Genomic Insights Guide Successful Treatment in a Challenging Case of Metastatic Canine Melanoma

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Case Background

Lucy, a happy and active 13-year-old Golden Retriever, was found to have two lesions on her left forelimb in July 2024. Histopathology confirmed cutaneous malignant melanoma, with high Ki-67 indices of 19.6% and 48.4%, indicating aggressive biological behavior. Surgery was performed, but with incomplete margins. Lucy was started on Oncept melanoma vaccine postoperatively.

In December 2024, a new mass developed on Lucy's left lateral shoulder. Cytology and histopathology confirmed metastatic malignant melanoma, with a mitotic index exceeding 100 per 10 high-power fields (2.37 mm^2) and evidence of lymphatic invasion, hallmarks of highly aggressive disease.

To explore further treatment options, VetOmics' Canine Comprehensive Genomic Profiling (CGP) was pursued.

Genomic-Guided Treatment Recommendations

Canine CGP revealed:

- Extensive copy number alterations
- Low tumor mutation burden (TMB)

Among the most prominent alterations were high-level gains in CDK4 and CDK6, supporting the use of palbociclib, a CDK4/6 inhibitor, as a rational, targeted therapy.

Additional prioritized options included:

- Sirolimus (based on AKT1 alteration)
- Imatinib (based on CTNNB1 alteration)
- Olaparib (based on MSH3 alteration)

Notably, due to Lucy's low TMB and absence of appropriate predictive biomarkers, immunotherapy was not recommended.

Precision Medicine in Action

Lucy began single-agent palbociclib therapy in January 2025, administered orally at 0.2 mg/kg once daily by her owner at home.

At her most recent follow-up in June 2025, Lucy remains clinically stable, with no evidence of disease progression. She continues to be active, comfortable, and in good spirits, demonstrating a durable response to therapy more than five months after starting treatment.

"Success! Lucy on palbociclib. Going strong!"
— Dr. Janet Carreras

Why This Matters

In this case, VetOmics' Canine CGP identified putative driver alterations that supported the use of palbociclib, which led to a strong and sustained clinical response in an aggressive, metastatic melanoma. Additional genomically informed therapies were also identified as backup options, providing a rational framework for future treatment decisions if needed.

Key take home point

While Lucy responded well to palbociclib due to CDK4/6 copy number gains, not all canine cutaneous melanomas carry the same alterations or respond similarly.

Moreover, Lucy's case exhibited that canine cutaneous melanoma could exhibit a low tumor mutation burden (TMB), in contrast to human cutaneous melanoma, which is often characterized by high TMB and better response to immunotherapy. This underscores the importance of tumor-specific genomic profiling to inform personalized and effective treatment strategies for pets.