# AbstractID: 13065 Title: Intra-patient response heterogeneity using FLT PET during chemotherapy in canine subjects with lymphoma

**Purpose:** PET is routinely used for treatment response assessment in lymphoma after the completion of therapy. However, characterization of lymph node response heterogeneity during therapy could result in treatment modification to improve outcome. We used PET during chemotherapy to assess intra-patient response heterogeneity in canine subjects with lymphoma.

**Method and Materials:** Nine dogs with lymphoma were treated with GS-9219, a novel antineoplastic agent preferentially targeting proliferative lymphoid cells. Using the cellular proliferation marker [$^{18}$F]FLT, whole-body PET/CT scans were acquired pre-treatment and after 1, 3, and 5 chemotherapy cycles. Lymph nodes (~16/dog) were segmented on CT images and these contours were applied to PET images to extract mean and maximum SUV for each node. Lymph node response was defined as relative change in SUV. For each dog, nodal responses and baseline values were normalized to their respective means. Heterogeneity was measured using the coefficient of variation (CV) and range of nodal responses and baseline values.

**Results:** Intra-patient heterogeneity of lymph node baseline values and responses were substantial. Within each dog, the average variation of mean SUV baseline values (CV: 30%) was slightly less than that of response (CV: 40%). Similar heterogeneities were measured using maximum SUV. There was no significant correlation between heterogeneities of baseline uptake and response ($p=0.3$). Individual dogs responded differently to treatment as some responses were very heterogeneous (most heterogeneous, CV: 115%) while others were quite uniform (least heterogeneous, CV: 5%). Response heterogeneity increased throughout therapy with CV of 35% after 1 chemotherapy cycle, 55% after 3 cycles, and 60% after 5 cycles. Heterogeneity trends measured using CV and ranges were consistent.

**Conclusions:** During chemotherapy, there was substantial intra-patient response heterogeneity (~40%) in dogs with lymphoma. Early PET assessment of nodal response heterogeneity may identify poorly responding lymph nodes, permit early intervention, and improve outcomes in lymphoma patients.