

CURRENT PERSPECTIVE IN MULTIPARAMETER CYTOMETRY AND DATA ANALYSIS

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The human immune system is comprised of a diverse and interactive network of specialized cells localized in diverse tissues throughout the body, where they mediate protection against pathogens and environmental insults while maintaining tissue homeostasis. During the last decade, we witnessed an exponential increase of novel technologies that are able to deliver an in-depth profiling immune profiling of T and B cells. High-dimensional single-cell technologies, such as multiparameter flow cytometry, mass cytometry, genomic and proteomic cytometry are the key techniques that hold a great promise for deciphering complex immunological processes. Thousands of transcripts and proteins confer function and discriminate cell types in the body. Using high-parameter technologies, we can now measure phenotype and genotype markers at once in single cell level.

In order to analyze this high dimensional data number of automated gating strategies were developed to replace manual gating. With the aid of dimensionality reducing and clustering algorithms to visualize and analyze, this allows for a more comprehensive picture of the different cell populations involved in the immune response, at a single cell resolution level. This undoubtedly leads to the discovery of new biomarkers and techniques to be applied in clinical immunology.

In this presentation, we discuss the impact of new cytometry techniques for in-depths insights into the dynamics of immune response obtained from static snapshot data and to provide tools to immunologists to address the high dimensionality of their single-cell data.