

## Biomarkers of FOXP3+ Treg cell (dys) function in human health and disease

**Ciriaco A. Piccirillo**  
McGill University, USA

Biomarkers of the immune dysregulation that underlies human autoimmunity and chronic inflammatory are poorly defined. CD4+ Treg cells, constitutively expressing IL-2R $\alpha$  (CD25) and the FOXP3 transcription factor, are a major player in the maintenance of immune tolerance and control of autoimmunity. A developmental or functional Treg cell defect is believed to underlie many human autoimmune diseases. The discrimination of dysfunctional Treg cells, relative to their functional counterparts and other T cell subsets, in human autoimmunity has always been a major caveat due to the lack of specific and stable markers. Thus, clinical markers for Treg mediated immune regulation would greatly aid the development of therapeutics for functional potentiation of these cells in inflammatory contexts. Recently, we developed a state-of-the-art single cell strategy to examine the genetic, phenotypic, and functional heterogeneity of the Treg population at the clonal level. Our novel strategy has enabled us to identify unique functional and genetic signatures amongst FOXP3+ Treg cell subsets from healthy individuals, and in states of disease. We have identified several transcriptional modulators potentially involved in the induction, maintenance or effector activity of FOXP3 expression, and likely involved in the stability of FOXP3+ Treg cell function. Notably, some gene candidates encode cell surface antigens whose expression can potentially be used to detect and isolate functional and dysfunctional FOXP3+ Treg cells, relative to conventional pathogenic T cells, from PBMC. Our functional analysis of unstable Treg cells has provided us with a unique opportunity to delineate the mechanisms underlying the instability of FOXP3 expression in the Treg lineage, as well as identifies the markers that relate with Treg functionality.

### Biography

Piccirillo is an immunologist who trained at the reputed Laboratory of Immunology, National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH). He is currently Associate Professor and Principal Investigator of the Laboratory of Immunoregulation unit at the Research Institute of the McGill University Health Center (RI-MUHC). He is currently co-Leader of the Infection and Immunity Axis at the RI-MUHC. He is also Director of the Immunophenotyping platform for the RIMUHC. Moreover, he is the Director of McGill's FOCIS Center of Excellence in Translational Immunology and Therapeutics whose mission is to support basic and clinical research in immunology.

[ciro.piccirillo@mcgill.ca](mailto:ciro.piccirillo@mcgill.ca)