

## Therapeutic canine lymphoma vaccine produces anti-cancer response in dogs treated with chemotherapy

Michael Lawman<sup>1</sup>, Alice Villalobos<sup>2</sup>, James Hughes<sup>3</sup>, Mary Felt<sup>4</sup>, Curtis Kane<sup>5</sup>, Shabnam Eidizadeh<sup>1</sup>, Christopher Selmon<sup>6</sup> and Pat Lawman<sup>6</sup>. <sup>1</sup>St. Joseph's Children's Hospital, Tampa, FL, <sup>2</sup>Pawspice, Hermosa Beach, CA, <sup>3</sup>Armenia Animal Hospital, Tampa, FL, <sup>4</sup>Dupont Animal Hospital, Villa Park, IL, <sup>5</sup>Florida Veterinary Specialists, Tampa, FL, and <sup>6</sup>Morphogenesis, Inc., Oldsmar, FL

Lymphoma is most common in middle-aged dogs of certain breeds but crosses all ages/breeds and can occur in otherwise healthy animals. At diagnosis, tumors are usually multicentric and of significant mass. Chemotherapy can be effective in reducing tumor mass, inducing remission and increasing longevity in some dogs but is not a cure. Alternatively, immunotherapy has the potential to cure canine lymphoma but is impeded by the aggressive nature of the disease, tumor mass/number and poor prognosis. It is postulated that chemotherapy followed by immunotherapy might provide the most efficacious approach to treating this disease. The caveat to this hypothesis is whether patients treated with chemotherapy can still mount a robust anti-tumor response.

The current study compares the anti-tumor response in patients receiving **ImmuneFx-CL**<sup>™</sup> canine lymphoma vaccine alone versus those receiving chemotherapy and vaccine. **ImmuneFx-CL** is an immunotherapy based on autologous tumor cells from tissue biopsy or needle aspirate engineered to express Emm55, a *Streptococcus pyogenes* serotyping antigen. **ImmuneFx-CL** was administered to 16 canine lymphoma patients of various breeds, each with naturally-occurring disease. A vaccine dose of  $3 \times 10^7$  irradiated tumor cells was given once per week for 4 weeks and then monthly. Humoral immunity was assessed by semi-quantitative Western and dot-blot immunoassays. Cell-mediated immunity to autologous tumor cells was assessed by CTL assays. Clinical response was assessed by standard measurement criteria.

All patients in this study, regardless of treatment regimen, generated significant humoral and cellular anti-tumor responses.

Combination of chemotherapy and **ImmuneFx-CL** is a viable treatment option for canine lymphoma.