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Immune phenotyping of canine peripheral leukocytes by mass cytometry

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Abstract

Dogs are a key non-rodent species in preclinical safety studies, especially in pharmaceuticals, due to their close physiological, metabolic, and immunological resemblance to humans. Consequently, immunophenotyping canine peripheral blood mononuclear cells (PBMCs) is vital for translational research, immune monitoring, and safety assessments in drug development. However, the limited availability of canine-specific antibodies restricts detailed and accurate immune profiling, which is essential for advancing safety evaluations in drug development.

To address this challenge, we developed a 15-marker panel for comprehensive mass cytometry-based immunophenotyping of cryopreserved canine PBMCs. This panel covers major leukocyte subsets, including B cells, CD4+ T helper cells, regulatory T cells, CD8+ cytotoxic T cells, memory T cell subsets, natural killer T cells, natural killer cells, dendritic cells, CD4+ monocytes, classical monocytes, and neutrophils. The panel was rigorously optimized and validated on both the CyTOF XT® and Lunarion® mass cytometry platforms, demonstrating consistent performance across instruments. Importantly, the implementation of mass cytometry allows the generation of a backbone panel, to which additional markers can be added without extensive panel design or modification of the backbone itself.

The poster presents the full gating strategy applied on both CyTOF XT® and Lunarion® instrument and provides a comparative analysis of leukocyte subset frequencies as assessed by both mass cytometry platforms.