

## **OSTEOSARCOMA VACCINATION RESEARCH AT UPENN**

**Dr. Nicola Mason BVetMed PhD DACVIM**

Osteosarcoma is a common, highly aggressive bone cancer that most frequently affects the long bones of large and giant breed dogs. Even with standard of care treatment which involves amputation of the affected limb and chemotherapy, the median survival of canine patients is 12 months. Most dogs succumb to metastatic disease associated with early spread of the cancer from the primary tumor site. Researchers at the University of Pennsylvania's School of Veterinary Medicine led by Dr. Nicola Mason, in collaboration with Advaxis Corp. are now evaluating the use of a vaccine that is aimed at eliminating cancer cells that survive after chemotherapy. The vaccine is composed of a genetically modified bacteria called *Listeria* that expresses a tumor marker known as Her2/neu. The concept behind the vaccine is that the bacteria will stimulate the patient's immune system to kill the bacteria and also to kill cells that express Her2/neu. This target is expressed on approximately 40% of canine osteosarcomas. If the immune system is appropriately 'awakened' by this vaccine, then it is expected that immune cells will find and eliminate any remaining cancer cells that have avoided the standard chemotherapy. Furthermore, it is hoped that the immune system will develop a 'memory' of these cancer cells and will be able to prevent further osteosarcoma lesions developing. This vaccine approach has shown promise in pre-clinical mouse studies conducted by Professor Yvonne Paterson of the University of Pennsylvania's School of Medicine and in early clinical trials in people with end stage cervical cancer, conducted by Advaxis Inc., the biotechnology company that has developed the *Listeria* vaccine platform.

The osteosarcoma vaccine is administered intravenously to dogs that have been diagnosed with osteosarcoma that has been shown to express the Her2/neu target. Each patient receives three vaccines, three weeks apart and patients are then followed every 2 months to determine whether the vaccine has prevented the usual recurrence of cancer in the lungs. To date, two dogs have been vaccinated with the recombinant her2/neu expressing bacterial vaccine. Both dogs have done extremely well, with no serious side effects noted at the time of administration. The first dog to receive the vaccine was Sasha, a 12 year old American Bulldog from North Carolina. Sasha's owners have been writing a blog on Sasha's treatment and progress (and the treatment and stories behind the other dogs that are participating in this clinical trial) and you can read more about the vaccine and how Sasha responded to it at: <http://lilisnotes.com/sashas-second-treatment-mason-bone-cancer-study>. The clinical trial aims to enroll a minimum of 9 dogs and a maximum of 18 dogs. Currently, 7 dogs are enrolled in the study with the third dog scheduled to be vaccinated in September. More information about the study including eligibility requirements and study benefits can be found at: <http://www.vet.upenn.edu/FacultyandDepartments/Pathobiology/ClinicalTrialsinPathobiology/CancerVaccineforDogswithOsteosarcoma/tabid/2345/Default.aspx>

Success of the vaccine will be judged by its ability to 1) stimulate immune responses against Her2/neu and 2) prolong overall patient survival.

Please contact Dr. Nicola Mason at 215 898 3996 or [nmason@vet.upenn.edu](mailto:nmason@vet.upenn.edu) if you are interested in participating in this clinical trial.