill bacteria. But the molecular defect has only recently been elucidated by researchers at the School of Veterinary Medicine of the University of Pennsylvania.

Over the last two years, Dr. Urs Giger, assistant professor of medicine and medical genetics, and Dr. Mark A. Bronslein (V'73), a practitioner in Ardmore, PA, have been treating an inbred Irish setter cross which has chronic recurrent bacterial infections. Since a few weeks of age, the dog has had a variety of infections, including skin, gum and bone infections, pneumonia, and recently pyometra. They appeared poorly responsive to antibiotics, the only treatment presently available. "Interestingly, the white blood cell or leukocyte count of this dog was always incredibly high, being at times over 200,000," said Dr. Giger. "Such leukocyte counts are generally only seen in dogs with leukemia. These leukocytes were obviously unable to fight any infection, although they appeared morphologically normal and were present in large numbers."

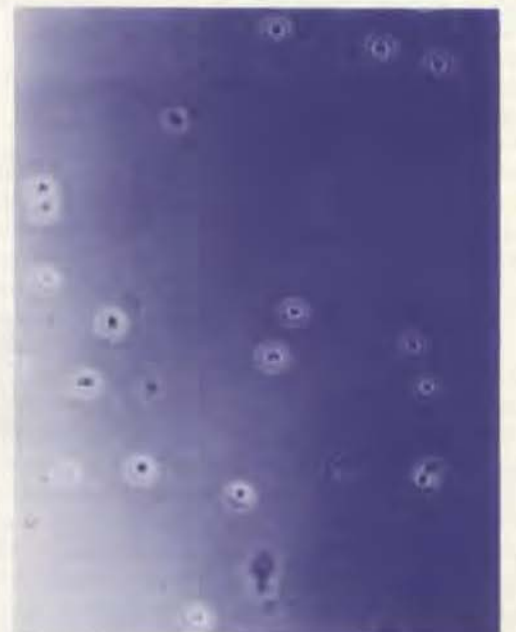
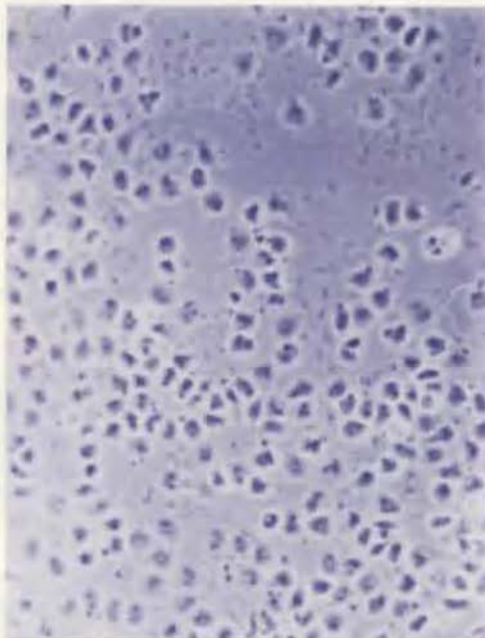
Dr. Giger and his collaborators, therefore, studied the function of these leukocytes and found that they had diminished capability of adhering to any surface because adhesion-promoting proteins on their cell surface were missing. "The process of adhesion is vital in the function of leukocytes and includes cell adher-

ence to blood vessel walls, cell migration to the site of infection, and binding of bacteria," explained Dr. Giger. "Our patient's leukocytes remained in the blood stream because they were unable to travel to the infected tissue and kill bacteria."

Based on data of limited functional and monoclonal antibody studies from related dogs, this disorder appears autosomal recessive inherited and occurs rarely in the Irish setter breed. A leukocyte adhesion defect

similar to the disorder in this dog has also been reported in children with recurrent infections.

Dr. Giger presented the results of these studies at the National Meeting of the American Society of Hematology in San Francisco. The leukocyte adhesion deficiency in Irish setters is only one of the inherited immunodeficiency syndromes recognized and investigated in dogs by members of the Section of Medical Genetics here at the School.



White blood cell adhesion to plastic surface; cells from control dog adhere readily and spread on surface (left), whereas few cells from the affected dog are adhering (right).