Genomic Guided Use of Gilvetmab Achieves Sustained Remission in Recurrent Canine Pulmonary Carcinoma

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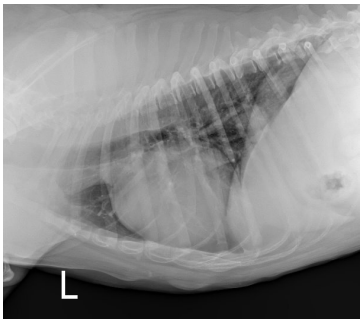
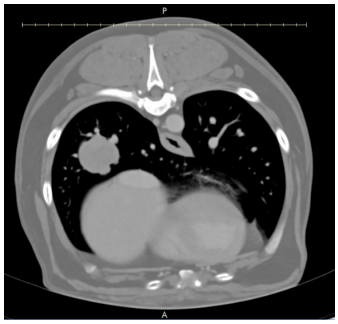
Case Background

Petey is a 14-year-old Pit Bull who was first diagnosed with a grade 1 pulmonary carcinoma in Fall 2023. The tumor was surgically removed with clean margins. During routine surveillance imaging in October 2024, chest X rays identified a new pulmonary lesion overlying the diaphragm, concerning for tumor regrowth. Petey underwent a thoracic CT scan which showed a solitary regrowth with no evidence of pulmonary or lymph node metastasis. He had a second thoracotomy and lobectomy surgery, and histopathology confirmed a grade 2 pulmonary carcinoma. Given the more aggressive histologic features, Dr. Boostrom and his care team pursued Canine Comprehensive Genomic Profiling (CGP) in November 2024 to evaluate targeted therapeutic options.

Below are CT scan images prior to Petey's second surgery, and poor Petey after his second surgery






Genomic Findings and Interpretation

Canine CGP was performed on the recurrent tumor and revealed multiple genomic alterations consistent with aggressive disease biology. Two TP53 alterations were identified, including a frameshift mutation (Leu360fs) and a copy number loss. In addition, inactivating mutations and copy number losses were detected across several genes involved in double strand DNA repair, including ATR, NBN, RAD51C, FANCL, and CHEK1. Together, these findings suggested a Homologous Recombination Defect (HRD) and potential sensitivity to PARP inhibition, such as olaparib.

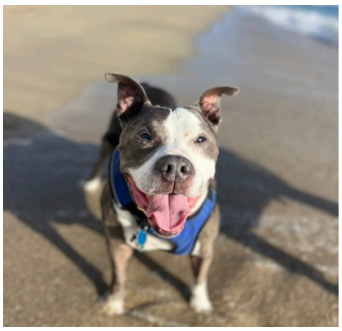
Importantly, Petey's tumor demonstrated a very high tumor mutational burden (TMB), measured at 145 mutations per megabase, representing the third highest TMB observed in our cohort of more than 500 sequenced canine cancers. This finding supported potential sensitivity to immune checkpoint inhibitors.

Based on these results, three treatment options were recommended: gilvetmab, olaparib, and ibrutinib, with gilvetmab prioritized as first-line therapy.

Precision Medicine in Action: Treatment and Clinical Response

Petey began gilvetmab therapy on December 5, 2024, and completed a total of five treatments. He has remained in sustained complete remission for twelve months and continues to do well clinically. This outcome exceeds typical expectations for recurrent grade 2 pulmonary carcinoma following repeat surgical resection.

Here is Petey enjoying his life after gilvetmab treatment



Why This Matters

Petey's case highlights the clinical value of genomics guided therapy in veterinary oncology. Canine CGP identified biologically meaningful features, including high TMB and HRD, that expanded therapeutic options beyond standard management. His sustained remission with gilvetmab provides encouraging support for the hypothesis that immunotherapy may be particularly effective in canine tumors with elevated tumor mutational burden (TMB). One limitation of anti-PD1 therapy to date has been a relatively low objective response rate - 46% for mast cell tumors and 20% for melanomas. Genomic guidance could be a powerful tool in determining which patients are most likely to benefit. Additional options from Petey's CGP results, including PARP inhibitor therapy, remain rational should future treatment be required.